Final Staff Assessment

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CALIFORNIA ENERGY COMMISSION

CARLSBAD ENERGY CENTER PROJECT

Application For Certification (07-AFC-6)
San Diego County

STAFF REPORT

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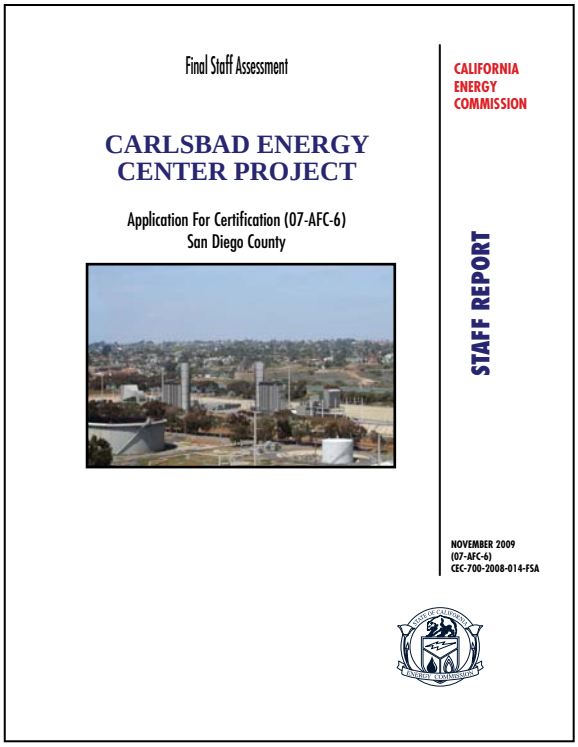

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Carlsbad Energy Center Project
(07-AFC-6)
FINAL STAFF ASSESSMENT

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EXECUTIVE SUMMARY

Mike Monasmith

INTRODUCTION

This Final Staff Assessment (FSA) contains the California Energy Commission (Energy Commission) staff's evaluation of the Carlsbad Energy Center Project (CECP) Application for Certification (07-AFC-6). The proposed 558-megawatt (MW) CECP electric generating plant and related facilities cannot be constructed or operated without the Energy Commission's certification. This FSA examines engineering, environmental, public health, and safety aspects of the CECP 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 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 Environmental Impact Report (EIR).

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

This FSA is not the decision document for these proceedings, nor does it contain findings of the Energy Commission related to environmental impacts or the project's compliance with local/state/federal legal requirements. The FSA serves as staff's testimony in evidentiary hearings to be held by the Committee assigned to this proceeding, comprised of two Commissioners and a Hearing Officer. After evidentiary hearings, the Committee will consider testimony and comments presented by staff, the applicant, other parties to the proceeding, governmental agencies and the public – all aspects that comprise the official record of this proceeding -- and issue a Presiding Member's Proposed Decision (PMPD). Following a public hearing, the full five-member Energy Commission will make its final decision on this power plant application based upon the PMPD, the evidentiary record, comments by parties to the proceeding and input from members of the public.

PROJECT LOCATION AND DESCRIPTION

The 23-acre CECP would be located on the northeast section of the 95-acre Encina Power Station (EPS), located along the western, coastal border of the City of Carlsbad in northern San Diego County. The CECP will use high-efficiency, combined-cycle power generation units (CECP Unit 6 and 7) fueled by natural gas.

The proposed site is currently occupied by the EPS east tank farm, which includes above-ground fuel oil Tanks 5, 6, and 7. As proposed by the applicant, these fuel oil

tanks would be demolished and removed, and the soil upon which the tanks currently stand would be remediated, as appropriate. The EPS has been in operation since the early 1950s and periodically expanded. EPS Units 1, 2, and 3 would be permanently retired once the CECP is approved and operational. EPS Units 4 and 5, part of a subsequent EPS expansion that occurred in the late 1970s, would continue generating electricity regardless of this proceeding or its outcome. CECP construction is proposed to begin during the first or second quarters of 2010, and take 25 months to complete. The applicant expects commercial operations to begin by summer of 2012. **Project Description Figure 2A** is the project site and vicinity map.

The CECP would connect its nominal 540 MWs of electricity to the existing Encina 138-kilovolt (kV) switchyard, with minor modifications to accommodate the electricity needs of the recently approved Carlsbad Seawater Desalination Project. CECP would also connect generation to a proposed new Encina 230-kV switchyard. Transmission interconnections to both switchyards would be comprised of an overhead line from CECP Unit 6 to the 138-kV switchyard, and a combined above and below-ground cable from CECP Unit 7 to the proposed new 230-kV switchyard located at San Diego Gas & Electric's Cannon Substation, immediately south of the CECP site. **Project Description Figure 3** shows the general arrangement of the proposed transmission system, as conceived by the applicant, as well as the overall CECP plot plan.

Natural gas would be provided through a new 1,100-foot long interconnection to an existing Southern California Gas Company high pressure natural gas line located adjacent to the CECP site. The new CECP units would be natural gas-fired only with no fuel oil emergency backup capability.

The new CECP facility would be air-cooled, eliminating the traditional use of large quantities of once-through cooling seawater. The minimal water necessary for CECP's industrial purposes would be provided either through reclaimed water or by desalinated water produced on-site via an ocean water purification system. Reclaimed water and associated wastewater discharge could potentially be provided by the Carlsbad Municipal Water District. Alternatively, a proposed desalination system would utilize EPS' existing, permitted ocean water intake and discharge facilities. Both potential sources of CECP's industrial water needs, as well as permitted stormwater contingencies for the project's construction and operation, are outlined and specifically addressed in the **Soil and Water** section of this staff assessment. Potable water (suitable for drinking and showering) for the proposed project would be obtained through the Carlsbad Municipal Water District.

Associated CECP equipment would include an emission control system necessary to meet emission limits. Nitrogen oxide (NO_x) emissions would be controlled at the power plant's stack by a combination of ultra-low NO_x combustors in the selective catalytic reduction systems and are addressed in the **Air Quality** section of this staff assessment. **Project Description Figures 4** and **5** illustrate the local and regional setting of the proposed project.

PUBLIC AND AGENCY COORDINATION

On September 17, 2007, the Energy Commission staff provided the CECP description and AFC to a comprehensive list of libraries, agencies, organizations, and property owners within 1,000 feet of the proposed project and 500 feet of the linear facilities. The Commission staff's notification letter requested public and agency review, comment, and continued participation in the Energy Commission's certification process.

In addition, the Public Adviser's Office (PAO) of the Energy Commission provided notification by letter and enclosed notice of the December 17, 2007 Informational Hearing and Site Visit held at the Faraday Center in Carlsbad. Outreach by the PAO and the City of Carlsbad was conducted for city residents, representatives of environmental, Native American, and local public interest and regulatory organizations, and others with an expressed or anticipated interest in this project. Also, elected and certain appointed officials from the City of Carlsbad and San Diego County were similarly notified of the hearing and site visit. The PAO also contacted the *North County Times* newspaper and arranged to have a one-page flyer distributed to Carlsbad subscribers regarding the December 17, 2007 Information Hearing and Site Visit.

On January 24, 2008, staff conducted a publicly noticed Data Response and Issues Resolution workshop at the City of Carlsbad's Dove Library complex. Topics discussed included air quality, cultural resources, land use, noise, transmission systems engineering, soil and water resources, visual resources, and waste management. Participating agencies in the workshop included several City of Carlsbad agencies and the San Diego Air Pollution Control District. Representatives from intervenor California Unions for Reliable Energy (CURE) also participated in the day-long workshop, as did dozens of Carlsbad residents and interested citizens.

On March 26, 2008, staff conducted a second publicly noticed Data Response and Issue Resolution workshop at the Hilton Gardens in the City of Carlsbad. Topics discussed included air quality, cultural resources, hazardous materials management, land use, traffic and transportation, public health, soil and water resources, visual resources, and waste management. Participating agencies in the workshop included several City of Carlsbad public agencies and the San Diego Air Pollution Control District, as well as members of the public.

On September 7, 2008, staff distributed the revised CECP project description and components as described in the applicant's July 25, 2008 Supplement to the AFC, called the Project Enhancements and Refinements (PEAR) package. The PEAR supplement was distributed to a comprehensive list of libraries, agencies, and organizations, and a notice of this supplement was mailed to agencies, libraries and property owners within 1,000 feet of the proposed project and 500 feet of the linear facilities. The supplement was also made available to hundreds of individuals through the Energy Commission's *listserve* e-mail alert system. Modifications to the proposed AFC consist of an increase in stack height from 100 feet to 139 feet; an alternative industrial water proposal that would desalinate and purify seawater on-site; a single, 25-

month construction schedule; and waste management clarifications for the demolition of EPS Tanks 5 through 7 and the remediation of associated soil. The PEAR also included the proposal to construct a new 230-kV switchyard and other transmission interconnection upgrades on the CECP site and adjacent San Diego Gas & Electric (SDG&E) Cannon substation.

In addition to multiple staff workshops and meetings, staff has received an unprecedented volume of correspondence from other local, state, and federal agencies that have an interest in the project, including the City of Carlsbad (and several of its departments, including the Carlsbad Fire Department), San Diego County Department of Environmental Health, San Diego Air Pollution Control District, San Diego Regional Water Quality Control Board, North (San Diego) County Transit District, California Department of Transportation, California Coastal Commission, California State Lands Commission, California Department of Fish & Game, United States Fish & Wildlife Service, National Marine Fisheries Service, and the Federal Aviation Administration. Staff has also considered the extensive comments from Intervenors to the proceeding, community groups, and individual members of the public over the past two years of discovery and analysis leading up to the publication of this Final Staff Assessment.

LIBRARIES

On November 7, 2007, the Energy Commission sent the Carlsbad Energy Center Project AFC to the Carlsbad City Library on Dove Lane and the Georgina Cole City Library on Carlsbad Village Drive. The AFC and supplemental material was also sent to state libraries in Eureka, Fresno, Los Angeles, Sacramento, San Diego, and San Francisco.

ENVIRONMENTAL JUSTICE

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

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

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

- the minority population of the affected area is greater than 50% of the affected area's general population; or
- the minority population percentage of the area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis.

The **Socioeconomics** section of this staff assessment shows a total minority population of 27.32 percent within one mile of the CECP site. Within a six-mile buffer, staff identified a 35.84 percent minority population. Several census blocks with a minority population of greater than 50 percent exist within the six-mile boundary. Despite a total minority population less than the 50 percent threshold, staff's environmental justice outreach was nonetheless incorporated into its overall analysis and outreach activity facilitated by the Energy Commission's Siting Office, and Public Adviser's Office.

STAFF'S ASSESSMENT

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

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

Staff has prepared its final analyses and has made recommendations for all technical areas.

SUMMARY OF PROJECT RELATED IMPACTS

Staff believes that as currently proposed, including the applicant's proposed mitigation measures and the staff's multiple proposed conditions of certification, the CECP project would comply with all applicable laws, ordinances, regulations, and standards (LORS). Staff has also concluded that significant adverse direct, indirect, and cumulative impacts would not occur, and/or can be brought to a level of less than significant. For a more detailed review of potential impacts, see staff's technical analyses in the FSA. The status of each technical area is summarized in the table below.

Technical Area	Complies with LORS	Impacts Mitigated
Air Quality	Yes	Yes
Biological Resources	Yes	Yes
Cultural Resources	Yes	Yes
Efficiency	Yes	Yes
Facility Design	Yes	Yes
Geology & Paleontology	Yes	Yes
Hazardous Materials	Yes	Yes
Land Use	Yes	Yes
Noise and Vibration	Yes	Yes
Public Health	Yes	Yes
Reliability	Yes	Yes
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

ALTERNATIVES SUMMARY

The "Guidelines for Implementation of the California Environmental Quality Act," Title 14, California Code of Regulation, Section 15126.6(a), provides direction by requiring an evaluation project alternatives to the CECP, which may include project site alternatives, as well as alternative generation technologies. The FSA includes such an alternatives analysis, including site alternatives. The alternative sites would not significantly reduce or avoid CECP impacts, and are not environmentally superior.The analysis also addresses the "no project" alternative (Cal. Code Regs., tit. 14, §15126.6(e)).

In addition to alternative project sites, Staff's analysis included examining alternative energy producing technologies. However, alternative technologies did not meet the objectives of the project, and the impacts of CECP can be mitigated such that its impacts are less than significant. Nornor is the "No Project Alternative" superior to the proposed project. The No Project scenario would not address the projected need for

load pocket capacity in the San Diego Gas & Electric service area necessary for electric reliability and to support intermittent renewable generation located inland. Moreover, it would fail to modernize and replace Encina's aging electric generation infrastructure to make it more efficient and reduce the need for "once through" cooling with ocean water.

NOTEWORTHY PUBLIC BENEFITS

CECP offers the following public benefits:

- facilitating the retirement of existing EPS Units 1 through 3;
- utilizing existing EPS infrastructure to reduce environmental impacts and costs;
- eliminating the daily need for millions of gallons of once-through ocean water cooling, and its associated fish impingement and biological impacts (entrainment);
- meeting the need for new, more efficient, reliable electrical generating resources located in a critical load center of the San Diego region by modernizing existing aging electrical generation infrastructure in north coastal San Diego County; and,
- accomplishing a *brownfield (*land that has already been developed as an industrial use) redevelopment of an existing power plant for a net increase in electrical generation capacity.

Staff has identified additional noteworthy socioeconomics public benefits that would include both short term construction-related and long term operational-related increases in local expenditures and payrolls, as well as sales tax revenues.

RECOMMENDATIONS

The FSA is a document of the Energy Commission staff so, by its very nature, the conclusions and recommendations presented are considered staff's analysis of the project and its official testimony.

Each technical area assessment in the FSA includes a discussion of the project and the existing environmental setting; the project's conformance with laws, ordinances, regulations and standards (LORS); whether the facility can be constructed and operated safely and reliably; project specific direct and cumulative impacts; the environmental consequences of the project using the proposed mitigation measures; conclusions and recommendations; and any proposed conditions of certification under which the project should be constructed and operated, should it be approved.

In summary this FSA finds that:

- As shown in the above table, the project is in conformance with all LORS.
- The proposed project area is a highly disturbed area with no sensitive biological resources. The proposed laydown areas and linear facilities are similarly developed or barren. Direct impacts to biological resources at the project site are unlikely because of the developed nature of the area.

- Implementation of the Energy Commission staff's proposed conditions of certification is necessary to avoid or minimize potential indirect impacts to biological resources. The project would not result in take of listed species and no wetlands or other waters of the United States will be directly impacted by the project.
- The construction and operation of the CECP would comply with all federal, state, and local laws, ordinances, regulations, and standards relating to biological resources if staff's conditions of certification are adopted and implemented.
- The proposed Carlsbad Energy Center Project, with the effective implementation of the recommended condition of certification, would be consistent with the applicable laws, ordinances, regulations, and standards pertaining to local land use planning and would not generate a significant impact under the California Environmental Quality Act guidelines with respect to the act's Appendix G issues, "Land Use and Planning" and "Agriculture Resources."
- Transmission system impacts and appropriate mitigation have been fully identified at this point and are acceptable and would comply with all applicable laws, ordinances, regulations, and standards. The project interconnection to the grid would not result in downstream transmission impacts.
- Energy Commission staff has determined that the proposed project is consistent with the applicable land use LORS including the Carlsbad General Plan, Municipal Code and Zoning Code, Specific Plan 144, Precise Development Plan 06-02, the Aqua Hedionda Land Use Plan, and the South Carlsbad Coastal Redevelopment Plan; and is consistent with the development pattern for the area established by the General Plan, Muncipal Code and Zoning Code and the various plans noted above. In addition, the proposed CECP would be compatible with existing on-site or nearby uses, as it is consistent with the general character of these permitted uses and the planned development pattern for the City's Main Street Industrial Corridor. Staff is proposing Condition of Certification **LAND-1** to ensure the project is constructed and operated in accordance with the City's minimum Industrial zoning code standards, to the extent feasible.
- The San Diego Air Pollution Control District has determined that the project complies with the appropriate rules and requirements of the District, and would not contribute to the degradation of the air quality. The applicant has identified and will obtain emission reduction credits in sufficient quantity to fully offset all nonattainment pollutants and their precursors at a minimum ratio of 1:1.
- Staff evaluated the global climate change and greenhouse gas (GHG) emissions from the project. The CECP would replace a less efficient existing facility with lower emissions of carbon dioxide per megawatt hour. The project, as a hybrid base-load/peaking project, with an enforceable operating limitation less than 60% of capacity (4,100 hours per year), is not subject to the requirements of Senate Bill 1368 and the Emission Performance Standard. Staff recommends reporting of the GHG emissions as the California Air Resources Board develops greenhouse gas regulations and/or trading markets. The project may be subject to additional reporting requirements and GHG reductions as these regulations become more fully developed and implemented. The **Air Quality** section contains a GHG Appendix.

- With the proposed conditions of certification included in the various technical areas, the project's construction and operation impacts can be mitigated to a level less than significant.

LORS OVERRIDE

Conceptually, there are two types of "overrides" which may come into play in a power plant siting case. The first addresses environmental impacts. Where a project will result in significant environmental impacts that cannot be mitigated, an agency cannot approve that project unless it finds that "the benefits of the project outweighs the unavoidable significant adverse environmental effects." [20 Cal. Code of Regs. § 1755 (d)(2).] As found in the summary above and in more detail in the sections of the FSA below, all potentially significant impacts are mitigated and no environmental override is necessary.

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The second type of override addresses nonconformance of a project with state or local laws, ordinances, regulations, or standards (LORS). The Commission cannot license a project that conflicts with one or more LORS unless it finds "that such facility is required for public convenience and necessity and that there are not more prudent and feasible means of achieving such public convenience and necessity." (Pub. Resources Code, § 25525.) This determination must be made based on the totality of the evidence of record and consider environmental impacts, consumer benefits, and electric system reliability.

As discussed in the summary above and in detail in the Land Use section of the FSA, staff finds that the project conforms to the Carlsbad General Plan, Municipal Code and Zoning Code, Specific Plan 144, Precise Development Plan 06-02, the Aqua Hedionda Land Use Plan, and the South Carlsbad Coastal Redevelopment Plan; and is consistent with the development pattern for the area established by the General Plan, Muncipal Code and Zoning Code and the various plans noted above. However, the local government—the City of Carlsbad—opposes the project and contends that the project is not in conformity with certain land use mechanisms that it has established for the project area that includes the existing power plant and CECP. As a result of this position, on October 20, 2009, the city council discussed and instituted a land use moratorium on electrical generation in the PU (Public Utility) zone within the city's Coastal Zone.

Staff gives "due deference" to a local government's views regarding conformity with its own local land use provisions (meaning staff would normally support any objective and unbiased reading of such local provisions). Moreover, staff acknowledges local land use LORS and critical threshold levels (the city of Carlsbad applies an "extraordinary public benefit" test to any land use development in determining appropriateness). Because of this, as well as ambiguity regarding the city's interpretation of its complex and layered land use ordinances, staff recommends that the Commission license the project with findings pursuant to its override authority under provisions of the Public Resources Code section 25525, based on the benefits of the project.

INTRODUCTION

Mike Monasmith

PURPOSE OF THIS REPORT

This Final Staff Assessment (FSA) is the California Energy Commission staff's independent analysis of the proposed Carlsbad Energy Center Project (CECP) Application for Certification (AFC). This FSA is a staff document. It is neither a Committee document, nor a draft decision. It is staff's final testimony, based on nearly two years of intensive discovery and analysis. The FSA describes the following:

- the proposed project;
- the existing environment of the proposed project;
- whether the project 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;
- a comprehensive cumulative analysis of the potential impacts of the project, along with potential impacts from other existing and known planned developments;
- mitigation measures proposed by the applicant, staff, interested agencies and interveners which may lessen or eliminate potential impacts;
- the proposed conditions under which the project should be constructed and operated, if it is certified;
- project alternatives; and
- facility closure requirements.

The analyses contained in this FSA are based upon information from the: 1) Application For Certification and AFC amendments, 2) responses to data requests, 3) issue resolution workshops and meetings, 4) supplementary information from local, state, and federal agencies, interested organizations and interveners, 5) existing documents and publications, 6) independent field studies and research, and 7) comments from parties to the proceeding made during the various stages of discovery. The analysis for most technical areas includes a discussion of proposed conditions of certification. Each proposed condition of certification is followed by a proposed means of "verification." The FSA presents 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 Regulation 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 contains an Executive Summary, Introduction, Project Description and Project Alternatives. The environmental, engineering, and public health and safety analysis of the proposed project is contained in a discussion of nineteen (19) technical areas.

Each of the following technical areas is addressed in a separate chapter:

- air quality
- biological resources
- cultural resources
- hazardous materials management
- land use
- noise and vibration
- public health
- socioeconomic resources
- soil and water resources
- traffic and transportation
- transmission line safety and nuisance
- visual resources
- waste management
- worker safety and fire protection
- facility design
- geological and paleontological resources
- power plant efficiency
- power plant reliability
- transmission system engineering

Each of the nineteen (19) technical area assessments includes a discussion of:

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

These nineteen (19) chapters are followed by separate chapters which provide a specific discussion on aspects of facility closure, project construction and operation compliance and monitoring plans. The final chapter provides a list of staff that assisted in preparing this assessment report and includes their individual resumes and signed declaration for their testimony.

ENERGY COMMISSION SITING PROCESS

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

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

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

Staff conducts its environmental analysis in accordance with the requirements of the California Environmental Quality Act (CEQA). No Environmental Impact Report (EIR) is required because the Energy Commission's site certification program has been certified by the Resources Agency (Pub. Resources Code, §21080.5 and Cal. Code Regs., tit. 14, §15251 (k)). The Energy Commission was last certified in 2001 by Resources Secretary Mary Nichols. The Energy Commission is the CEQA lead agency and is subject to all portions of CEQA applicable to certified regulatory activities. Staff typically prepares both a preliminary and final staff assessment. The Preliminary Staff Assessment (PSA) was published on December 11, 2008 and provided the applicant, interveners, agencies, interested parties and members of the public the staff's preliminary analysis, conclusions, and recommendations.

Staff used the PSA as a means to identify and resolve issues between parties, and to narrow the scope of adjudicated issues that will be discussed, examined and questioned during the course of the evidentiary hearings. During the period between publishing the PSA and the Final Staff Assessment (FSA), staff conducted a two-day public workshop to discuss findings, propose mitigation, and explain compliance and monitoring requirements. Specifically, the two-day PSA Workshop for the CECP PSA was held on January 7 and 8, 2009, in Carlsbad.

Based on the workshop and extensive written comments and filings, staff refined several chapters of their analysis, corrected errors, and finalizes conditions of certification to reflect areas where staff has reached agreement with the parties. This refined analysis – staff's Final Staff Assessment -- serves as staff's final testimony to the Committee, parties to the proceeding and members of the public.

The Final Staff Assessment (FSA) is only one piece of evidence that will be considered by the Committee during the course of Evidentiary Hearings and in their decision making process. The CECP Committee is comprised of Vice-Chair James D. Boyd (presiding member) and Chairman Karen Douglas (associate member). Along with Hearing Officer Paul Kramer, the Committee will review all evidence, testimony and comments before providing a recommendation on the project to the full, five-member Energy Commission.

During the Evidentiary Hearings, all parties will be afforded an equal opportunity to present evidence and to rebut the testimony of other parties, thereby creating a legal hearing record on which an informed decision on the project can be based. The hearing before the Committee also allows parties the ability 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, ask questions, seek clarifications and make conclusions.

Following the Evidentiary Hearings, the two-member 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 its publication, the PMPD is circulated in order to receive public comments. At the conclusion of that comment period, the Committee may prepare a revised PMPD, if it so chooses. A revised PMPD would also be circulated for comment and review, as determined by the Committee. At the close of the comment period for the revised PMPD, the document is submitted to the full Energy Commission for a decision. Within 30 days of the Energy Commission's decision, any intervenor may request that the Energy Commission reconsider its decision by filing an appropriate motion.

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

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, California State Lands Commission, California Department of Transportation, National Marine Fisheries Service, State Water Resources Control Board, San Diego Regional Water Quality Control Board, California Department of Fish and Game, California Air Resources Board, and the San Diego Air Pollution Control District.

OUTREACH

The Energy Commission's outreach program is primarily facilitated by its Public Adviser's Office (PAO). This is an ongoing process that provides a consistent level of opportunity for public participation, regardless of outreach efforts conducted by the applicant or other parties to the proceeding.

On September 17, 2007, the Energy Commission staff sent the CECP AFC to the City of Carlsbad libraries on Dove Lane and Carlsbad Village Drive. The documents were also sent to state libraries in Eureka, Fresno, Los Angeles, Sacramento, San Diego, and San Francisco.

The PAO's public outreach work is an integral part of the Energy Commission's AFC review process. The PAO reviewed information provided by the applicant and also conducted its own outreach efforts to identify "sensitive receptors" (including schools, community, cultural and health facilities, daycare and senior-care centers) within a six-mile radius of the proposed site for the project. These sensitive receptors, especially elementary schools, are contacted and kept informed of Energy Commission proceedings through PAO outreach. The PAO also works with the siting division and the governmental affairs office to identify and contact local elected and appointed officials from the area.

The PAO provided notification by letter and enclosed notice of the December 17, 2007 Informational Hearing and Site Visit, held at the Faraday Center in Carlsbad. Notices were initially distributed to Carlsbad residents through a notice flyer sent to all subscribers of the *North County Times*. Notices were also distributed to representatives of environmental, Native American, and certain public interest and regulatory organizations with an expressed or anticipated interest in this project. Also, elected and certain appointed officials of the City of Carlsbad and San Diego County were similarly notified of the hearing and site visit.

Energy Commission regulations require staff to notice, at a minimum, property owners and residents 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 CECP 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 FSA.

This proceeding has received unprecedented levels of public participation, staff outreach, involvement by parties to the proceeding, and coverage from local and regional press and media outlets. Hundreds of thousands of individual mailers have been sent to Carlsbad residents by the applicant and Intervenors, including the city of Carlsbad. Also, during the course of this proceeding, the two daily newspapers that circulate within Carlsbad – *North County Times* and the *San Diego Union Tribune* – have generated nearly one-hundred stories related to this proceeding.

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 United States 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 U.S. EPA’s National Environmental Policy Act (NEPA) Compliance Analysis” dated April 1998. The purpose of the screening analysis is to determine whether a minority or low-income population exists within the potentially affected area of the proposed site.

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

PROJECT DESCRIPTION

Mike Monasmith

INTRODUCTION

Carlsbad Energy Center LLC (the applicant) filed an Application for Certification to the California Energy Commission on September 14, 2007, to construct and operate the Carlsbad Energy Center Project (CECP), a 558-megawatt (MW) gross combined-cycle power generating facility configured with two, Siemens SCC6-5000F natural-gas fired combustion turbines. The CECP would be built at the existing Encina Power Station (EPS) located on the northern coast of San Diego County, in the city of Carlsbad, approximately 5 miles south of the Camp Pendleton Marine Base, and 30 miles north of downtown San Diego.

On October 24, 2007, the Energy Commission received a supplement to the CECP Application for Certification (AFC) providing more detailed CECP information, and on October 31, 2007, the Energy Commission found that the AFC (07-AFC-6) was data adequate, and that staff could begin the discovery and analysis phase of the Energy Commission's 12-month licensing process. Following the initial phase of discovery and analysis – which involved the exchange of information through data requests, data responses and issue resolution workshops – the applicant amended their AFC on July 25, 2008 in the form of a Project Enhancement and Refinement (PEAR) package. The PEAR proposed project changes in facility design and other aspects, including water.

As proposed, the 23-acre CECP would be constructed and operated within 32 acres of EPS parcels located on the northeast section of the larger, 95-acre EPS power plant complex. The proposed CECP site is currently occupied by the EPS east tank farm, including above-ground fuel oil storage Tanks 5, 6, and 7. These dormant fuel oil storage tanks would be demolished and removed, and the soil upon which the tanks currently stand would be remediated, as appropriate and necessary. The EPS facility has been in operation since 1954. EPS Units 1, 2, and 3 (circa 1950 steam boilers that provided the initial electrical generation) would be permanently retired once the CECP is approved and operational. EPS Units 4 and 5, part of a subsequent EPS expansion that occurred in the late 1970s, would continue generating electricity regardless of this proceeding or its outcome. **Project Description Figures 1** and **2** shows the existing and virtual site appearance for the proposed CECP. **Project Description Figure 2A** is the CECP project site and vicinity map.

If approved by the Energy Commission, CECP construction is expected to begin in the second quarter of 2010, and take approximately 25 months for project completion (single phase construction schedule). Major milestones for the planned CECP construction schedule are:

- Begin construction: second quarter 2010
- Startup and testing: third quarter 2012
- Commercial operations: 90 days after testing begins (winter 2012)

The CECP would connect its nominal 540 MWs of electricity to the existing, slightly modified, Encina 138 kilo-volt (kV) switchyard, and to a proposed new Encina 230 kV switchyard (which would be built and located at San Diego Gas & Electric's Cannon Substation, located immediately south of the proposed CECP site). Transmission interconnections to these two switchyards would be comprised of an overhead line from CECP Unit 6 to the existing 138-kV switchyard, and a combined, above and below ground cable from CECP Unit 7 to the proposed new 230-kV substation. **Project Description Figure 3** shows the general arrangement of the proposed transmission system, as well as the over-all CECP plot plan.

Natural gas would be provided through a new 1,100-foot interconnection to an existing Southern California Gas Company high pressure natural gas line located adjacent to the CECP site. The new CECP units would be natural gas-fired only, with no fuel oil emergency backup capability whatsoever.

The new CECP facility would use evaporative air cooling, eliminating the daily need for large quantities of seawater for purposes of once-through cooling. The minimal industrial, wash-down and associated water necessary for CECP's industrial steam and landscape irrigation would be approximately 700,000 gallons per day. It could be provided through one of two identified and analyzed water sources – desalinated seawater provided by the EPS ocean intake/discharge system, or reclaimed water provided by the Carlsbad Municipal Water District. Desalinated, industrial water would be created by use of an on-site ocean water purification system comprised of an ultrafiltration system installed upstream of the first-stage reverse osmosis system, with a storage tank to permit continuous operation regardless of CECP's operating mode. The first-stage reverse osmosis-treated ocean water will pass through a second-stage reverse osmosis system. The second-stage reverse osmosis permeate will be further demineralized by treatment using ion exchange to produce purified industrial water suitable for injection into CECP Units 6 and 7 for steam creation and heat recovery.

The proposed desalination system will utilize EPS' existing, permitted ocean water intake and outfall discharge facilities. Approximately 4.32 million gallons of ocean water per day (mgd) would generate approximately 700,000 gallons of purified industrial water needed during peak generation. Of this 4.32 mgd needed for CECP's operation, the applicant would be responsible for 1.32 mgd, given the minimum daily intake of 3 mgd that EPS uses for daily system circulation, regardless of its level of operation on Units 1-5. If CECP is approved and operational, EPS Units 1-3 will cease to operate, while EPS Units 4-5 will continue to operate. EPS is permitted to use a maximum of 857 mgd of ocean water; of this number, Units 1-3 comprise 225 mgd, and Units 4-5 are responsible for 632 mgd. Given that EPS flows are permitted to operate from a minimum of 3 mgd, to a maximum of 857 mgd, the CECP's retirement of EPS Units 1-3 would reduce maximum, allowed seawater flows by over 26 percent (from 857mgd down to 632 mgd).

An alternative, identified and analyzed means by which the applicant could fulfill its industrial water needs is through the use of reclaimed water. As proposed in the initial, 2007 AFC filing, Title 22 reclaimed water would be sought through the Carlsbad Municipal Water District, a member agency of the Encina Wastewater Authority (EWA).

EWA conducts sewage treatment and generates reclaimed water for member agencies at its Encina Waste Water Treatment Facility, located approximately one-mile south of the EPS site. The applicant identified a potential pipeline route for both conveying reclaimed water to the CECP, and returning wastewater back. Once on-site, reclaimed water would be demineralized by the same process proposed for purified ocean water.

Wastewater discharge from the CECP would likewise have dual potential. It would either flow through the existing path of the EPS ocean water discharge (if the desalinated water option is pursued), or through the City's existing sanitary/industrial sewer system. Potable water (drinking and showering) for the proposed project would be obtained through the Carlsbad Municipal Water District. Storm water would be collected onsite and directed to a detention basin on the northern most section of the proposed site for appropriate treatment before flowing into the adjacent Agua Hedionda Lagoon. The **SOIL and WATER** section of this staff assessment provides more detail on these options.

Associated CECP equipment would include an emission control system necessary to meet the facility's emission limits. Nitrogen oxide (NO_x) emissions would be controlled in part at the power plant's stack by a combination of ultra-low NO_x combustors in the selective catalytic reduction systems. The **AIR QUALITY** section of this staff assessment provides more details on these aspects of the proposed project.

PROJECT PURPOSE AND OBJECTIVES

In general, the applicant's objectives are to design, build, own, and operate the Carlsbad Energy Center Project (CECP) to meet the need for additional electric generation capacity and ancillary services in the Southern California region. Specifically, the CECP is designed to provide flexible, quick-start peaking capacity in the northern San Diego County service territory of San Diego Gas and Electric (SDG&E).

The CECP AFC identifies several basic objectives for the development of the proposed power project. Key components of the CECP project include the following:

- facilitating the retirement of the aging and inefficient EPS Units 1 through 3;
- using existing EPS infrastructure to reduce/forgo environmental impacts and costs that would otherwise be associated with the construction of the CECP and additional generation on a non-industrial, greenfield location;
- eliminating the daily need for millions of gallons of ocean water for once-through cooling and any associated biological impingement and entrainment impacts;
- interconnecting to the adjacent San Diego Gas and Electric (SDG&E) electricity system and upgrading the utility's transmission facilities to accommodate increased, efficient electricity generation over what EPS Units 1 through 3 would have otherwise generated; and,
- Providing short and long-term employment for skilled labor in a region with over 10% unemployment, given CECP's capital construction budget of over $500 Million.

PROJECT –RELATED FEATURES AND FACILITIES

With the exception of short, on-site interconnections, no off-site transmission or gas supply lines are required for the project. Other features/facilities that would be developed as part of the proposed project are listed below.

- Ocean-water purification system and industrial wastewater discharge: An ocean-water purification system (desalination through reverse osmosis) is proposed as one of two water sources for CECP (other source would be reclaimed water). The discharge of industrial wastewater would be through the existing EPS ocean-water discharge system, or in the case of reclaimed, through connection to the Carlsbad Municipal Water District system. The ocean water purification system and industrial water discharge are both located within the EPS property boundaries.
- Tank demolition and remediation: EPS fuel oil tanks 5, 6, and 7 (EPS East Tank Farm), would be demolished, and associated soil remediation would occur where Phase I Environmental Assessment indicated the existence of potential soil contamination around the tanks.

  Retirement of existing EPS units: As part of the CECP, existing EPS Units 1, 2, and 3 would be permanently retired upon the successful commercial operation of the new CECP generating units (CECP Unit 6 and CECP Unit 7). EPS Units 4-5 would continue operating, regardless of the outcome of this CECP proceeding.
- New SDG&E switchyard: SDG&E would construct, own and operate a new 230-kV switchyard, which would be located on their property (Cannon Substation), south of the CECP site (APN 210-010-42). The electrical interconnection from CECP Unit 6 to the new SDG&E 230-kV switchyard would be via a new underground/above ground cable. SDG&E would also make slight modifications to their existing 138-kV switchyard (for connection to CECP Unit 7) in part to accommodate the electrical needs of the adjacent, Carlsbad Seawater Desalination Project, planned for location on the EPS complex, west of the CECP site.
- Natural gas interconnection pipeline: a 1,100 foot-long, 18-inch natural gas interconnection line would be built to the Southern California Gas Company (SoCalGas) transmission pipeline (within their right-of-way for Line TL 2009, or the "Rainbow line"), which is located immediately adjacent to the CECP site, parallel to the existing rail line.

Zoning/General Plan: The proposed power plant site is zoned P-U (Public Utility) in the city of Carlsbad General Plan. Electrical power-generating facilities are currently permitted uses within this zoning district and General Plan designation.

Transmission Lines: Complete and final System Impact Studies for CECP's interconnection to the existing, slightly modified Encina 138-kV switchyard and the new proposed 230-kV switchyard have been filed, analyzed and are discussed in detail within the **TRANSMISSION SYSTEM ENGINEERING** section of this staff assessment.

Potable Water Supply: The proposed project would include a 1,100-foot interconnection to the existing city potable water supply line that serves the existing EPS complex.

Industrial Water / Wastewater System: An ocean water purification system (reverse osmosis) is proposed as an alternative source of industrial water for CECP, in addition to the possible planned use of Title 22 California Code of Regulations reclaimed water supplied by the Carlsbad Municipal Water District. Discharged industrial wastewater, desalinated water and reclaimed water are all discussed in the **SOIL and WATER** section of this staff assessment.

If approved by the Energy Commission, project construction is expected to begin in the second quarter of 2010 and take approximately 25 months for completion (on a single phase construction schedule). Major milestones for the planned CECP construction schedule include:

- Begin construction: second quarter 2010
- Startup and testing: summer 2012
- Commercial operations: 90 days after testing begins (late summer 2012)

The capital cost for the project is estimated to exceed $500 million.

PROJECT DESCRIPTION - FIGURE 1

Carlsbad Energy Center Project - Existing View From Encina Power Station Turbine Building

SOURCE: PEAR Figure 1.3-1

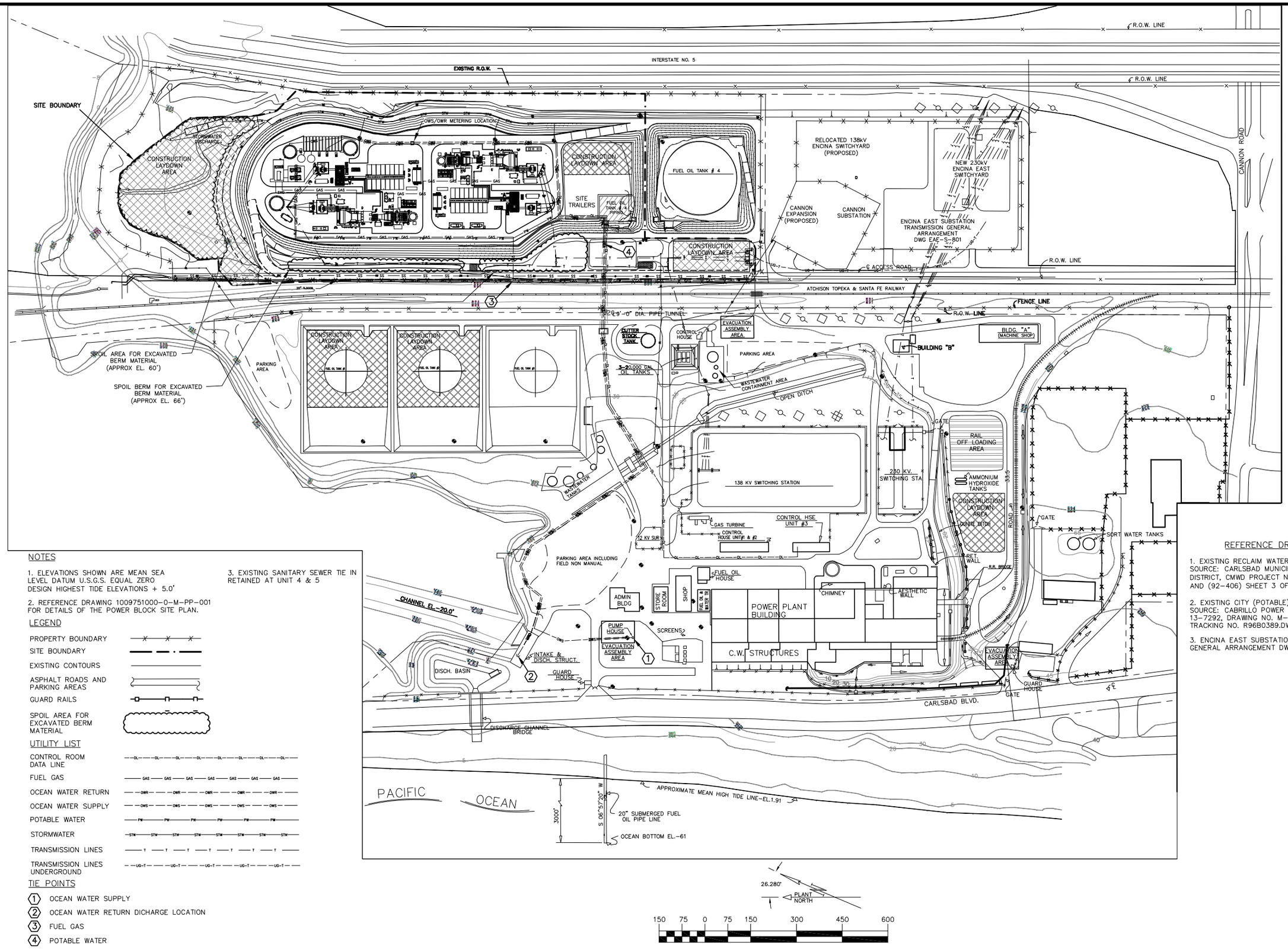
PROJECT DESCRIPTION - FIGURE 2

Carlsbad Energy Center Project - Project Site & Vicinity Map

SOURCE: AFC Figure 5.12-1

PROJECT DESCRIPTION - FIGURE 3

Carlsbad Energy Center Project - Plot Plan



NOTES

1. ELEVATIONS SHOWN ARE MEAN SEA LEVEL DATUM U.S.G.S. EQUAL ZERO DESIGN HIGHEST TIDE ELEVATIONS + 5.0'

2. REFERENCE DRAWING 1009751000-0-M-PP-001 FOR DETAILS OF THE POWER BLOCK SITE PLAN.

3. EXISTING SANITARY SEWER TIE IN RETAINED AT UNIT 4 & 5

LEGEND

PROPERTY BOUNDARY
SITE BOUNDARY
EXISTING CONTOURS
ASPHALT ROADS AND PARKING AREAS
GUARD RAILS
SPOIL AREA FOR EXCAVATED BERM MATERIAL

UTILITY LIST

CONTROL ROOM DATA LINE
FUEL GAS
OCEAN WATER RETURN
OCEAN WATER SUPPLY
POTABLE WATER
STORMWATER
TRANSMISSION LINES
TRANSMISSION LINES UNDERGROUND

TIE POINTS

1. OCEAN WATER SUPPLY
2. OCEAN WATER RETURN DICHARGE LOCATION
3. FUEL GAS
4. POTABLE WATER

REFERENCE DRAWINGS

1. EXISTING RECLAIM WATER PLAN SOURCE: CARLSBAD MUNICIPAL WATER DISTRICT, CMWD PROJECT NOS. (88-602) AND (92-406) SHEET 3 OF 17.

2. EXISTING CITY (POTABLE) WATER LINE SOURCE: CABRILLO POWER I LLC, PROJECT NO. 13-7292, DRAWING NO. M-661, SHEET 1 OF 1, TRACKING NO. R96B0389.DWG.

3. ENCINA EAST SUBSTATION TRANSMISSION GENERAL ARRANGEMENT DWG EXE-S-801

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMETAL PROTECTION DIVISION, NOVEMBER 2009

SOURCE: PEAR Figure 2.1-1

PROJECT DESCRIPTION - FIGURE 4

Carlsbad Energy Center Project - Regional Transportation

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMETAL PROTECTION DIVISION, NOVEMBER 2009

SOURCE: AFC Figure 5.13.1

ENVIRONMENTAL ASSESSMENT

AIR QUALITY

William Walters, P.E.

SUMMARY OF CONCLUSIONS

With the adoption of the attached conditions of certification, the proposed Carlsbad Energy Center Project (CECP) would conform with applicable federal, state and San Diego Air Pollution Control District air quality laws, ordinances, regulations and standards, and that the proposed Carlsbad Energy Center Project would not result in significant air quality related impacts.

All air quality issues related to the project have been addressed in the San Diego Air Pollution Control District's (District) Final Determination of Compliance (FDOC) and through additional staff recommended Conditions of Certification stipulated to by the applicant. The project has secured emission reduction credits in sufficient quantity to meet local air district requirements, and with staff's recommended Condition **AQ-SC10** will create or obtain sufficient emission reduction to fully mitigate all nonattainment pollutants and their precursors at a minimum ratio of one-to-one.

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 Carlsbad Energy Center Project would replace less efficient existing facilities with lower emissions of carbon dioxide per megawatt hour (CO_2/MWh), and would emit approximately 0.404 metric tonnes of carbon dioxide per megawatt hour (MTCO2/MWh). The project, as a peaking or mid-merit 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.

Staff notes that mandatory reporting of greenhouse gas 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, Chapter 488, Statutes of 2006). The project would emit as much as 0.8 million metric tonnes of carbon dioxide equivalent emissions and therefore would be subject to mandatory GHG reporting requirements. It may also be subject to GHG reductions or trading requirements as these regulations are implemented.

INTRODUCTION

This analysis evaluates the expected air quality impacts of the emissions of criteria air pollutants due to the construction and operation of the proposed Carlsbad Energy Center Project (CECP) by Carlsbad Energy Center LLC (applicant). The CECP would

be located in Carlsbad at the existing NRG owned Encina Power Plant located west of Interstate 5 and north of Cannon Road.

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

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

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

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

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

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

Applicable Law	Description
Federal	
40 Code of Federal Regulations (CFR) 52	Nonattainment New Source Review (NSR) requires a permit and requires Best Available Control Technology (BACT) and Offsets. Permitting and enforcement are delegated to SDAPCD. Prevention of Significant Deterioration (PSD) requires major sources or major modifications to major sources to obtain permits for attainment pollutants. The CECP is a modification of an existing major source and thus the trigger levels are 40 tons per year of NOx or VOC or SOx, 15 tons per year of PM10, or 100 tons per year of CO.
40 CFR 60 Subpart KKKK	New Source Performance Standard for Stationary Combustion Turbines: 15 parts per million (ppm) NOx at 15 percent O_2 and fuel sulfur limit of 0.060 lb SOx per million Btu heat input. BACT would be more restrictive.
40 CFR 60 Subpart IIII	New Source Performance Standard for Stationary Compression Ignition Internal Combustion Engines. Establishes emission standards for compression ignition internal combustion engines, including emergency fire water pump engines.
40 CFR Part 70	Title V: Federal permit. Title V permit application is required within one year of start of operation. Permitting and enforcement are delegated to SDAPCD.
40 CFR Part 72	Acid Rain Program. Requires permit and obtaining sulfur oxides credits. Permitting and enforcement are delegated to SDAPCD.
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, establishes maximum emission rates, establishes recordkeeping requirements.
Local – San Diego Air Pollution Control District (SDAPCD) Rule and Regulations	
Regulation II – Permits	This regulation sets forth the regulatory framework of the application for and issuance of construction and operation permits for new, altered and existing equipment. Included in these requirements are the federally delegated requirements for New Source Review, Title V Permits, and the Acid Rain Program. Regulation II Rule 20.1 and 20.3 establishes the pre-construction review requirements for new, modified or relocated facilities, in conformance with the federal New Source Review regulation to ensure that these facilities do not interfere with progress in attainment of the national ambient air quality standards and that future economic growth in the San Diego County is not unnecessarily restricted. This regulation establishes Best Available Control Technology (BACT) and emission offset requirements.

Applicable Law	Description
Regulation IV – Prohibitions	This regulation sets forth the restrictions for visible emissions, odor nuisance, fugitive dust, various air emissions, and fuel contaminants. This regulation also specifies additional performance standards for stationary gas turbines and other internal combustion engines. However, for this project these provisions are less strict than the new source rule requirements of Regulation II.
Regulation X – National Standards of Performance (NSPS) for New Stationary Sources	Regulation X 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 federal regulation apply to stationary gas turbines (40 CFR Part 60 Subpart KKKK) and emergency fire pump engines (40 CFR Part 60 Subpart IIII) as described above in the Federal LORS description. Subpart KKKK establish limits of NO_2 and SO_2 emissions from the facility as well as monitoring and test method requirements. Subpart IIII establishes emission standards for compression ignition internal combustion engines. SDAPCD is delegated enforcement authority for these NSPS through their authority to issue and enforce the Title V permit for this existing Title V source.
Regulation XI – National Emission Standards for Hazardous Air Pollutants	Regulation XI adopts federal standards for hazardous air pollutants (40 CFR Section 63) by reference. No such standards presently exist that would apply to the project.
Regulation XII – Toxic Air Contaminants – New Source Review	Regulation XII, Rule 1200, establishes the pre-construction review requirements for new, modified or relocated sources of toxic air contaminants, including requirements for Toxics Best Available Control Technology (T-BACT) if the incremental project risk exceeds rule triggers.
Regulation XIV – Title V Operating Permits	Regulation XIV, Rule 1401 defines the permit application and issuance as well as compliance requirements associated with the Title V federal permit program. Any new source which qualifies as a Title V facility must obtain a Title V permit within twelve months of starting operation. Regulation II, Rule 1412 defines the requirements for the Acid Rain Program, including the requirement for 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

METEOROLOGICAL CONDITIONS

The climate of San Diego County is controlled by a semi-permanent subtropical high-pressure system that is located off the Pacific Ocean. In the summer, this strong high-pressure system results in clear skies, high temperatures, and low humidity. Very little precipitation occurs during the summer months because storms are blocked by the high-pressure system. Beginning in the fall and continuing through the winter, the high pressure weakens and moves south, allowing storm systems to move through the area. Temperature, winds, and rainfall are more variable during these months, and stagnant conditions occur more frequently than during summer months. Weather patterns include

periods of stormy weather with rain and gusty winds, clear weather that can occur after a storm, or persistent marine layer conditions, with our without ground fog, that can occur during extended parts of the year. The City of Carlsbad receives an average of 11 inches of rain annually (WC 2008).

Temperature, wind speed, and wind direction data collected in Camp Pendleton, about 6.3 miles north northwest of the project site, were processed and provided to the applicant by the SDAPCD (Sierra 2007). The specific location of this meteorological station is approximately one-half mile from the surf zone, on the ocean side of the I-5 Freeway, and should represent the local weather patterns, including persistent marine layer and fog conditions, nearly identical to the project site. The most predominant annual wind direction from this monitoring site is onshore from the southwest to the west northwest with a strong secondary northeast to east northeast offshore component. Onshore winds are the most predominant during both the 2nd and 3rd quarters. The winds during the 1st and 4th quarters have a more predominate offshore component. In all cases, annual and quarterly, the wind frequencies outside of the previously stated predominate onshore and offshore directions are fairly low. The average wind speed is 5.3 miles per hour, and dead calm hours occur less than one percent of the time. The wind speeds are generally higher during daylight hours, and are highest during the 1st and 2nd quarters.

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

EXISTING AIR QUALITY

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

The U.S. Environmental Protection Agency (U.S. EPA), California Air Resource Board (ARB), and the local air district classify an area as attainment, unclassified, or nonattainment, depending on whether or not the monitored ambient air quality data show compliance, insufficient data is available, or non-compliance with the ambient air quality standards, respectively. The CECP project site is located within the San Diego Air Basin (SDAB) and, as stated above, is under the jurisdiction of the San Diego Air Pollution Control District. This area is designated as nonattainment for both the federal

and state ozone standards and the state PM10 and PM2.5 standards. **AIR QUALITY Table 3** summarizes federal and state attainment status of criteria pollutants for the SDAB.

The project site is located in northwestern San Diego County, in the City of Carlsbad just west of the Interstate 5, one quarter mile east of Carlsbad Boulevard, just south of Aqua Hedionda Lagoon, and 4/10^{ths} of a mile north of Cannon Road.

The operating monitoring stations closest to the proposed project site with long-term records for ozone and NOx are the Camp Pendleton and Oceanside Mission Avenue monitoring stations, for CO and PM10/PM2.5 the Escondido East Valley Parkway monitoring station and for SOx the San Diego 12th Avenue and Beardsley Street monitoring stations. The coastal location of the Camp Pendleton, Oceanside and San Diego monitoring stations make them somewhat more representative of conditions in Carlsbad than the inland Escondido monitoring stations, which due to its inland valley location would be expected to have higher CO and PM10/PM2.5 concentrations than found in coastal Carlsbad.

AIR QUALITY Table 2
Federal and State Ambient Air Quality Standards

Pollutant	Averaging Time	Federal Standard	California Standard
Ozone (O_3)	8 Hour	0.075 ppm [a] (147 μg/m^3)	0.070 ppm (137 μg/m^3)
	1 Hour	—	0.09 ppm (180 μg/m^3)
Carbon Monoxide (CO)	8 Hour	9 ppm (10 mg/m^3)	9.0 ppm (10 mg/m^3)
	1 Hour	35 ppm (40 mg/m^3)	20 ppm (23 mg/m^3)
Nitrogen Dioxide (NO_2)	Annual	0.053 ppm (100 μg/m^3)	0.03 ppm (57 μg/m^3)
	1 Hour	—	0.18 ppm (339 μg/m^3)
Sulfur Dioxide (SO_2)	Annual	0.030 ppm (80 μg/m^3)	—
	24 Hour	0.14 ppm (365 μg/m^3)	0.04 ppm (105 μg/m^3)
	3 Hour	0.5 ppm (1300 μg/m^3)	—
	1 Hour	—	0.25 ppm (655 μg/m^3)
Respirable Particulate Matter (PM10)	Annual	—	20 μg/m^3
	24 Hour	150 μg/m^3	50 μg/m^3
Fine Particulate Matter (PM2.5)	Annual	15 μg/m^3	12 μg/m^3
	24 Hour	35 μg/m^3	—
Sulfates (SO_4)	24 Hour	—	25 μg/m^3
Lead	30 Day Average	—	1.5 μg/m^3
	Calendar Quarter	1.5 μg/m^3	—
Hydrogen Sulfide (H_2S)	1 Hour	—	0.03 ppm (42 μg/m^3)
Vinyl Chloride (chloroethene)	24 Hour	—	0.01 ppm (26 μg/m^3)
Visibility Reducing Particulates	8 Hour	—	In sufficient amount to produce an extinction coefficient of 0.23 per kilometer due to particles when the relative humidity is less than 70 percent.

Source: ARB 2008a.

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

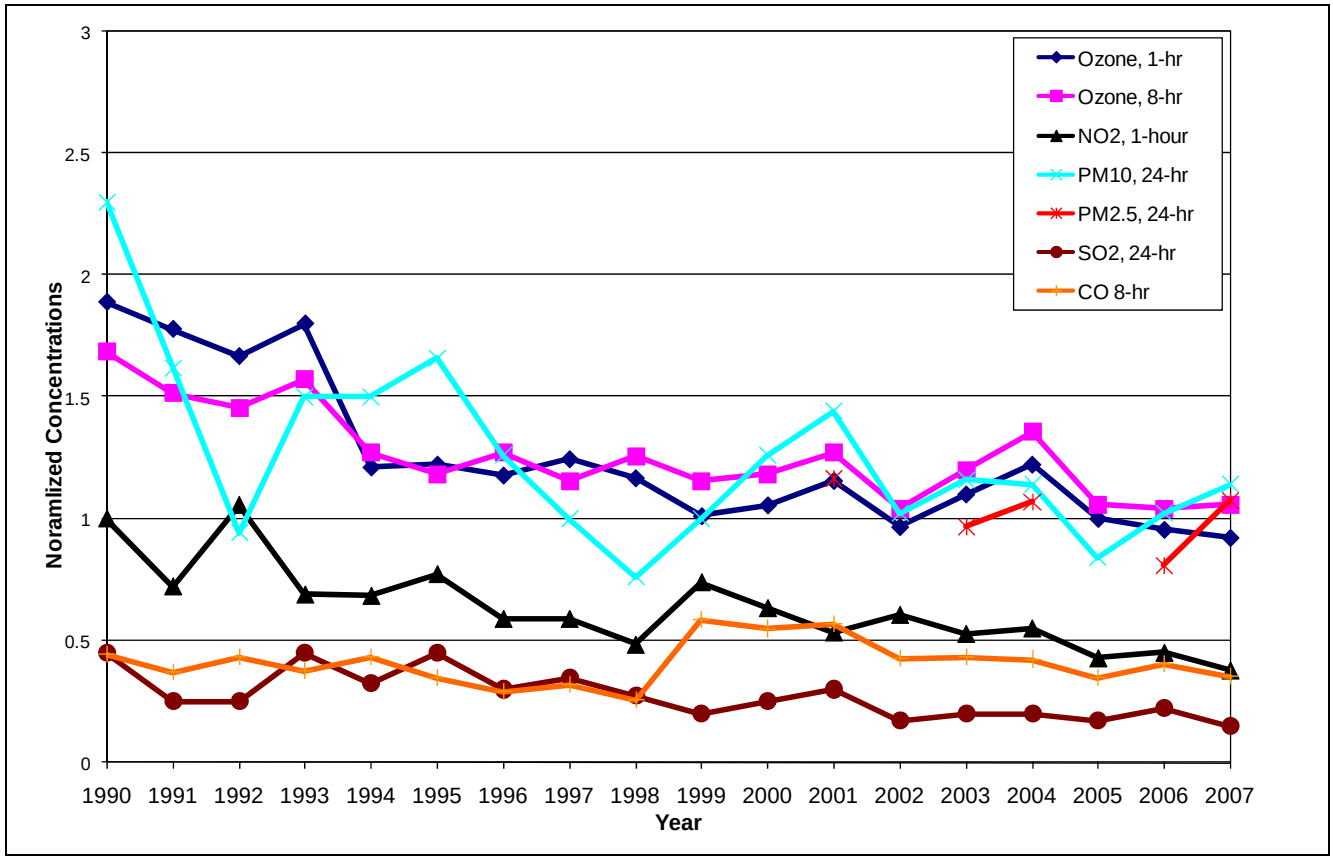
Pollutant	Attainment Status	
	Federal	State
Ozone	Former Subpart 1 Nonattainment (8-hr) [a]	Serious Nonattainment (1-hr)
CO	Attainment	Attainment
NO_2	Attainment	Attainment
SO_2	Attainment	Attainment
PM10	Attainment	Nonattainment
PM2.5	Attainment	Nonattainment

Source: ARB 2008b, U.S. EPA 2008.

Note: a – The U.S. EPA is in the process of redesignating the San Diego Air Basin to moderate non-attainment.

AIR QUALITY Figure 1 summarizes the historical air quality data for the project location, recorded at representative air monitoring stations (1990-2007 for Ozone, PM10, CO, NO_2, SO_2; 1999-2007 for PM2.5). In **AIR QUALITY Figure 1**, the short term normalized concentrations are provided from 1990 to 2007. Normalized concentrations represent the ratio of the highest measured concentrations in a given year to the most-stringent applicable national or state ambient air quality standard. Therefore, normalized concentrations lower than one indicates that the measured concentrations were lower than the most-stringent ambient air quality standard.

AIR QUALITY Figure 1
Normalized Maximum Short-Term Historical Air Pollutant Concentrations



Source: ARB 2008c, SDAPCD 2008a.

A Normalized Concentration is the ratio of the highest measured concentration to the applicable most stringent air quality standard. For example, in 1999 the highest one-hour average ozone concentration measured at the Oceanside Mission Avenue station was 0.091 ppm. Since the most stringent ambient air quality standard is the state standard of 0.09 ppm, the 1999 normalized concentration is 0.091/0.09 = 1.011.

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

Ozone

In the presence of ultraviolet radiation, both nitrogen oxides (NOx) and volatile organic compounds (VOC) go through a number of complex chemical reactions to form ozone. **AIR QUALITY Table 4** summarizes the best representative ambient ozone data collected from the Oceanside Mission Avenue and Camp Pendleton monitoring stations.

The table includes the maximum one-hour and eight-hour ozone levels and the number of days above the state or national standards. Ozone formation is higher in spring, summer, and early fall and lower in the winter. The SDAB was classified as an attainment area for the previous federal 1-hour ozone standard (no longer applicable) and is classified as a basic nonattainment area for the federal 8-hour ozone standard. The SDAB is also classified as a serious nonattainment area for the state 1-hour ozone standard.

AIR QUALITY Table 4
Ozone Air Quality Summary, 1990-2007 (ppm)

Year	Days Above CAAQS 1-Hr	Month of Max. 1-Hr Avg.	Max. 1-Hr Avg.	Days Above NAAQS 8-Hr	Month of Max. 8-Hr Avg.	Max. 8-Hr Avg.
Oceanside - Mission Avenue						
1990	14	OCT	0.170	5	OCT	0.118
1991	14	MAY	0.160	8	MAY	0.106
1992	12	SEP	0.150	7	SEP	0.102
1993	7	SEP	0.162	5	SEP	0.110
1994	2	JUN	0.109	1	SEP	0.089
1995	5	SEP	0.110	0	NOV	0.083
1996	4	MAY	0.106	3	OCT	0.089
1997	6	OCT	0.112	0	OCT	0.081
1998	3	JUL	0.105	1	JUL	0.088
1999	0	APR	0.091	0	APR	0.081
2000	1	MAR	0.095	0	MAR	0.083
2001	1	SEP	0.104	1	SEP	0.089
Camp Pendleton						
2002	0	MAY	0.087	0	MAY	0.073
2003	4	OCT	0.099	0	OCT	0.084
2004	4	MAY	0.110	2	OCT	0.095
2005	0	AUG	0.090	0	APR	0.074
2006	0	SEP	0.086	0	FEB	0.073
2007	0	MAR	0.083	0	MAY	0.074

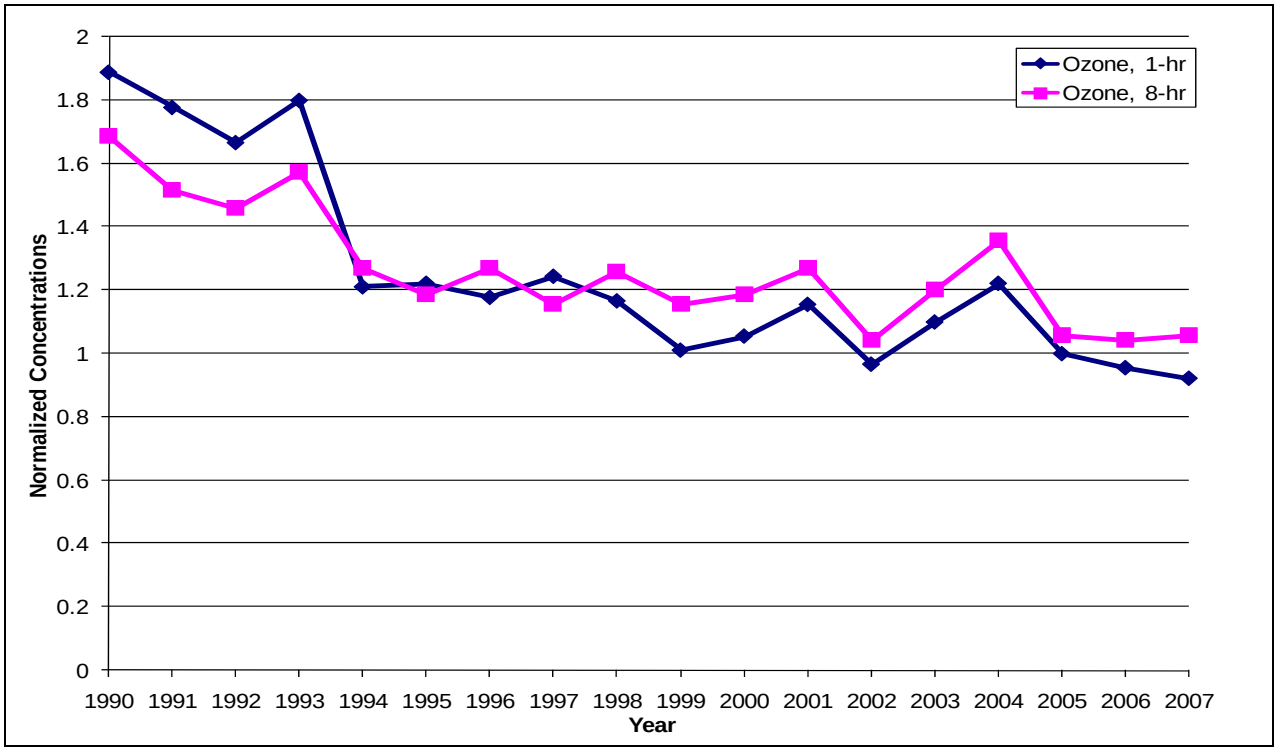
California Ambient Air Quality Standard (CAAQS): 1-Hr, 0.09 ppm, 8-Hr, 0.070 ppm
National Ambient Air Quality Standard (NAAQS): 8-Hr, 0.075 ppm, days above standard based on old standard of 0.080 ppm.

Source: ARB 2008c.

The yearly trends from 1990 to 2007 for the maximum one-hour and eight-hour ozone concentrations, referenced to the most stringent standard, and the number of days exceeding the California one-hour standard and the federal eight-hour standard for the Oceanside Mission Avenue (1990-2001) and Camp Pendleton (2002-2007) monitoring stations is shown in **AIR QUALITY Figure 2** and **Figure 3**, respectively.

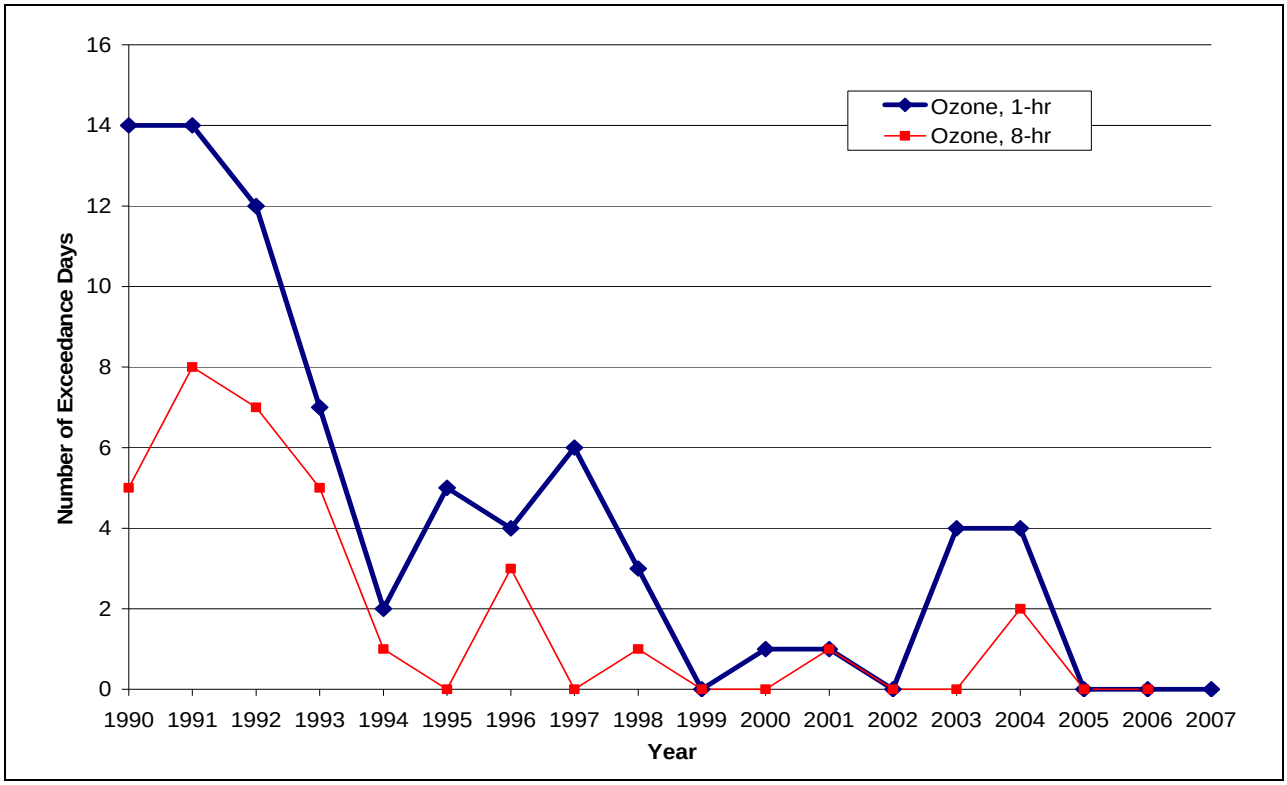
As these two figures show, the one-hour and eight-hour ozone concentrations were highest in 1990 and the number of exceedances was highest in 1990 or 1991. Maximum concentrations and the number of AAQS exceedances have declined significantly since 1990.

AIR QUALITY Figure 2
Normalized Ozone Air Quality Maximum Concentrations



Source: ARB 2008c.

AIR QUALITY Figure 3
Ozone – Number of Days Exceeding the Air Quality Standards



Source: ARB 2008c.

Respirable Particulate Matter (PM10)

As **AIR QUALITY Table 5** indicates, the representative monitoring stations annually experience occasional violations of the state 24-hour PM10 standard and continue to exceed the state annual PM10 standard. The SDAB is classified as an attainment area for the federal PM10 standard and as a nonattainment area for the state PM10 standards.

AIR QUALITY Table 5
PM10 Air Quality Summary, 1990-2007 ($\mu g/m^3$)

Year	Days * Above Daily CAAQS	Month of Max. Daily Avg.	Max. Daily Avg.	Annual Arithmetic Mean
Oceanside - Mission Avenue				
1990	35	NOV	115	32.8
1991	--	JAN	81	--
1992	0	SEP	47	28.7
1993	12	OCT	75	28.9
1994	16	JAN	75	29.1
1995	27	NOV	83	30.5
1996	6	JAN	63	25.6
1997	--	NOV	50	--
1998	0	AUG	38	22.1
Escondido – East Valley Parkway				
1999	0	DEC	50	29.7
2000	12	DEC	63	29.5
2001	12	JAN	72	30.6
2002	0	SEP	51	27
2003	31	DEC[a]	58[a]	32.7[a]
2004	6	JAN	57	27.3
2005	0	OCT	42	23.9
2006	6	DEC	51	24.2
2007	2	NOV[a]	57[a]	24[a]

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

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

[a] Excludes 2003 and 2007 firestorm events

Source: ARB 2008c, SDAPCD 2008a.

-- Data not available

PM10 can be emitted directly or it can be formed many miles downwind from emission sources when various precursor pollutants interact in the atmosphere. Gaseous emissions of pollutants like NOx, SOx and VOC from turbines, and ammonia from NOx control equipment, given the right meteorological conditions, can form particulate matter

in the form of nitrates (NO_3), sulfates (SO_4), and organic particles. These pollutants are known as secondary particulates, because they are not directly emitted, but are formed through complex chemical reactions in the atmosphere.

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

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

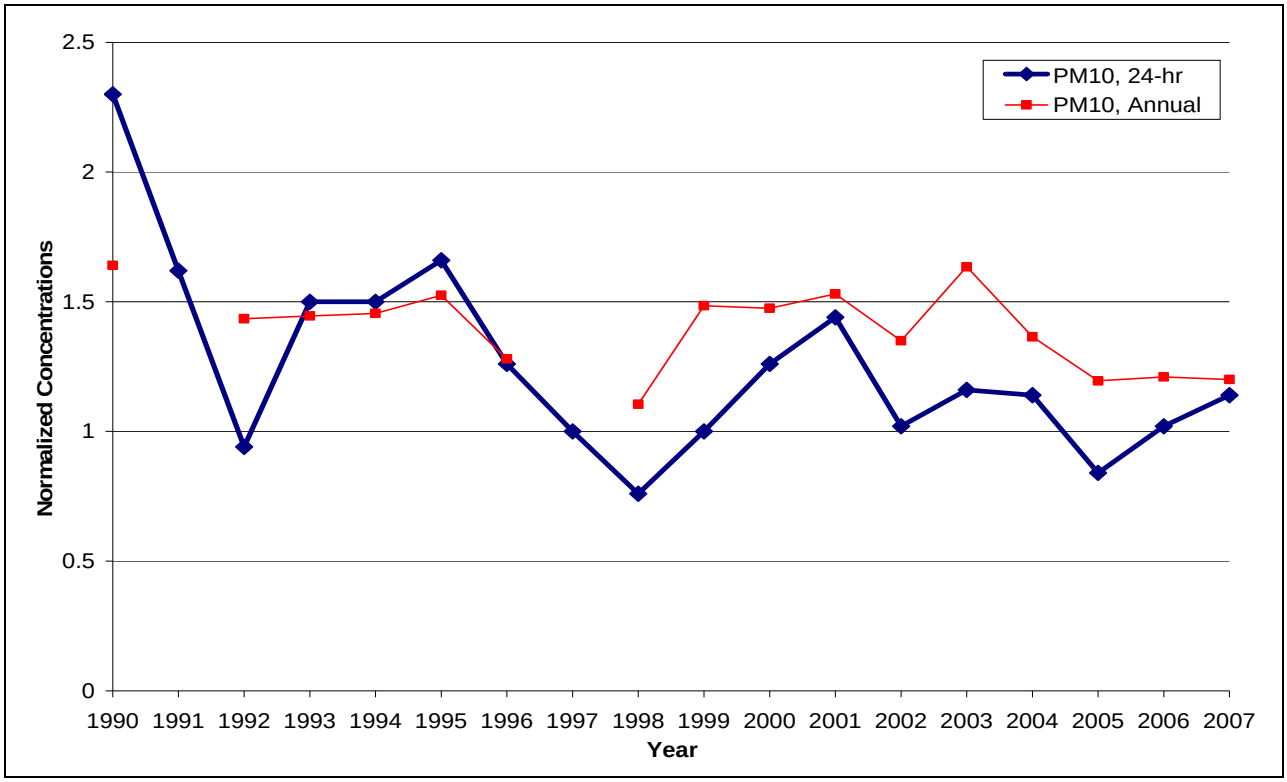
The 1990 to 2007 yearly trends for the maximum 24-hour PM10 and Annual Arithmetic Mean PM10, referenced to the most stringent standard, and the number of days exceeding the California 24-hour PM10 standard for the Oceanside (1990-1998) and Escondido (1999-2007) monitoring stations is shown in **AIR QUALITY Figure 4** and **Figure 5**, respectively.

As the two figures show, there is an overall gradual downward trend for PM10 concentrations and number of violations of the California 24-hour standard since 1990; however, there has been little progress since 1996.

Fine Particulate Matter (PM2.5)

The SDAB is classified as nonattainment for the state fine particulate matter (PM2.5) standard and is an attainment area for the federal standards. As shown in **AIR QUALITY Table 6**, the highest PM2.5 concentrations are generally measured in the winter. The relative contribution of wood-smoke particles to the PM2.5 concentrations may be even higher than its relative contribution to PM10 concentrations, considering that most of the wood-smoke particles are smaller than 2.5 microns.

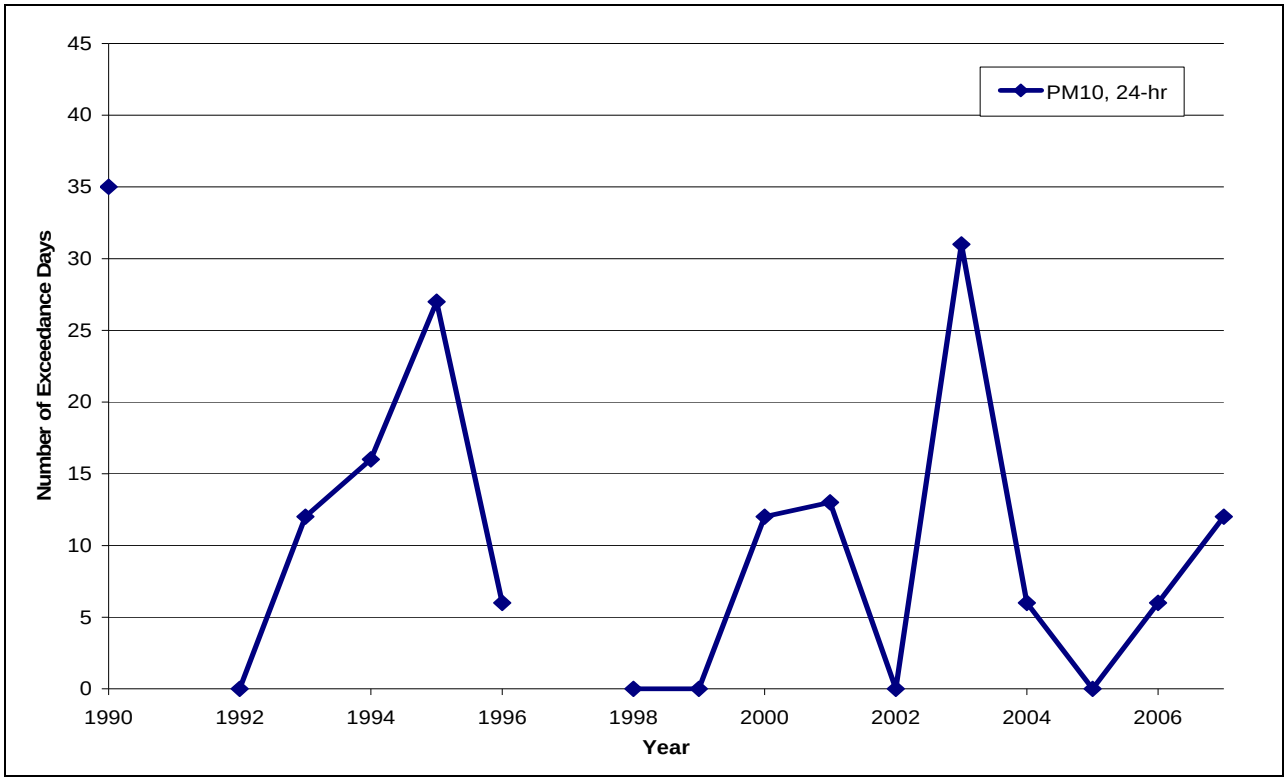
AIR QUALITY Figure 4
Normalized PM10 Air Quality Maximum Concentrations



Source: ARB 2008c, SDAPCD 2008a.

AIR QUALITY Figure 5

PM10 24-Hour – Number of Days Exceeding the Air Quality Standard



Source: ARB 2008c, SDAPCD 2008a.

As **AIR QUALITY Table 6** indicates, the 24-hour (3-year average 98th percentile) PM2.5 concentration levels have been declining from 1999-2007, but were still above the NAAQS of 35 $\mu g/m^3$ in 2007 at the Escondido monitoring station. The annual arithmetic means also appear to have been declining from 1999-2007, but continues to be as high as the CAAQS of 12 $\mu g/m^3$ as of 2007.

AIR QUALITY Table 6
PM2.5 Air Quality Summary, 1999-2007 ($\mu g/m^3$)

Year	National Maximum Daily	Month of Maximum Daily	98th Percentile Maximum Daily	State Annual Average	National Annual Average
Escondido – East Valley Parkway					
1999	64.3	OCT	--	--	18.0
2000	65.9	DEC	--	--	15.8
2001	60.0	JAN	40.8	--	17.5
2002	53.6	JAN	--	--	16.0
2003	37.9 [a]	OCT	33.9	14.2	14.2
2004	67.3	JAN	37.4	14.1	14.1
2005	43.1	JAN	--	--	--
2006	40.6	DEC	28.3	11.5	11.5
2007	36[a]	DEC	37.7	12	12

California Ambient Air Quality Standard: Annual Arithmetic Mean, 12 $\mu g/m^3$
National Ambient Air Quality Standard: 24-Hr Avg. Conc., 35 $\mu g/m^3$ (based on 98 percent of the daily concentrations, average over three years); Annual Arithmetic Mean, 15 $\mu g/m^3$
[a] Excludes 2003 and 2007 firestorm events

Source: ARB 2008c, SDAPCD 2008a.

Carbon Monoxide (CO)

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

AIR QUALITY Table 7 shows the maximum one-hour and eight-hour CO concentrations monitored in Oceanside and Escondido, where Escondido would be expected to have higher CO concentrations than Carlsbad due to its inland valley

location. CO is considered a local pollutant, as it is found in high concentrations only near the source of emission. Automobiles and other mobile sources are the principal sources of the CO emissions. High levels of CO emissions can also be generated from fireplaces and wood-burning stoves. According to the data recorded at the Oceanside and Escondido air monitoring stations, there has been only one exceedance of the Ambient Air Quality Standards since 1990 and that exceedance was due to the 2003 firestorm (see **AIR QUALITY Figure 1 and Table 7**).

AIR QUALITY Table 7
CO Air Quality Summary, 1990-2007 (ppm)

Year	Month of Max. 8-Hr Average	Maximum 1-Hr Average	Maximum 8-Hr Average
Oceanside - Mission Avenue			
1990	JAN	6.0	4.00
1991	DEC	7.0	3.33
1992	JAN	7.0	3.88
1993	DEC	5.3	3.40
1994	DEC	5.2	3.91
1995	JAN	4.4	3.13
1996	JAN	4.0	2.60
1997	JAN	6.1	2.88
1998	DEC	3.2	2.31
Escondido – East Valley Parkway			
1999	DEC	9.9	5.26
2000	NOV	9.3	4.93
2001	JAN	8.5	5.11
2002	JAN	8.5	3.85
2003	OCT	8.9[a]	3.90[a]
2004	JAN	6.3	3.81
2005	JAN	5.9	3.10
2006	DEC	5.7	3.61
2007	DEC	5.2	3.19

California Ambient Air Quality Standard: 1-Hr, 20 ppm; 8-Hr, 9.0 ppm
National Ambient Air Quality Standard: 1-Hr, 35 ppm; 8-Hr, 9 ppm
[a] Excludes 2003 firestorm event where maximum 1-Hr and 8-Hr CO concentrations were 12.7 and 10.6 ppm, respectively.

Source: ARB 2006, ARB 2008c, SDAPCD 2008a.

Nitrogen Dioxide (NO_2)

As shown in **AIR QUALITY Table 8,** the maximum one-hour and annual concentrations of NO_2 at the Oceanside and Camp Pendleton monitoring stations are lower than the California and National Ambient Air Quality Standards. Approximately 75 to 90 percent of the NOx emitted from combustion sources is Nitric Oxide (NO), while the balance is NO_2. NO is oxidized in the atmosphere to NO_2 by oxygen and ozone. In the summer, the conversion rates of NO to NO_2 are high, but the relatively high temperatures and windy conditions (atmospheric unstable conditions) generally disperse pollutants, preventing the accumulation of NO_2 to levels approaching the California one-hour ambient air quality standard. Additionally NO_2 concentrations are reduced during

summer daylight conditions through consumption in the photochemical reaction that creates ozone. The formation of NO_2 in the presence of ozone is according to the following reaction:

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

As shown in **AIR QUALITY Table 8,** the maximum one-hour and annual concentrations of NO_2 at the Oceanside and Camp Pendleton monitoring stations typically occur in winter or fall.

AIR QUALITY Table 8
NO_2 Air Quality Summary, 1990-2007 (ppm)

Year	Month of Max. 1-Hr Average	Maximum 1-Hr Average	Annual Average
Oceanside – Mission Avenue			
1990	JAN	0.180	0.023
1991	FEB	0.130	0.024
1992	JAN	0.190	0.024
1993	FEB	0.124	0.020
1994	JAN	0.123	0.020
1995	NOV	0.139	0.019
1996	JAN	0.106	0.017
1997	OCT	0.106	0.018
1998	DEC	0.087	0.016
1999	JAN	0.133	0.019
2000	JAN	0.114	0.017
2001	FEB	0.096	0.016
Camp Pendleton			
2002	FEB	0.109	0.013
2003	JAN	0.095	0.012
2004	JAN	0.099	0.012
2005	JAN	0.077	0.012
2006	MAY	0.081	0.011
2007	JAN	0.068	0.010
California 1-Hr Ambient Air Quality Standard: 0.18 ppm California Annual Arithmetic Mean Ambient Air Quality Standard: 0.03 ppm National Annual Arithmetic Mean Ambient Air Quality Standard: 0.053 ppm			

Source: ARB 2008c.

Sulfur Dioxide (SO_2)

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

Sources of SO_2 emissions within the SDAB come from every economic sector and include a wide variety of fuels: gaseous, liquid and solid. The SDAB is designated

attainment for all the SO_2 state and federal ambient air quality standards. **AIR QUALITY Table 9** shows the historical one-hour, 24-hour and annual average SO_2 concentrations collected from the Oceanside Mission Avenue, San Diego 12th Avenue, and Beardsley Street monitoring stations. As **AIR QUALITY Table 9** shows, concentrations of SO_2 are far below the state and federal SO_2 ambient air quality standards.

AIR QUALITY Table 9
SO_2 Air Quality Summary, 1990-2007 (ppm)

Year	Maximum 1-Hr Avg.	Month of Max. 24-Hr Avg.	Maximum 24-Hr Avg.	Annual Average
Oceanside – Mission Avenue				
1990	0.020	DEC	0.018	0.001
1991	0.020	NOV	0.010	0.001
1992	0.020	SEP	0.010	0.001
San Diego - 12th Avenue [a]				
1993	0.047	JAN	0.018	0.003
1994	0.069	JUN	0.013	0.003
1995	0.063	AUG	0.018	0.003
1996	0.048	APR	0.012	0.003
1997	0.052	MAY	0.014	0.003
1998	0.040	JUL	0.011	0.003
1999	0.039	AUG	0.008	0.002
2000	0.038	SEP	0.010	0.004
2001	0.052	AUG	0.012	0.003
2002	0.028	SEP	0.007	0.003
2003	0.036	JAN	0.008	0.004
2004	0.042	SEP	0.008	0.004
2005	0.040	APR	0.007	0.003
San Diego – Beardsley Street				
2006	0.034	FEB	0.009	0.004
2007	0.018	OCT	0.006	0.003

California Ambient Air Quality Standard: 1-Hr, 0.25 ppm; 24-Hr, 0.04 ppm
National Ambient Air Quality Standard: 3-Hr, 0.5 ppm; 24-Hr, 0.14 ppm; Annual, 0.030 ppm
[a] 2005 is a mixture of San Diego 12th Avenue and Beardsley Street.

Source: ARB 2006, ARB 2008c, SDAPCD 2008a.

Visibility

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

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

Summary

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

AIR QUALITY Table 10
Staff Recommended Background Concentrations (µg/m^3)

Pollutant	Averaging Time	Recommended Background	Limiting Standard	Percent of Standard
NO_2	1 hour	152.6	339	45%
	Annual	22.8	57	40%
PM10	24 hour	57	50	114%
	Annual	24.2	20	121%
PM2.5	24 hour	37.7	35	108%
	Annual	12	12	100%
CO	1 hour	6,785	23,000	30%
	8 hour	4,011	10,000	40%
SO_2	1 hour	94.3	655	16%
	3 hour	84.9	1,300	7%
	24 hour	23.6	105	23%
	Annual	10.7	80	14%

Source: ARB 2006, ARB 2008c, SDAPCD 2008a, and Energy Commission Staff Analysis

Where possible, staff prefers that the recommended background concentrations come from nearby monitoring stations with similar characteristics. For this project the Camp Pendleton monitoring station (ozone and NO_2) is located reasonably close to the project site, in the Camp Pendleton Marine Base approximately 6.3 miles north northwest of the project site. The Escondido (CO, PM10, and PM2.5) and San Diego (SO_2) monitoring stations are located further from the site, but considering the inland valley location of Escondido and the more industrialized area of San Diego these two locations should provide conservatively high background concentrations for Carlsbad.

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

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

PROJECT DESCRIPTION AND EMISSIONS

The applicant has proposed to develop the CECP on a 23-acre site, within the 95-acre Encina Power Station site. This 23-acre site currently contains three unused fuel-oil storage tanks that previously serviced the existing Encina Power Station boilers. The project would consist of two Siemens Rapid Response SGT6-5000F gas turbines operating in combined cycle mode and a 246 brake horsepower (bhp) diesel fire pump engine. The project would employ air cooling and would not include any other stationary emission sources. The existing Encina Power Station (EPS) boilers Units 1 through 3 would be removed from service after the new power facilities are installed and begin commercial operation.

The project would maximize the use of existing linear lines; therefore, no offsite construction is necessary for transmission, gas supply, or sewer lines for this project. The proposed project includes demolition of fuel-oil storage tanks 5, 6, and 7 along with any resulting soil remediation, and the construction of a new 230-kV switchyard. An ocean-water purification system would be constructed to assure sufficient quantities of water. The maximum daily intake of ocean water for purification purposes would range between 604,500 gallons per day (gpd) without power augmentation (PAG) and 1.22 million gallons per day (mgd) with PAG operating 8 hours per day, plus additional ocean water for mixing at the outfall for a maximum 4.32 mgd. The project would discharge industrial wastewater either through the existing EPS ocean-water discharge system or through the City's existing sanitary/industrial wastewater sewer system,

The project site is located in the City of Carlsbad just west of the I-5, one quarter mile east of Carlsbad Boulevard, just south of Aqua Hedionda Lagoon, and 4/10ths of a mile north of Cannon Road. The site location is in a man-made depression or pit that was constructed as secondary containment for the fuel tanks. The general area around the site has mixed use with heavy industrial use (the Encina Power Station), light industrial use, commercial use, residential, and schools; as well as, recreational use of the Pacific Ocean beaches, the Agua Hedionda Lagoon, and Cannon Park.

The nearest residence is located approximately 0.44 miles to the northeast of the site, with other residences 0.49 miles and 0.51 miles to the northwest and southwest of the site. The nearest school, Jefferson Elementary, is located approximately 0.69 miles north northwest of the site.

CONSTRUCTION

Construction of the CECP would consist of the following onsite activities: 1) demolition of the existing oil tanks; 2) removal of oil contaminated soils; 3) site preparation, grading and reclaim water pipeline installation; 3) reconstruction of the berm; 4) power plant construction.

The total construction period is 25 months. During the construction periods, most of heavier construction activities would occur between 7 am and 7 pm, 9 hours per day, 5 days per week. However, there would be times when additional hours of construction may be necessary to make up for construction delays due to weather or other

unforeseen events. Some activities would be continuous 24 hours per day, 7 days per week, during some construction periods and during startup and commission of the units.

Construction laydown and construction worker parking area for this project would occupy approximately 10 acres of property within the existing Encina Power Station. An existing railroad line, which would be available for delivery of materials and heavy equipment, is located immediately on the west side of the project site. Materials and other equipment would also be delivered by truck, accessed from Cannon Road.

Fugitive dust emissions during the construction of the project would result from dust entrained during demolition, site preparation and grading/excavation activities, on-site and offsite travel on paved and unpaved surfaces, and aggregate and soil loading and unloading operations, as well as wind erosion of areas disturbed during construction activities. The largest fugitive dust emissions are often generated during site preparation activities, where work such as clearing, grading, excavation of footings and foundations, and backfilling operations occur. These types of activities require the use of large earth moving equipment, which generate combustion emissions, along with creating fugitive dust emissions. Fugitive dust emissions resulting from onsite soil disturbances, such as dozing and grading, and from onsite and offsite traffic also were estimated.

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

Below construction emissions are based on the 25 month construction schedule. The applicant's estimates for the maximum daily emissions during construction period are shown in **AIR QUALITY Table 11**.

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

Activity	NOx	CO	VOC	SOx	PM10	PM2.5
On-Site						
Construction Equipment	274.90	150.27	25.19	0.30	11.45	11.45
Fugitive Dust	--	--	--	--	30.77	6.14
Off-site						
Worker Travel, Truck, Rail Deliveries	218.78	379.15	42.62	0.40	9.45	9.45
Total Maximum Daily Emissions	493.67	529.42	67.82	0.71	51.66	27.04

Source: SR 2008h, Table 5.1E1-19

The peak annual on-site and off-site construction equipment exhaust and fugitive emissions, which for NOx occur during months 5 through 16 of the 25 month construction schedule, are summarized in **AIR QUALITY Table 12**.

AIR QUALITY Table 12
Peak Annual Emissions During Construction, tons/year

Activity	NOx	CO	VOC	SOx	PM10	PM2.5
On-Site						
Construction Equipment	16.94	13.34	1.68	0.02	0.71	0.71
Fugitive Dust	--	--	--	--	2.47	0.45
Off-site						
Worker Travel, Truck, Rail Deliveries	9.69	31.61	3.26	0.03	0.49	0.49
Total Peak Annual Emissions	26.63	44.95	4.94	0.05	3.68	1.65

Source: SR 2008h, Table 5.1E1-19

The onsite emissions shown in **AIR QUALITY Tables 11** and **12** are somewhat lower than the emissions, from an earlier applicant emission estimate, that were used to model the air quality impacts from construction.

INITIAL COMMISSIONING

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

The commissioning activities for the two turbines (known as Units 6 and 7) would be completed simultaneously. Commissioning is estimated to last for 58 days for Unit 6 and 61 days for Unit 7. Starting with Unit 6 first, each of the two gas turbines would undergo sequential test operation with increasing load levels and successive application of the air pollution control systems. After completing the commissioning period, the new units are expected to be available for commercial operation. During the commissioning period, the existing boilers Units 1, 2, and 3 at the Encina Power Station would be available for operation; however, these boilers would not be operated simultaneously with a new CTG undergoing a commissioning test.

AIR QUALITY TABLE 13 presents the applicant's estimated emissions during the initial commissioning period (CECP 2007a). The project would have a total of 49 commissioning activities, which are summarized in the 18 test categories as shown in the table. The emission rate for SO_2 is not expected to be higher during the commissioning period than during normal operation.

AIR QUALITY Table 13
CECP Initial Commissioning Activities, Duration, and Emissions (lbs/hr/turbine)

Commissioning Activity	Duration (hr)	NOx	CO	VOC	PM
GT Testing @ 0% load	8	47.0	3812.6	163.8	11.6
GT Testing @ 40% load	8	200.1	2210.4	84.6	12.8
Steam Blow/HRSG Tuning	12	146.3	3642.7	80.8	12.0
Steam Blow	24	83.9	762.3	59.4	9.3
Establish vacuum/HRSG,BOP Tuning GT Load Test & Bypass Valve Tubing	64	14.9	56.8	8.5	8.6
GT Load Test & Bypass Valve Tubing /Safety Valve Testing	12	18.5	70.2	7.7	8.8
GT Base Load/Commissioning of NH_3 system GT Load Test & Bypass Valve Tubing	24	21.7	71.0	8.1	9.8
Bypass Operation/STG Initial Roll & Trip Test	10	18.2	86.9	11.3	8.9
Bypass Operation/STG Load Test	16	14.9	56.8	8.5	8.6
GT on Bypass/STG Load Test	16	19.8	54.2	6.6	9.5
Combine Cycle Testing/Drift Test (1)	24	16.1	25.6	3.9	9.0
Combine Cycle Testing/Drift Test (2)	24	15.8	15.6	3.0	8.9
Emissions Tuning/Drift Test Pre-performance Testing/Drift Test	60	21.7	71.0	8.1	9.8
RATA/Pre-performance Testing/Source Testing	15	20.2	57.6	6.9	9.5
Pre-performance Testing/Source Testing (1)	14	20.6	61.4	7.2	9.6
Pre-performance Testing/Source Testing (2)	12	21.7	71.0	8.1	9.8
Performance Testing	48	17.9	37.4	5.0	9.2
CALISO Certification	24	21.7	71.0	8.1	9.8

Source: CECP 2007a, Appendix 5.1 B, Table 5.1B-9
Note: BOP = Balance of Plant.

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

AIR QUALITY Table 14 shows the summary of annual initial commissioning emissions per turbine.

AIR QUALITY Table 14
CECP Initial Commissioning Emissions per Turbine, tons

	NOx	CO	VOC	PM
Per Gas Turbine	6.24	65.17	3.48	1.96
Total	12.48	130.34	6.96	3.92

Source: CECP 2007a, Appendix 5.1 B, Table 5.1B-9 and FDOC (SDAPCD 2009)

OPERATIONAL PHASE

Equipment Description

The CECP facility would consist of two power blocks, with the following major components, providing a total nominal generating capacity of 540.4 MW net: (CECP 2007a, SR 2008h):

- Two Siemens SGT6-PAC5000F Combustion Turbine generators (CTG) equipped with Dry Low-NOx (DLN) combustion system, inlet air filters, steam power augmentation, and inlet air evaporative coolers;

- Two Heat Recovery Steam Generators (HRSG);
- Each HRSG would be equipped with a selective catalytic reduction (SCR) system with 19 percent aqueous ammonia injection to further reduce NOx emissions, and an oxidation catalyst to reduce CO emissions;
- Two condensing steam turbine generators (STG);
- Two air-cooled fin-fan coolers;
- Two 139-foot tall, 21.3-foot diameter exhaust stacks;
- A continuous emission monitoring (CEM) system installed on each stack would record concentrations of NOx, CO, and oxygen in the flue gas;
- A 246 brake horsepower (bhp) emergency fire pump engine.

Facility Operation

The facility would be capable of operating 7 days a week, 24 hours per day, but is being permitted to a maximum emission equivalent of 4,100 hours per year. This is equivalent to an annual capacity factor of approximately 47 percent. The applicant expects that the new facility would be operated primarily as an intermediate duty unit (aka mid-merit) on a daily basis, especially during summer months when there are peak demands. Annual non-emergency operation of the emergency fire pump engine would be limited to 50 hours per year of engine testing.

The applicant is not able to determine the exact operational schedule for CECP since the operation profile would change depending on the variable demand in the service area. The Energy Commission 2007 Integrated Energy Policy Report (IEPR) forecasts an increasing demand for electricity in the San Diego region (CEC 2007f). In addition, the South Bay Power plant in the service region city of Chula Vista is expected to retire, perhaps as early as the end of 2009. Therefore, overall power generation at the Encina Power Station is likely to increase, rather than decrease, over the next several years.

CECP operations would require a 14 person workforce including operators on rotating shifts and maintenance technicians during the standard 8-hour work day. However, CECP operation would not require new employees because this 14 person workforce would be provided by the 50 person workforce which operates the existing Encina Power Station.

Emission Controls

The exclusive use of pipeline-quality natural gas, a relatively clean-burning fuel, would limit the formation of VOC, PM10, and SO_2 emissions. Natural gas contains very little noncombustible gas or solid residues and a small amount of reduced sulfur compounds, including mercaptan. A dry low-NOx (DLN) combustor and post-combustion NOx control in the form of a selective catalytic reduction (SCR) system would be provided for each power block to control NOx concentrations in the exhaust gas. The SCR system would use 19 percent aqueous ammonia to reduce NOx emissions to no greater than 2.0 parts per million by volume, dry (ppmvd) adjusted to 15 percent oxygen from the gas turbines/SCR systems. Ammonia slip would be limited to 5 ppmvd at 15 percent oxygen on a dry basis. Staged combustion of a pre-mixed fuel/air charge would reduce CO and

VOC emissions. An oxidizing catalytic converter would be used to further reduce the CO concentration in the exhaust gas emitted to the atmosphere to 2.0 ppmvd adjusted to 15 percent oxygen. VOC emissions would also be limited to 2.0 ppmvd adjusted to 15 percent oxygen. Particulate and SOx emissions would be controlled using natural gas as the sole fuel for the CTG (CECP 2007a). The emergency fire pump engine emissions would be controlled by the use of an engine meeting U.S.EPA/ARB Tier 2 engine emission standards, or Tier 3 if available, and using California low sulfur (15 ppm sulfur) diesel fuel.

Two 139-foot tall, 21.3-foot diameter stacks would release the CTGs exhaust gas into the atmosphere. A continuous emission monitoring (CEM) system would be installed on the CTG stack to monitor flue gas flow rate, NOx and CO concentration levels, and percentage of oxygen in the flue gas to assure adherence with the proposed emission limits. The CEM system would generate reports of emissions data in accordance with permit requirements and send alarm signals to the control room in plant when the level of emissions approaches or exceeds pre-selected limits.

Project Operating Emissions

Air emissions would be generated from operating the two CTGs. The maximum hourly normal operating emission rates for the CTGs are provided in **AIR QUALITY Table 15.** The maximum hourly normal operating emission rates reflect the cold ambient base load operating case.

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

Operating Unit	NOx	CO	VOC	SOx[b]	PM10
Unit 6	15.1	9.2	4.0	4.4	9.50
Unit 7	15.1	9.2	4.0	4.4	9.50
Total Maximum Hourly Emissions	30.2	18.4	8.0	8.8	19.00

Source: CECP 2007a, Appendix 5.1B, Table 5.1B-2B and FDOC (SDAPCD 2009)
[a] Emission rates shown reflect the highest value at any operating load. The full load average annual hourly emission rate values for NOx, CO, VOC and SOx are somewhat lower than these maximum values. For NOx, CO, and VOC emission levels exclude startups and shutdowns.
[b] SO_2 emissions are based on worst case natural gas sulfur content of 0.75 grains/100 dry standard cubic feet. Actual likely long-term worst-case sulfur content is less than 0.25 grains/100 dry standard cubic feet.

Expected maximum emission rates during startup and shutdown events are summarized in **AIR QUALITY Table 16**. Hourly startup emissions rates reflect 22 minutes of elevated emissions followed by 38 minutes of normal operating emission levels. During shutdown, the emissions rates reflect 7 minutes of elevated emission levels preceded by 53 minutes of normal operating emissions. The applicant also expects that there could be periodic cases which would have both startup and shutdown events within an hour. This case represents the worst case hourly emissions, reflecting 29 minutes of higher emission levels and 31 minutes of normal operating emission levels; however, it is expected that this would occur very infrequently. PM10 and SO_2 emissions are not shown in the **AIR QUALITY Table 16**, since the emissions for these pollutants are not estimated to be higher or lower during startup and shutdown events than during normal operation.

AIR QUALITY Table 16
Maximum Short-Term Event Emissions, lbs/hr, per gas turbine

Startup/Shutdown	NOx	CO	VOC
Startup	69.2	545	15.5
Shutdown	47	286	8.2
Startup/Shutdown	86	814	19.8

Source: FDOC (SDAPCD 2009)

The derivation of these short-term emission limits includes a safety factor of 2 for short-term emission limits (CECP 2007a, Appendix 5.1B, Table 5.1B-7). A safety factor of 1.5 is used for annual emissions estimates of startup and shutdown.

The FDOC issued by the San Diego Air Pollution Control District includes a number of permit conditions that allow for operation during tuning (adjusting or tuning the combustor cans) circumstances (Conditions **AQ-13**), at low load (Conditions **AQ-20**) and operation of the turbine units at NOx concentrations greater than BACT (Conditions **AQ-32**, **33** and **34**). After additional review and discussion with the District, staff is satisfied that these conditions, even though they allow higher stack NO_2 concentrations, do not allow emission rates (lbs/hour) that are higher than the bounding conditions for emissions presented in **Air Quality Tables 13** and **16** so the impact analysis for initial commission and start-up operations does provide the bounding worst-case.

The applicant also requested an allowance for increased NOx 1-hour average emissions up 12 ppm (or six time higher than normally allowed) for up to 15 hours per year during transient conditions that could have occurred in several defined ways, including: rapid turbine load changes initiated under Automatic Generation Control, rapid turbine load changes due to automatic safety or equipment protection control systems activation, the first two hours after inactivation of the gas turbine inlet air cooler, or other events resulting from technological limitations agreed to by the District. The District researched this request and determined that there was insufficient documentation to support the need for this additional exception to the 2.0 ppm NOx limit, but the District does allow for the 2.0 ppm NOx, the 2.0 ppm CO, and the 1.5 ppm VOC concentration limits to be based on a 3-hour average during transient conditions rather than a one-hour average to cover minor potential emission spikes during transient conditions (**AQ-28**, **29**, and **30**). Staff supports the District's finding regarding transient conditions operation.

AIR QUALITY Table 17 summarizes the maximum (worst-case) estimated daily emissions for CECP. Maximum daily emissions for turbines are based on 6 hours of startup, 6 hours of shutdown, and 12 hours of normal operation.

AIR QUALITY Table 17
CECP Worst-Case Hourly and Daily Emissions

	Hours	NOx	CO	VOC	SOx[a]	PM10	NH_3
Startup (lbs/hr)	6	69.2	545	15.5	4.40	9.50	14.01
Shutdown (lbs/hr)	6	47	286	8.2	4.40	9.50	14.01
Normal Operation (lbs/hr)	12	15.1	9.2	4.0	4.40	9.50	14.01
Emergency Fire Pump (lbs/hr)	1	2.08	0.24	0.05	0.00	0.035	0.00
Maximum (Single gas turbine, lbs/day)		877	5102	190	106	228	336
Maximum (Two gas turbines, lbs/day)		1,754	10205	380	211	456	672
Maximum (New Equipment, lbs/day)		1,756	10205	380	211	456	672

Source: CECP 2007a, Appendix 5.1B, Table 5.1B-2B and FDOC (SDAPCD 2009)
[a] SO_2 annual emissions are based on SDG&E tariff basis of 0.75 grains/100 dry standard cubic feet.

Maximum annual emissions for turbines are based on 300 hours of startup and 300 hours of shutdown and 3500 hours of normal operation at annual average base conditions. The maximum annual emissions are shown in **AIR QUALITY Table 18**. The emissions from the emergency fire pump are estimated based on 50 hours of operation annually. The emission rates for annual worst-case emissions calculation are slightly lower than those for daily worst-case emissions calculation, as the applicant has assumed somewhat different annual average and hourly/daily worst case startup and shutdown emissions; and the operating condition assumed for the annual emissions calculations is the average ambient base load case, rather than the cold ambient base load case that was used to calculate the maximum potential daily emissions. The annual emissions listed in **AIR QUALITY Table 18** are the proposed annual emission limits for the CECP.

AIR QUALITY Table 18
CECP Worst-Case Hourly and Annual Emissions

	Hours	NOx	CO	VOC	SOx[a]	PM10	NH_3
Startup (lbs/hr)	300	51.88	409.25	15.5	1.37	9.5	13.08
Shutdown (lbs/hr)	300	35.05	214.71	8.2	1.37	9.5	13.08
Normal Operation (lbs/hr)	3500	14.13	8.6	3.7	1.37	9.5	13.08
Emergency Fire Pump (lbs/hr)	50	2.08	0.24	0.05	0.0	0.035	0.0
Maximum (Single gas turbine, ton/yr)		37.77	108.65	10.03	2.81	19.48	26.81
Maximum (Two gas turbines, ton/yr)		75.54	217.30	20.05	5.61	38.95	53.62
Maximum (New Equipment, ton/yr)		75.59	217.31	20.05	5.61	38.95	53.62

Source: CECP 2007a, Appendix 5.1B, Table 5.1B-4 and FDOC (SDAPCD 2009)
[a] For the purposes of determining annual average SOx emissions a natural gas sulfur content of 0.25 grains/100 dry standard cubic feet is used. The FDOC indicates an annual permitted emission rate of 8.43 tons per year per turbine based on a sulfur content of 0.75 grains/100 dry standard cubic feet.

AIR QUALITY Table 19 summarizes the expected applicant's estimate for the maximum annual emissions for the CECP, the existing Encina Power Plant Unit 1-3 annual emissions baseline[1], and the expected maximum annual incremental project emission increase.

AIR QUALITY Table 19
CECP Incremental Annual Emissions

	Pollutant (tons/year)				
Emission Source	**NOx[a]**	**CO[b]**	**VOC[c]**	**SOx**	**PM10[d]**
CECP Expected Maximum Annual Emissions	72.11[a]	217.3	20.1	5.6	39.0
Encina Power Plant Units 1-3 Emissions Baseline	32.21	268.80	15.3	6.15	31.5
Net Emissions Increase	39.9	-51.51[b]	4.8	-0.6	7.5

Source: CECP 2007a, SR 2008k, and FDOC (SDAPCD 2009).
[a] The applicant has taken a reduced facility-wide NOx emission limit to ensure that emissions were limited below PSD permitting thresholds.
[b] This represents normal operating years. For the initial commissioning year the annual CO emissions would be permitted to 339.9 tons, which for that one year of initial commissioning would result in an emission increase in CO of 71.0 tons.
[c] This represents normal operating years. For the initial commissioning year the annual VOC emissions would be permitted to 23.7 tons, which for that one year of initial commissioning would result in an emission increase in VOC of 8.4 tons compared to the average annual potential VOC increase of 4.8 tons.
[d] The total emission increase for PM2.5 is 7.6 tons.

[1] Baseline as determined by SDAPCD staff through correspondence with the Encina project owner using an average of 2002 to 2006 emissions, correcting 2002 and 2003 NOx emissions for Rule 69 compliance. The specific annual corrected emissions baseline for Encina boiler units 1 to 3, in tons per year, determined by SDAPCD staff are as follows (SDAPCD 2008c):

	2002	2003	2004	2005	2006	Average
NOx	39.99	27.7	46	31.73	16.17	32.21
CO	494.59	344.03	266.73	144.25	94.43	268.80
VOC	16.18	14.83	22.14	15.41	8.11	15.33
SOx	9.53	12.51	2.41	3.69	2.59	6.15
PM10	34.97	27.66	45.28	33.58	15.97	31.49

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

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

METHOD AND THRESHOLDS FOR DETERMINING SIGNIFICANCE

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

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

DIRECT/CUMULATIVE IMPACTS AND MITIGATION

While the emissions are the actual mass of pollutants emitted from the project, the impacts are the concentration of pollutants from the project that reach the ground level. When emissions are expelled at a high temperature and velocity through the relatively tall stack, the pollutants would be significantly diluted by the time they reach ground level. The emissions from the proposed project are analyzed through the use of air dispersion models to determine the probable impacts at ground level.

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

The applicant has used EPA-approved screening (SCREEN3) and refined (ISCST3 and AERMOD version 07026) air dispersion models to estimate the direct impacts of the project's NOx, PM10, CO, and SOx emissions resulting from project construction and operation.

Staff revised the background concentrations provided by the applicant, replacing them with the available highest ambient background concentrations as show in **AIR QUALITY Table 10**. Staff added the modeled impacts to these background concentrations, then compared the results with the ambient air quality standards for each respective air contaminant to determine whether the project's emission impacts would cause a new violation of the ambient air quality standards or would contribute to an existing violation.

The inputs for the air dispersion models include stack information (exhaust flow rate, temperature, and stack dimensions), specific turbine emission data and meteorological data, such as wind speed, atmospheric conditions, and site elevation. For this project, the meteorological data used as inputs to the model included hourly wind speeds and directions measured at the Camp Pendleton Station during 2003 through 2005, which is the closest complete meteorological data source to the project site, and is meteorological data both compiled by and approved for use by the SDAPCD. Additionally, the applicant obtained hourly ozone and NO_2 ambient data from the Camp Pendleton monitoring station for 2003 to 2005 from the District that was used in a more refined NO_2 impact modeling analysis using the Ozone Limiting Method (OLM) or the Plume Volume Molar Ratio Method (PVMRM) options that are available with AERMOD.

Construction Impacts and Mitigation

The following section discusses the project's short-term direct and cumulative construction ambient air quality impacts, as estimated by the applicant and revised by staff, and provides a discussion of appropriate mitigation. Staff reviewed the construction emissions estimates and air dispersion modeling procedures and requested the applicant provided revisions to both analyses as part of project discovery. Staff considers the revised analyses to provide an adequately conservative prediction of project construction impacts.

Construction Impact Analysis

The applicant used both the EPA guideline Industrial Source Complex Short Term (ISCST) model and ARMS/EPA Regulatory Model (AERMOD) model to estimate ambient impacts. The emission sources for the construction site were grouped into three categories: exhaust emissions, construction dust emissions, and windblown dust emissions. The exhaust and construction dust emissions were modeled as volume sources. The windblown dust emissions were modeled as area sources. For the volume sources, the vertical dimension was set to 6 meters, and the horizontal dimension was set based on the width of the construction area.

For the determination of one-hour average construction NOx concentrations the Ozone Limiting Method (OLM) was used to determine worst-case near field NO_2 impacts. The NOx emissions from internal combustion sources, such as diesel engines or gas turbines, are primarily in the form of nitric oxide (NO) rather than NO_2. The NO converts into NO_2 in the atmosphere, primarily through the reaction with ambient ozone, and NOx

OLM assumes full conversion of stack NO emission with the available ambient ozone. The NOx OLM method used assumed an initial NO_2/NOx ratio of 0.1 for diesel equipment. Actual monitored hourly background ozone and NO_2 concentration data (2003 to 2005 data that corresponds with the meteorological files) were used by this modeling method to calculate maximum potential NO to NO_2 conversion plus actual corresponding hourly NO_2 background to determine the maximum hourly NO_2 impacts. For the computing of annual average construction NOx concentrations, the Ambient Ratio Method (ARM) with the national default value of 0.75 for the annual average NO_2/NOx ratio was used by the applicant.

To determine the construction impacts on short-term ambient standards (i.e. 1-hour through 24 hours) the worst-case daily on-site construction emission levels were modeled[2]. For pollutants with annual average ambient standards, the annual on-site emissions levels were added to a conservatively estimated "background" of existing emissions to determine the cumulative effect. For the modeling analysis, it is assumed that all of the equipment would operate from 7 am to 4 pm for the short-term impact modeling (24 hours or less) and also only work on weekdays for the annual impact modeling. **AIR QUALITY Table 20** provides the results of this modeling analysis.

AIR QUALITY Table 20
CECP Maximum Onsite Construction Impacts, (μg/m^3)

Pollutant	Averaging Period	Project Impact (μg/m^3)	Background (μg/m^3) [a]	Total Impact (μg/m^3)	Limiting Standard (μg/m^3)	Type of Standard	Percent of Standard
NO_2	1 hour [b]	244	30	274	339	CAAQS	81%
	annual [c]	9	22.8	31.8	57	CAAQS	56%
PM10	24 hour	17	57	74	50	CAAQS	148%
	annual	2.4	24.2	26.6	20	CAAQS	133%
PM2.5	24 hour	7.1	37.7	44.8	35	NAAQS	128%
	annual	0.9	12	12.9	12	CAAQS	108%
CO	1 hour	1,343	6,785	8,128	23,000	CAAQS	35%
	8 hour	168	4,011	4,179	10,000	CAAQS	42%
SO_2	1 hour	2.7	94.3	97.0	655	CAAQS	15%
	3 hour	0.9	84.9	85.8	1,300	NAAQS	7%
	24 hour	0.1	23.6	23.7	105	CAAQS	23%
	annual	0.01	10.7	10.7	80	NAAQS	14%

Source: SR 2008a
[a] Background values, other than the 1-hour NO_2 value, have been adjusted per staff recommended background concentrations shown in **AIR QUALITY Table 10**.
[b] The NOx modeling analysis was performed using the ozone limiting method and matched both hourly background and hourly NO2 background concentrations for the ten highest modeled concentrations of each of the three modeled years (2003 to 2005) to determine a maximum hourly concentration.
[c] The annual modeling results were adjusted using the U.S. EPA default annual average Ambient Ratio Method (ARM) NOx ratio of 0.75.

As can be seen from the modeling results provided in **AIR QUALITY Table 20**, the construction impacts have the potential to worsen the existing violations of the PM10 and PM2.5 ambient air quality standards and are, therefore, potentially significant and

[2] The modeled emissions are based on an earlier construction equipment emission estimate that was somewhat higher than the latest emission estimate shown in **AIR QUALITY Tables 11** and **12**.

require all feasible mitigation. The applicant's construction modeling analysis indicates that the maximum NO_2, CO and SO_2 impacts would remain below the CAAQS and NAAQS. The NOx and VOC emissions from construction, when considering their potential secondary ozone formation added to the existing ozone "background", have the potential to contribute to existing exceedances of the ozone standard and are therefore potentially significant and staff recommends all feasible mitigation.

The maximum NO_2 project impacts are shown to be much higher than the background concentration in **AIR QUALITY Table 20** because the maximum modeled NO_2 impact, including ozone conversion of NO to NO_2 plus the actual hour NO_2 background, happened to occur during an hour with a low ambient NO_2 concentration.

The maximum construction impacts occur at the property line. The maximum residential and nearest school receptor[3] impacts of gaseous air pollutants (NOx, CO, and SOx) are lower than the maximum impact levels at the property line shown in **AIR QUALITY Table 20.** The maximum property line impacts are well below the associated ambient air quality standards for these pollutants. The maximum modeled residential and school receptor PM10 and PM2.5 concentrations, not including background, were determined to be as follows:

	Residential Receptor	School Receptor[4]
PM10 24-hour	6.25 µg/m^3	<5.36 µg/m^3
PM10 annual	0.082 µg/m^3	<0.017 µg/m^3
PM2.5 24-hour	2.60 µg/m^3	<2.22 µg/m^3
PM2.5 annual	0.031 µg/m^3	<0.006 µg/m^3

Staff is recommending all feasible mitigation measures to reduce construction emissions and associated impacts.

Construction Mitigation

Staff recommends that construction emission impacts be mitigated to the greatest feasible extent including all required measures from the District's rules and regulations, as well as other measures considered necessary by staff to fully mitigate the construction emissions. The District recently promulgated a fugitive dust control rule (Rule 55), that will become effective on December 24, 2009. The standard recommended Energy Commission fugitive dust control conditions would require control measures that would be as strict as or stricter than the requirements of new District Rule 55.

Applicant's Proposed Mitigation

The applicant proposed the following construction emission mitigation measures (CECP 2007a, Appendix 5.1E):

[3] The nearest residence is located approximately 0.44 miles to the northeast of the site, with other residences 0.49 miles and 0.51 miles to the northwest and southwest of the site. The nearest school, Jefferson Elementary, is located approximately 0.69 miles north northwest of the site.

[4] The impacts shown are for a point approximately 500 meters south of the school as the receptor grid did not extend far enough north to include the school. The more distant school would have lower impacts.

- Unpaved roads and disturbed areas in the project construction site will be watered as frequently as necessary to prevent fugitive dust plumes. The frequency of watering can be reduced or eliminated during periods of precipitation.
- The vehicle speed limit will be 15 miles per hour within the construction site.
- The construction site entrances shall be posted with visible speed limit signs.
- Construction equipment vehicle tires will be inspected and washed as necessary to be cleaned free of dirt prior to entering paved roadways.
- Gravel ramps of at least 20 feet in length will be provided at the tire washing/cleaning station.
- Unpaved exits from the construction site will be graveled or treated to prevent track out to public roadways.
- Construction vehicles will enter the construction site through the treated entrance roadways, unless an alternative route has been submitted to and approved by the Compliance Project Manager.
- Construction areas adjacent to any paved roadway will be provided with sandbags or other measures as specified in the Storm Water Pollution Prevention Plan (SWPPP) to prevent run-off to roadways.
- Paved roads within the construction site will be swept at least twice daily (or less during periods of precipitation) on days when construction activity occurs to prevent the accumulation or dirt and debris.
- At least the first 500 feet of any public roadway exiting from the construction site shall be swept at least twice daily (or less during periods of precipitation) on days when construction activity occurs or on any other day when dirt or runoff from the construction site is visible on public roadways.
- Soil storage piles and disturbed areas that remain inactive for longer than 10 days will be covered or treated with appropriate dust suppressant compounds.
- Vehicles used to transport solid bulk material on public roadways and having the potential to cause visible emissions will be provided with a cover, or the materials will be sufficiently wetted and loaded onto the trucks in a manner to provide at least one foot of freeboard.
- Wind erosion control techniques (such as windbreaks, water, chemical dust suppressants, and / or vegetation) will be used on all construction areas that may be disturbed. Any windbreaks installed to comply with this condition shall remain in place until the soil is stabilized or permanently covered with vegetation.

The applicant's construction emissions estimates as presented in **AIR QUALITY Tables 11** to **12,** and as used to determine the construction modeling impact results shown in **AIR QUALITY Table 18** assume the use of these fugitive emission control measures, as well as, the use of construction equipment that meets U.S. EPA/ARB Tier 2 nonroad diesel engine standards.

Adequacy of Proposed Mitigation

The applicant's proposed mitigation measures are very similar to those generally proposed by staff, so they are generally considered adequate with minor modifications to incorporate the latest staff recommendations and site specific concerns.

Staff Proposed Mitigation

Staff recommends construction PM10 and NOx emission mitigation measures as articulated in Conditions of Certification **AQ-SC1** through **AQ-SC5** that include the mitigation measures proposed by the applicant, with additional construction PM10 emission mitigation measures, revised construction equipment mitigation measures, and an addition to mitigate the potential for dust plume impacts on the adjacent I-5 freeway to assure maximum feasible fugitive dust control performance, construction equipment exhaust emissions control, and compliance enforcement mechanisms.

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**.

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

Staff recommends Condition of Certification **AQ-SC4** to 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, and to respond to any potential dust plume impacts to the adjacent I-5 freeway. Specific attention to mitigating visible dust impacts on the I-5 freeway are considered necessary due to its proximity, high traffic volumes, and its predominate downwind direction from the site.

Staff recommends Condition of Certification **AQ-SC5**, integrating and augmenting the applicant's assumed construction equipment mitigation as reasonable, 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 EPA/ARB Tier 2 engine compliant equipment for equipment over 100 horsepower where available, a good faith effort to find and use available 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.

Implementation of staff's recommended construction emission mitigation measures contained in the recommended Conditions of Certification would substantially reduce fugitive dust and tailpipe emissions during construction, particularly during the peak construction grading period, and reduce the potential for significant air quality impacts from this temporary emission source.

Operation Impacts and Mitigation

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

The applicant performed direct impact modeling analyses, including operations, startup and shutdown, fumigation, and an initial commissioning impact analysis.

Operational Modeling Analysis

Initial screening modeling was performed to determine the worst case short-term ambient and operating condition. Turbine emission rates were first calculated for seventeen operating conditions:

- Three nominal load points, low (60%), mid, and base (100%).
- Four different ambient conditions, cold, mild, average, and hot.
- Operating base load with the inlet evaporative coolers (not cold ambient) and with steam power augmentation (not cold or mild ambient).

These conditions were then modeled to determine the worst case short-term ambient and operating conditions and the assumptions to be used for the stack parameters in the startup/initial commissioning worst-case short term impact modeling analysis.

A refined modeling analysis was performed to estimate off-site criteria pollutant impacts from operational emissions of the proposed project. Refined modeling was performed in two phases: coarse grid modeling and fine grid modeling. Preliminary modeling was performed with the coarse grid to identify the areas of maximum concentration. Fine grids were used to refine the location of the maximum concentration.

The applicant used the AERMOD model to estimate ambient impacts. For the determination of NOx concentrations under all operating conditions the Plume Volume Molar Ratio Method (PVMRM) option was used. The NOx emissions from internal combustion sources, such as gas turbines, are primarily in the form of NO rather than NO_2. The NO converts into NO_2 in the atmosphere, primarily through the reaction with ambient ozone, and PVMRM mixes the plume with an assumed ozone concentration to determine the actual availability of ozone in the mixed plume and then assumes full conversion of stack NO emission with that available amount of ozone. The PVMRM method used by the applicant assumed an initial NO_2/NOx ratio of 0.1 and a final equilibrium ratio of 0.9. Actual monitored hourly background ozone and NO_2

concentration data (2003 to 2005 data that corresponds with the meteorological files) were used by this modeling method to calculate maximum potential NO to NO_2 conversion.

The applicant's predicted maximum concentrations of the directly emitted (not secondarily formed) pollutants for the CECP project under normal steady-state operating conditions of the CTGs are summarized in **AIR QUALITY Table 21.**

AIR QUALITY Table 21
CECP Normal Gas Turbine Operating Impacts – Both CTGs, (µg/m^3)

Pollutant	Averaging Period	Project Impact (µg/m^3)	Background (µg/m^3) [a]	Total Impact (µg/m^3)	Limiting Standard (µg/m^3)	Type of Standard	Percent of Standard
NO_2	1 hour	13.3	152.6	165.9	339	CAAQS	49%
	annual	0.1	22.8	22.9	57	CAAQS	40%
PM10	24 hour	1.2	57	58.2	50	CAAQS	117%
	annual	0.1	24.2	24.3	20	CAAQS	122%
PM2.5	24 hour	1.2	37.7	38.9	35	NAAQS	111%
	annual	0.1	12	12.1	12	CAAQS	101%
CO	1 hour	9.0	6,785	6,794	23,000	CAAQS	30%
	8 hour	1.9	4,011	4,013	10,000	CAAQS	40%
SO_2 [b]	1 hour	4.3	94.3	98.6	655	CAAQS	15%
	3 hour	2.0	84.9	86.9	1,300	NAAQS	7%
	24 hour	0.4	23.6	24.0	105	CAAQS	23%
	annual	0.0	10.7	10.7	80	NAAQS	13%

Source: SR 2008f
[a] Background values have been adjusted per staff recommended background concentrations shown in **AIR QUALITY Table 10**.

The applicant's predicted maximum concentrations of the directly emitted pollutants for the CECP project, including the fire pump engine along with the CTGs operating under normal steady-state conditions are summarized in **AIR QUALITY Table 22.**

AIR QUALITY Table 22
CECP Normal Facility Operating Impacts – CTGs and Fire Pump Engine, (µg/m^3)

Pollutant	Averaging Period	Project Impact (µg/m^3)	Background (µg/m^3) [a]	Total Impact (µg/m^3)	Limiting Standard (µg/m^3)	Type of Standard	Percent of Standard
NO_2	1 hour	108.0	152.6	260.6	339	CAAQS	77%
	annual	0.1	22.8	22.9	57	CAAQS	40%
PM10	24 hour	1.2	57	58.2	50	CAAQS	117%
	annual	0.1	24.2	24.3	20	CAAQS	122%
PM2.5	24 hour	1.2	37.7	38.9	35	NAAQS	111%
	annual	0.1	12	12.1	12	CAAQS	101%
CO	1 hour	18.2	6,785	6,803	23,000	CAAQS	30%
	8 hour	1.9	4,011	4,013	10,000	CAAQS	40%
SO_2 [b]	1 hour	4.3	94.3	98.6	655	CAAQS	15%
	3 hour	2.0	84.9	86.9	1,300	NAAQS	7%
	24 hour	0.4	23.6	24.0	105	CAAQS	23%
	annual	0.0	10.7	10.7	80	NAAQS	13%

Source: SR 2008f
[a] Background values have been adjusted per staff recommended background concentrations shown in **AIR QUALITY Table 10**.

As the difference in **AIR QUALITY Tables 21** and **22** shows, the fire pump engine, when testing has a higher short-term near-field impact potential for NOx and CO than the CTGs. This is due both to its lower height and lower exhaust buoyancy that enhances downwash and higher near-field ground level impacts and the more concentrated NOx and CO emissions in the fire pump engine exhaust. The applicant's modeling results indicate that the project's normal operational impacts would not create violations of NO_2, SO_2 or CO standards, but could further exacerbate violations of the PM10 and PM2.5 standards. In light of the existing PM10 and PM2.5 non-attainment status for the project site area, staff considers the modeled impacts to be significant and, therefore, we recommend mitigation.

Startup/Shutdown Event Modeling Impact Analysis

NOx and CO emissions are usually higher during startup and shutdown events than during steady state operation as the gas turbine emissions are higher during the short periods of unsteady state operation for startup and shutdown and the SCR and oxidation catalyst control systems are not functioning at their peak efficiency immediately upon startup or during shutdown. The applicant used the AERMOD model (version 07026) to determine the maximum short term NOx and CO emission impacts during simultaneous startup/shutdown of two gas turbines. The applicant's predicted maximum short-term NOx and CO concentrations from startup/shutdown events are summarized in **AIR QUALITY Table 23.**

AIR QUALITY Table 23
CECP Startup/Shutdown Impacts, (µg/m^3)

Pollutant	Averaging Period	Project Impact (µg/m^3)	Background (µg/m^3) [a]	Total Impact (µg/m^3)	Limiting Standard (µg/m^3)	Type of Standard	Percent of Standard
NO_2	1 hour	80.4	152.6	233.0	339	CAAQS	69%
CO	1 hour	1,134	6,785	7,919	23,000	CAAQS	34%
	8 hour	236	4,011	4,247	10,000	CAAQS	43%

Source: SR 2008f
[a] Background values have been adjusted per staff recommended background concentrations shown in **AIR QUALITY Table 10**.

The applicant's modeling results indicate that the project's maximum startup/shutdown emission impacts would not cause any new significant ambient impacts associated with NOx and CO.

Fumigation Modeling Impact Analysis

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

Fumigation conditions are short-duration events and are generally only compared to one-hour standards. Two types of fumigation are analyzed using the SCREEN3 model: inversion breakup and shoreline. Inversion breakup fumigation occurs under low-wind conditions when a rising morning mixing height caps a stack (i.e., is at or right above the stack height) limiting plume rise and mixing which fumigates the air below. Shoreline fumigation occurs near a large water body shoreline when a roughness boundary causes turbulent dispersion to be much more enhanced near the ground, fumigating air below. The applicant modeled seventeen different operating cases to determine the maximum fumigation impacts from the CTGs. All of the pollutants/averaging periods showed maximums under hot ambient full load with steam power augmentation, except for the PM10/PM2.4 impacts which showed a maximum under the hot ambient low load (60 percent) operating condition. The results of the analysis are shown in **AIR QUALITY TABLE 24**.

AIR QUALITY Table 24
Maximum CECP Fumigation Impacts, (µg/m^3)

Pollutant	Averaging Period	Project Impact (µg/m^3)	Background (µg/m^3) [a]	Total Impact (µg/m^3)	Limiting Standard (µg/m^3)	Type of Standard	Percent of Standard
Inversion Breakup Fumigation							
NO_2	1 hour	2.6	152.6	155.2	339	CAAQS	46%
PM10	24 hour	0.9	57	57.9	50	CAAQS	116%
PM2.5	24 hour	0.9	37.7	38.6	35	NAAQS	110%
CO	1 hour	1.6	6,785	6,787	23,000	CAAQS	30%
	8 hour	1.0	4,011	4,012	10,000	CAAQS	40%
SO_2 [b]	1 hour	0.8	94.3	95.1	655	CAAQS	15%
	3 hour	0.6	84.9	85.5	1,300	NAAQS	7%
	24 hour	0.3	23.6	23.9	105	CAAQS	23%
Shoreline Fumigation							
NO_2	1 hour	18.5	152.6	171.1	339	CAAQS	50%
PM10	24 hour	1.7	57	58.7	50	CAAQS	117%
PM2.5	24 hour	1.7	37.7	39.4	35	NAAQS	113%
CO	1 hour	11.3	6,785	6,796	23,000	CAAQS	30%
	8 hour	3.5	4,011	4,014	10,000	CAAQS	40%
SO_2 [b]	1 hour	5.4	94.3	99.7	655	CAAQS	15%
	3 hour	4.8	84.9	89.7	1,300	NAAQS	7%
	24 hour	0.5	23.6	24.1	105	CAAQS	23%

Source: SR 2008f
[a] Background values have been adjusted per staff recommended background concentrations shown in **AIR QUALITY Table 10**.

Maximum inversion breakup fumigation impacts for the turbines are lower than normal operating impacts predicted by AERMOD and were predicted to occur about 24.5 kilometers from the site (19.5 kilometers for PM10/PM2.5). The impacts under inversion fumigation conditions were found to above the maximum concentrations calculated under normal CTG operations (see **AIR QUALITY Table 21**), and the maximum impacts were found to occur approximately 2.0 kilometers from the site (1.3 kilometers for PM10/PM2.5).

Initial Commissioning Short-Term Modeling Impact Analysis

The applicant presented forty nine initial commissioning activities that would occur prior to meeting normal emission limits. The worst case conditions for the short-term NOx and CO impacts occur prior to the installation of the oxidation and SCR catalysts. The emissions for all cases and the worst-case are provided in **AIR QUALITY Tables 13 and 14**.

The applicant expects that there would be a staggered commissioning schedule for the project, therefore, the two CTGs would not undergo commissioning simultaneously. Consequently, analysis of commissioning impacts shown in **AIR QUALITY Table 25** is based on one CTG undergoing the worst case commissioning activity and the second CTG undergoing a normal operating startup/shutdown hour (see **AIR QUALITY Table 16**). The SO_2 and PM10 emissions and ambient air quality impacts are not forecast to be higher during initial commissioning or startup/shutdown events than they are under normal operation.

Air Quality Table 25
Maximum CECP Initial Commissioning Impacts

Pollutant	Averaging Period	Project Impact ($\mu g/m^3$)	Background ($\mu g/m^3$) [a]	Total Impact ($\mu g/m^3$)	Limiting Standard ($\mu g/m^3$)	Type of Standard	Percent of Standard
NO_2	1 hour	127.5	152.6	280.1	339	CAAQS	83%
CO	1 hour	3,228	6,785	10,013	23,000	CAAQS	44%
CO	8 hour	676	4,011	4,687	10,000	CAAQS	47%

Source: SR 2008f
[a] Background values have been adjusted per staff recommended background concentrations shown in **AIR QUALITY Table 10**.

The applicant's impact analysis indicates that the project's maximum initial commissioning emission impacts are below the most stringent ambient air quality standards for NO_2 and CO.

Chemically Reactive Pollutant Impacts

Ozone Impacts

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

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

PM2.5 Impacts

Secondary 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 and irreversibly to particulate form. Nitric acid reacts with ammonia to form both a particulate and a gas phase of ammonium nitrate. The particulate phase will tend to fall out; however, the gas phase can revert back to ammonia and nitric acid. Thus, under the right conditions, ammonium nitrate and nitric acid establish a balance of concentrations in the ambient air. There are two conditions that are of interest, described as *ammonia rich* and *ammonia poor*. The term ammonia rich indicates that there is more than enough ammonia to react with all the sulfuric acid and to establish a balance of nitric acid-ammonium nitrate. Further ammonia emissions

in this case would 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 would tend to increase PM2.5 concentrations.

The San Diego Air Basin has not undergone the rigorous secondary particulate studies that have been performed in other areas of California, such as the San Joaquin Valley, that have more serious fine particulate pollution problems. However, the available chemical characterization data shows that the annual ammonium nitrate and ammonium sulfate fine particulate concentrations in El Cajon and San Diego range from approximately 50 and 60 percent of the state annual ambient standard (ARB 2005). Because of the known relationship of NOx and SOx emissions to PM2.5 formation, it can be said that the emissions of NOx and SOx from the CECP do have the potential (if left unmitigated) to contribute to higher PM2.5 levels in the region.

Additionally, there would certainly be some secondary particulate conversion from the ammonia emitted from the CECP project; however, there is currently no regulatory model that can predict the conversion rate. Therefore, it is recommended that ammonia emissions be limited to the extent feasible, while ensuring that the selective catalytic reduction unit maintains NOx emissions below the required controlled concentration limit of 2 ppm.

Impact Summary

The applicant is proposing to mitigate the project's NOx, VOC, SO_2, and PM10 emissions through the use of BACT and limit the ammonia slip emissions to 5 ppm. The applicant also proposes to fully offset the project's permitted NOx net emission increase as required by the District, and staff is recommending additional mitigation to fully mitigate the permitted net emission increase for all of the criteria ozone and particulate precursor criteria pollutants. The ammonia slip concentration level matches other recently licensed large combined cycle projects in California. With the applicant proposed and staff recommended emission offset mitigation and ammonia slip limit, it is staff's belief that the project would not cause significant secondary pollutant impacts.

Operations Mitigation

Applicant's Proposed Mitigation

Emission Controls

As discussed in the project description section, the applicant proposes to employ dry lo-NOx burners, SCR with ammonia injection, CO catalyst, and operate exclusively on pipeline quality natural gas to limit turbine emission levels. The AFC (CECP 2007a) and the FDOC (SDAPCD 2009) provide the following BACT emission limits, each for the two CTGs:

- NOx: 2.0 ppmvd at 15 percent O_2 (one-hour average, excluding startup/shutdown) and 15.1 lb/hr
- CO: 2.0 ppmvd at 15 percent O_2 (one-hour rolling average, excluding startup/shutdown) and 9.2 lb/hr

- VOC: 1.5 ppmvd at 15 percent O_2 (one-hour rolling average, excluding startup/shutdown) and 4.0 lb/hr
- PM10: 9.5 lb/hr
- SO_2: 4.4 lb/hr with fuel sulfur content of 0.75 grains/100 scf
- NH_3: 5 ppmvd at 15 percent O_2 and 13.08 lb/hr

The District's FDOC conditions include provisions to allow the NOx and CO emissions to meet 2.0 ppmvd with a three hour averaging period during transient load conditions and VOC emissions to meet 1.5 ppmvd with a three hour averaging period during transient load conditions, as well as, allowing higher NOx emissions during low load and tuning periods (see Conditions of Certification **AQ-28**, **29**, **30**, **32**, **33**, and **34**), and provides separate emission limits for startup, shutdown, and initial commissioning consistent with the emission levels shown in **AIR QUALITY Tables 13** and **16** (see Conditions of Certification **AQ-40** to **AQ-43**).

Emission Offsets

District Rules 20.1 and 20.3 require NOx and VOC offsets for a major modification to an existing major stationary source, defined as an emission increase of more than 25 tons per year for NOx or VOC. The net emissions increase from the new facility, the CECP permitted emissions minus the baseline emissions from the existing Encina boiler units 1, 2, and 3, would exceed the District's NOx offset threshold level but not the VOC offset threshold, as shown in **AIR QUALITY Table 19**. The applicant has proposed to offset NOx emission through NOx and VOC emission reduction credits, using the interpollutant ratio of 2:1 for VOC ERCs for NOx emissions and the District's Federal Offset Requirement ratio of 1.2 to 1 for both interpollutant traded VOC offsets and NOx offsets. The applicant has proposed four offset certificates that total, after application of the interpollutant offset ratio, 49.6 tons of NOx equivalent per year. This amount is more than sufficient, with the offset ratio of 1.2 to 1, to offset the proposed 39.9 ton/year NOx emission increase.

Air Quality Table 26
NOx Offsets Surrendered for Carlsbad

Pollutant	Location	Credit Number	ERC Amount (tpy)	NOx equivalent Amount (tpy)
NOx	Naval Air Station – North Island	978938-05	35.3	35.3
NOx	3200 Harbor Drive, San Diego	981518-01	2.3	2.3
VOC	850 Lagoon Drive, Chula Vista	070823-02	5.3	2.65
VOC	7757 Andrews Avenue, San Diego	080212-01	18.7	9.35
			Total ERC	49.6
			Total Required (at 1.2:1 ratio)	47.88
			Total Surplus	1.72

Source: FDOC (SCAQMD 2009)

Air Quality Table 26 shows that the total amount of NOx ERCs available (49.6 tpy) exceeds the District's offset requirements based on the revised potential to emit emission increase of 39.9 tpy. This offset proposal also meets staff's recommended minimum offset ratio of 1:1.

The applicant has proposed (SR 2009a) the use of 2.9 tons of PM10 ERCs that they currently own and fund the creation of emission reduction credits for the remainder of the PM10 and VOC credits to meet CEC recommended 1:1 emission mitigation for the other non-attainment pollutant and precursors that have permitted emission increases (PM10 and VOC). The maximum permitted emission increases are 7.6 tons PM, based on PM2.5, and 8.4 tons of VOC during initial commissioning.

CO is attainment for the region. No offsets are proposed or required.

Adequacy of Proposed Mitigation

Staff concurs with the District's determination that the project's proposed emission controls/emission levels for criteria pollutants and ammonia slip meets BACT requirements and that the proposed emission levels are reduced to the lowest technically feasible levels. Staff also concurs that the applicant's District offset proposal would fully mitigate the proposed project's net NOx emissions increase.

Staff accepts the Applicant's newly proposed offset strategy to meet staff recommended mitigation levels, and provides specifics on its recommended implementation below in the staff proposed mitigation section.

Staff Proposed Mitigation

Staff is proposing Condition of Certification **AQ-SC7** to ensure that onsite soil remediation activities, other than transportation of contaminated soils would not occur at the project site. On-site soil remediation activities, such as soil farming, have not been analyzed and would increase emissions and localized impacts during construction.

Staff is proposing Conditions of Certification (**AQ-SC6** and **AQ-SC8**) that would ensure that the license is amended as necessary to incorporate changes to the air quality permits and ensure ongoing compliance through the requirement of quarterly reports.

Staff is proposing Condition of Certification **AQ-SC9** to ensure that initial commissioning occurs sequentially with only one turbine undergoing initial commissioning at a time as proposed by the applicant and evaluated in the impact assessment.

Staff proposes Condition of Certification **AQ-SC10** to specify the following four methods that the applicant can use to offset its emission increases for PM and VOC:

1. ERCs from the SDAPCD bank that are currently owned by the applicant.
2. Create enforceable emission reductions from the site, such as by shutting down the existing peaking turbine.
3. Create enforceable emission reductions from third party sources, which could be accomplished by funding the Carl Moyer Program[5] or a similar emission reduction program specific to this project[6].

[5] The ARB Carl Moyer Web page has the following description of the program: "The Carl Moyer Memorial Air Quality Standards Attainment Program provides incentive grants for cleaner-than-required engines, equipment and other sources of pollution providing early or extra emission reductions. Eligible projects include cleaner on-road, off-road, marine, locomotive and stationary agricultural pump engines, as well as forklifts, airport ground support equipment, and auxiliary power units. The program achieves near-term reductions in emissions of oxides of nitrogen

4. ERCs from the SDAPCD bank to be obtained by the applicant only if local emission reduction projects are clearly demonstrated to be unavailable, using methods 2 or 3 above, to meet the total emission reduction liability.

Assuming that the applicant does use their currently owned PM10 credits to partially meet the staff recommended offset liability, the applicant's emission reduction fee for the remaining 13.1 tons of emissions would equal $251,520.

Staff has determined that the proposed emission controls and emission levels, along with the applicant proposed and staff recommended emission offset package, would mitigate all project air quality impacts to less than significant.

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.

CUMULATIVE IMPACTS

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

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

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

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(NOx), particulate matter (PM), and reactive organic gas (ROG) which are necessary for California to meet its clean air commitments under the State Implementation Plan Program funds" (ARB 2008e).

[6] An example of a power plant project that completed a project specific emission reduction program is the Otay Mesa Power Plant Project.

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

- a summary of projections for criteria pollutants by the air district and the air district's programmatic efforts to abate such pollution;
- an analysis of the project's *localized cumulative impacts*, the project's direct operating emissions combined with other local major emission sources;
- a discussion of greenhouse gas emissions and global climate change impacts.

Summary of Projections

The SDAPCD has developed several elaborate plans to implement the federal Clean Air Act and state law as it addresses the cumulative air impacts of criteria pollutants in the San Diego air basin. These plans evaluate the regional context of air pollution in the air basin, and provide the air district strategies for addressing these cumulative impacts and eventually achieving "attainment" with various federal and state standards.

The SDAPCD is the lead agency for managing air quality and coordinating planning efforts for San Diego County and the San Diego Air Basin, so that the federal 8-hour ozone standard is attained in a timely fashion and attainment with CO standards are maintained. The District is responsible for developing those portions of the State Implementation Plan (SIP) and the Air Quality Management Plan (AQMP), that deal with certain stationary and area source controls and, in cooperation with the transportation planning agencies (TPAs), the development of transportation control measures (TCMs). Additionally, the SDAPCD is responsible for providing plans for attaining the California ozone standard and for reducing particulate (PM10 and PM2.5) emissions in compliance with Senate Bill 656 (Sher, Chapter 738, Statutes of 2003). In this role, the SDAPCD is the agency with principal responsibility for analyzing and addressing cumulative air quality impacts, including the impacts of ambient ozone, particulate matter, and CO. The District has summarized the cumulative impacts of ozone, particulate matter, and CO on the air basin from the broad variety of its sources. Analyses of these cumulative impacts, as well as the measures the District proposes to reduce impacts to air quality and public health, are summarized in six publicly available documents. These adopted air quality plans are summarized below.

- Eight-Hour Ozone Attainment Plan (federal 8-hour ozone attainment plan)
  Link: http://www.sdapcd.org/planning/8-Hour-Ozone-Attainment-Plan.pdf
- Air Resources Board's Proposed State Strategy for California's 2007 State Implementation Plan (federal 8-hour ozone attainment plan)
  Link: http://www.arb.ca.gov/planning/sip/2007sip/2007sip.htm
- Ozone Redesignation Request and Maintenance Plan (federal 1-hour ozone maintenance plan)
  Link: http://www.sdapcd.org/planning/RedesigPlan.pdf
- 2004 Revision to the California State Implementation Plan for Carbon Monoxide (federal CO maintenance plan)
  Link: http://www.arb.ca.gov/planning/sip/co/final_2004_co_plan_update.pdf

- 2004 Triennial Revision of the Regional Air Quality Strategy for San Diego County (state ozone attainment plan)
  Link: http://www.sdapcd.org/planning/RAQS-04.pdf
- Measures to Reduce Particulate Matter in San Diego County (Health and Safety Code 39614)
  Link: http://www.sdapcd.org/planning/SB656StaffRpt.pdf

The final 8-hour ozone attainment plan for San Diego County was submitted by the state in the ARB *Proposed State Strategy for California's 2007 State Implementation Plan* document in late 2007. This plan has not been approved by U.S. EPA, so the approved 1-hour plan is the currently approved ozone attainment plan for San Diego County. The 2007 State Implementation Plan, when approved by U.S. EPA, will become the ozone attainment plan for the District.

Eight-Hour Ozone Attainment Plan and Air Resources Board's Proposed State Strategy for California's 2007 State Implementation Plan

The District's Eight-Hour Ozone Attainment plan relies strongly on existing control measures included in District rules and regulations. The ARB's state proposed strategy for the State Implementation Plan relies primary on existing control measures, as well as tightening vehicle emissions (both on- and off-road vehicles) and emissions from other transportation sources, pesticides, and consumer products. No new control strategies that are directly applicable to the project are noted in either of these two ozone planning documents. Indirectly, the on-road and off-road control measures would regulate some of the delivery vehicles and construction equipment used during the projects construction and operation. U.S. EPA has not yet approved the 8-hour ozone attainment plan for California.

Ozone Redesignation Request and Maintenance Plan

This plan was prepared after the SDAB came into compliance with the federal 1-hour ozone standard in December 2002. U.S. EPA approved this plan and redesignated the San Diego Air Basin as attainment with the 1-hour standard effective July 28, 2003. The specific control measures included in the approved 1-hour ozone maintenance plan are those that were approved for the nonattainment State Implementation Plan (SIP), and no new measures were proposed. The existing measures from the previously approved SIP are included in the District's rule and regulations and ARB vehicle emission regulations. Therefore, compliance with these rules and regulations would ensure that the project conforms to the 1-hour ozone maintenance plan.

While the San Diego area is no longer subject to the revoked federal 1-hour ozone standard, the 8-hour ozone plan has not yet been approved by U.S. EPA, so this plan is the currently approved ozone plan for San Diego County.

2004 Revision to the California State Implementation Plan for Carbon Monoxide

The Carbon Monoxide Maintenance Plan applies to 10 separate areas in California that attained the federal CO standards in the 1990s, including the San Diego area. This plan does not include any further measures or requirements that would specifically relate to the project's direct and indirect emission sources. This plan relies on current motor

vehicle programs to ensure that attainment with the federal CO standards are maintained.

The project's construction and operation were not found to cause any new exceedances of the carbon monoxide ambient air quality standards (CO AAQS). The project's generated traffic would be insignificant in comparison with the existing San Diego County traffic, and the project's primary emission sources normally emit CO concentrations out of the stack that are below the federal ambient air quality standards. Therefore, the project would not impact the Carbon Monoxide Maintenance Plan.

2004 Triennial Revision of the Regional Air Quality Strategy for San Diego County

This plan is prepared to determine progress and measures needed to attain California Ambient Air Quality Standards (CAAQS) for ozone, carbon monoxide, nitrogen dioxide, and sulfur dioxide. San Diego County is in attainment with all of these state standards except ozone. This plan describes the extent of ozone air quality improvement during the previous three years, provides a discussion of actual versus forecasted ozone precursor emission rates, and evaluates the need for further control measures in order to achieve attainment with the state ozone ambient air quality standards. None of the measures determined for further study in this document would apply to the proposed project.

The draft triennial plan was completed in August 2008, but is has not yet been officially approved (SDAPCD 2008c). None of the emission reduction measures proposed in the draft document, which includes a Best Available Retrofit Control Technology (BARCT) measure for existing older peaker turbines and a control measure for small boilers (less than 5 million Btu/hr heat input), would impact the new gas turbines and internal combustion engines that would be installed as part of this project.

Measures to Reduce Particulate Matter in San Diego County

This plan, completed in December 2005, analyzed potential particulate control measures, listed by ARB, as required by Health and Safety Code 39614. The SDAPCD's review indicated that 59 of these ARB measures were already included in existing District rules and regulations, that 25 of these control measures would not significantly reduce particulate emissions in San Diego County, and that 19 of these control measures could have cost effective particulate reductions. The District will evaluate these 19 control measures further and will propose new regulations, or non regulatory programs, for consideration of the District Board, if appropriate. Of these 19 control measures, there are eight fugitive dust control measures that could be applicable to the project's construction activities, including earthmoving, demolition, grading, carryout and trackout, unpaved staging areas, and windblown dust controls. The District has not yet promulgated any regulations for fugitive dust control; however, a fugitive dust rule is planned to be promulgated prior to the end of the project's construction. Staff's proposed fugitive dust control measures (Condition of Certification **AQ-SC3** and **AQ-SC4**) require stringent emission control measures for all of the applicable fugitive dust sources that are identified for further study in this planning document and that are likely to be included in the District's future fugitive dust control rule.

Summary of Conformance with Applicable Air Quality Plans

The applicable air quality plans do not outline any new control measures applicable to the proposed project's operating emission sources. Therefore, compliance with existing District rules and regulations would ensure compliance with those air quality plans.

SDAPCD recently evaluated additional fugitive dust control measures and recently adopted a fugitive dust control rule (Rule 55, effective December 24, 2009). Staff's recommended Conditions or Certification **AQ-SC3** and **AQ-SC4** include fugitive dust control measures that should meet or exceed the fugitive dust control requirements of new SDAPCD Rule 55. However, **AQ-SC3** has been revised to include the potential that specific fugitive dust control measures that are required by SDAPCD Rule 55 could be more stringent than those currently required in staff's proposed conditions.

Localized Cumulative Impacts

Since the power plant air quality impacts can be reasonably estimated through air dispersion modeling (see the "Operational Modeling Analysis" subsection) 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 Energy Commission staff recommends the use of ambient air quality monitoring data (see the "Environmental Setting" subsection), 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 Energy Commission staff (or the applicant) works with the air district to identify all projects that have submitted, within the last year of monitoring data, new applications for an authority to construct (ATC) or permit to operate (PTO) and applications to modify an existing PTO within six miles of the project site. Based on staff's modeling experience, beyond six miles there is no statistically significant concentration overlap for non-reactive pollutant concentrations between two stationary emission sources.
- Second, the Energy 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 (EIRs) that are prepared for those sources. The initiation of the EIR process is a reasonable basis on which to determine what is "reasonably foreseeable" for new area sources.
- The data submitted, or generated from the applications with the air district for point sources or initiating the EIR process for area sources, provides enough information to include these new emission sources in air dispersion modeling. Thus, the next step is to review the available EIR(s) and permit application(s), determine what sources must be modeled and how they must be modeled.
- Sources that are not new, but may not be represented in ambient air quality monitoring are also identified and included in the analysis. These sources include existing sources that are co-located with or adjacent to the proposed source (such

as the existing Encina 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 two miles away.

- The modeling results must be carefully interpreted so that they are not skewed towards a single source, in high impact areas near that source's fence line. It is not truly a cumulative impact of the CECP if the high impact area is the result of high fence line concentrations from another stationary source and CECP is not providing a substantial contribution to the determined high impact area.

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

The original list of possible new sources from the SDAPCD included 5 sources (CECP 2007a, Appendix 5.1F. Of the 5 stationary sources identified by SDAPCD:

- One was identified to be outside of the six mile radius.
- Four were identified to have emissions less than 5 tons/year of any criteria pollutant, and so would not have a significant potential to create significant cumulative impacts

Therefore, the local cumulative assessment for CECP, which is comprised of a short-term modeling analysis for worst-case NO_2 and CO impacts, only includes the existing Encina Power Plant facilities that would remain in operation after the construction of the project.

There are proposed construction projects near the proposed project site such as the I-5 widening project[7]; however, the timeframe and emissions from these projects is unknown and these construction projects would be limited in duration. Meanwhile emissions from existing mobile emission sources, such as the I-5 freeway, and temporary construction emission sources are forecast to have long-term emission reductions or significantly reduced emission potentials for most pollutants through improvements in on-road and off-road vehicle engine technology and vehicle turnover, respectively.

The applicant used stack and building parameters and emission data for the existing Encina Power Plant, specifically boiler units 4 and 5 that would remain after construction of the project, and generally followed the same modeling procedures used for the CECP operating emissions modeling analysis, using the most recent version of AERMOD (Version 07026). The optional PVMRM method available with AERMOD, discussed under the operating impacts section, was used to model the short-term NOx impacts. The modeling assumed worst-case short-term emissions for the CECP (cold startup) and assumed full load emissions for the existing Encina Power Station boiler units 4 and 5 and peaking turbine. The results of the applicant's cumulative modeling analysis are provided in **AIR QUALITY Table 27**.

AIR QUALITY Table 27
Cumulative Impacts Modeling Results (µg/m^3)

Pollutant	Averaging Period	Project Impact (µg/m^3)	Background (µg/m^3) [a]	Total Impact (µg/m^3)	Limiting Standard (µg/m^3)	Type of Standard	Percent of Standard
NO_2	1 hour	133.5	152.6	286.1	339	CAAQS	84%
	annual [b]	0.3	22.8	23.1	57	CAAQS	41%
PM10	24 hour [c]	7.1	57	64.1	50	CAAQS	128%
	annual	0.1	24.2	24.3	20	CAAQS	122%
PM2.5	24 hour [c]	7.1	37.7	44.8	35	NAAQS	128%
	annual	0.1	12	12.1	12	CAAQS	101%
CO	1 hour	3,228	6,785	10,013	23,000	CAAQS	44%
	8 hour	676	4,011	4,687	10,000	CAAQS	47%
SO_2	24 hour [c]	10.5	23.6	34.1	105	CAAQS	32%
	annual	0.1	10.7	10.8	80	NAAQS	14%

Source: CECP Cumulative Assessment (SR 2008f).
[a] Background values have been adjusted per staff recommended background concentrations shown in **AIR QUALITY Table 10**.
[b] Annual NO2 impact has been multiplied by the U.S.EPA Ambient Ratio Method value of 0.75.
[c] These 24-hour values are all based on worst-case existing Encina Boilers firing oil, when firing natural gas the worst-case cumulative PM10/PM2.5 and SO2 impacts are 1.4 and 0.4 µg/m^3, respectively.

[7] A draft environmental document has not yet been prepared for the I-5 widening project, and due to the delay in the environmental documentation it is likely that the project will not begin construction near the CECP project site until sometime between 2015 and 2020, so the CECP construction and I-5 widening project construction will not occur at the same time in the same general area (i.e. no cumulative air quality impacts). The CECP operation and the I-5 widening construction are expected to have maximum air quality impacts in different locations due to the differences in the types emission sources and their relative buoyancy and downwind dispersion. Therefore, significant cumulative impacts from the CECP operation and I-5 widening construction are not expected.

The results of this modeling effort, **AIR QUALITY Table 27**, show that CECP, along with the existing Encina Power Station, would not contribute to new short-term AAQS violations for NO_2 or CO.

The CECP would mitigate emissions through the use of BACT and District required and staff recommended banked or new, owner-funded, emission reductions. Therefore, the cumulative operating impacts after mitigation are considered to be less than significant.

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

Localized Heat Impacts

The Carlsbad community has expressed concerns regarding the potential for direct impacts to local air temperatures from the new gas turbine/HRSG stacks and two air-cooled fin-fan cooler units, both of which emit their heat at much lower heights than the existing combined boiler stack. Additionally, while the maximum heat rejection from the existing Encina facility boilers 1-3 is much higher than the CECP, the heat is rejected using a once-through ocean water cooling system which would not be expected to impact local air temperatures significantly. Staff conducted a modeling analysis to determine the potential localized heat impacts[8]. The AERMOD dispersion model was used and proxy emission rates were substituted for heat flux values. Both short-term and long-term incremental heat impacts were determined. **AIR QUALITY Table 28** provides the results from the modeling analysis.

AIR QUALITY Table 28
Localized Heat Impact Modeling Results

Equipment Type	Temperature Increase
1-Hour Peak Impacts	
HRSGs (both)	1.92°F
Fin Fan Coolers (both)	1.65°F
Entire Facility	1.35°F
Annual Average Impacts	
HRSGs (both)	0.012°F
Fin Fan Coolers (both)	0.0084°F
Entire Facility	0.0055°F

Source: Staff Modeling Analysis

Note: the HRSG and Fin Fan Cooler worst case impacts cannot be added for the determination of the entire facility impacts as the peak impacts from each occur at different locations.

The worst-case annual average heat impacts are very minor at only 0.012 degrees Fahrenheit at any specific location. The maximum 1-hour heat impacts were determined to occur in locations that were on hilltops or ridges to the west southwest of the project site that are not populated; however, the maximum heat impacts found in the nearby adjacent populated areas were determined to be nearly as high as these maximums. While the highest hourly impact is over 1.5 degrees Fahrenheit the frequency of impacts

[8] This analysis modeled the heat from the fin-fan coolers using an equivalent stack approach.

above 1 degree Fahrenheit in populated areas was determined to be less than ten hours per year. Additionally, the heat impacts to the populated areas occur during onshore wind conditions that are generally consistent with cooler conditions, for example the peak one-hour impact was determined during an ambient temperature of under 70 degrees Fahrenheit. Thus, any increases in temperature would be relatively small even when calculated with conservative modeling assumptions, would be transient in nature.

The model used has inherent conservatism for heat modeling due to several factors including: 1) the additive effect of adjacent heat plumes on total plume rise is not considered by the model; 2) the model in general is fairly conservative (under predictive) regarding plume rise in order to be conservative regarding the assessment of ground level impacts; 3) while the AERMOD model attempts to adjust for terrain it is still somewhat conservative when providing impacts at locations well above stack height; and 4) most importantly the heat input emissions proxy value was kept at maximum full load value while the exhaust temperature was held a conservatively low value of 100F which would reduce the heat induced plume rise. Additionally, the small reduction in direct heat impacts from the operation of boilers 1-3 has not been considered. For these reasons it is felt that these modeling results are conservative and likely over predict the direct ground level heat impacts from the CECP.

COMPLIANCE WITH LORS

The San Diego Air Pollution Control District issued a Preliminary Determination of Compliance (PDOC) for the CECP on November 21, 2008, with public notice occurring on November 25, 2008 (SDAPCD 2008b). The District issued a Final Determination of Compliance (FDOC) on August 4, 2009 (SDAPCD 2009) that included consideration of comments received from responsible agencies and the public. Compliance with all District Rules and Regulations was demonstrated to the District's satisfaction in the FDOC. The District's FDOC conditions are presented in the Conditions of Certification. Staff submitted comments on the PDOC, and is satisfied with the District's responses and the FDOC.

FEDERAL

The District is responsible for issuing the Federal New Source Review (NSR) permit but is not currently delegated enforcement for the Prevention of Significant Deterioration (PSD) permitting process. The applicant has stipulated to emission levels that ensure that the project's net emission increase of pollutants would be below PSD permit trigger levels. The District's FDOC permit conditions have been designed to ensure that the project will comply with the applicable NSPS Subparts KKKK and IIIII that are delegated to the District for enforcement as part of its Title V permit responsibility.

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 and the Energy Commission's affirmative finding for the project.

The District has evaluated compliance of the emergency diesel fire pump engine with Air Toxic Control Measure (ATCM) requirements under Title 17 of the California Code of Regulations. The District has determined, with their FDOC permit conditions, that the engine will comply with the ATCM requirements

LOCAL

The applicant provided an air quality permit application to the SDAPCD in 2007 and the District has issued a FDOC (SDAPCD 2009), which states that the proposed project is expected to comply with all applicable District rules and regulations.

The District rules and regulations specify the emissions control and offset requirements for new sources such as the CECP. Best Available Control Technology would be implemented, and emission reduction credits (ERCs) for NOx emissions are required by District rules and regulations based on the permitted emission levels for this project. Compliance with the Districts new source requirements would ensure that the project would be consistent with the strategies and future emissions anticipated under the Districts air quality attainment and maintenance plans.

As part of the Energy Commission's licensing process, in lieu of issuing a construction permit to the applicant for the CECP, the District will prepare and present to the Commission a DOC, both a PDOC, and after a public comment period, an FDOC. The PDOC was published on November 21, 2008 with public notice occurring on November 25, 2008. The FDOC was issued on August 4, 2009. The FDOC evaluates whether and under what conditions the proposed project would comply with the District's applicable rules and regulations, as described below.

Regulation II – Permits

Rule 20.1 and 20.3 – New Source Review

Rules 20.1 and 20.3 generically apply to all sources subject to permitting under the nonattainment NSR and PSD programs. All portions of Rule 20.1 apply. This includes definitions and instructions for calculating emissions. Applicable components of Rule 20.3 are described below.

Rule 20.3(d)(1) – Best Available Control Technology/Lowest Achievable Emission Rate

This subsection of the rule requires that BACT be installed on a pollutant specific basis if emissions exceed 10 lbs/day for each criteria pollutant (except for CO, for which the PSD BACT threshold is 100 tons per year). This subsection also requires that Lowest Achievable Emission Rate (LAER) be installed on a pollutant specific basis, for federal nonattainment pollutants and precursors, if the project is a new major source or a major modification to an existing major source. Because the District attains the national ambient air quality standards for CO, SO2, and PM10, LAER does not apply to these particular pollutants (District Rule 20.3(d)(1)(v)). The project is defined as a major modification to an existing major source based on the net emissions increase of NOx being greater than 25 tons per year, but the net emissions increase of VOC is below the 25 ton per year threshold. Therefore, LAER is required for the gas turbines NOx

emissions. The emergency fire pump engine is exempt from LAER requirements. BACT is required for VOC, PM10, and SOx.

The District has determined, with some revisions to the pollutant averaging periods, and a reduction of the VOC emission limit from 2.0 ppm to 1.5 ppm (@15% O_2) that the project meets LAER and BACT requirements.

Rule 20.3(d)(2) – Air Quality Impact Analysis

This portion of the rule requires that an Air Quality Impact Analysis (AQIA) be performed for air contaminants that exceed the trigger levels published in Table 20.3-1 of the District's Rules and Regulations. For an AQIA of PM10, the rules require that direct emissions and emissions of PM10 precursors be included in the analysis.

The CECP has prepared an AQIA for NOx, CO, and PM10 that was evaluated by District Staff as part of the FDOC analysis.

Rule 20.3(d)(4) – Public Notice And Comment

This portion of the rule requires the District to publish a notice of the proposed action in at least one newspaper of general circulation in San Diego County and requires sending notices to the U.S. EPA and the ARB. The District must allow at least 30 days for public comment and consider all comments submitted. The District must also make all information regarding the evaluation available for public inspection.

The official public notice and comment period for the CECP started after newspaper notice publication on November 25, 2008 and ended on December 24, 2008. Rule 20.3(d)(4)(i) requires that the District consider all comments received. The District considered all comments received before taking final action in the FDOC.

Rule 20.3(d)(5) – Emission Offsets

This portion of the rule requires that emissions of any federal nonattainment criteria pollutant or its precursors, which exceed major source thresholds, be offset with actual emission reductions. The District is a federal nonattainment area only for ozone. Therefore, this rule requires offsets only for NOx and VOC emissions, as ozone precursors, if the project's net emissions increase greater than 25 tons per year for these two pollutants. The CECP permitted emission increase of NOx is greater than the offset threshold but the permitted emission increase of VOC is below the offset threshold. Therefore, offsets are only required by the District for NOx emissions. Based on the permitted emission limits the net emission increase is 39.9 tons per year of NOx, and the District required offset ratio of 1.2 to 1, the total NOx Emission Reduction Credit (ERC) requirement for the project is 47.88 tons. The FDOC conditions (incorporated into this FSA) would require that all required NOx ERCs are provided prior to gas turbine start-up.

The applicant has obtained NOx and VOC ERCs (used as ozone precursor interpollutant offsets - VOC for NOx) in quantities necessary to meet the Districts offset requirements (see Air Quality Table 26**). Compliance with this rule is expected. Rule 20.3(e)(1) – Compliance Certification**

This rule requires that the applicant certify that all major stationary sources owned or operated by the applicant in California are in compliance, or on an approved schedule for compliance, with all applicable emission limitations and standards under the federal Clean Air Act. This applicant owns Encina and other major stationary sources within California. The District's FDOC notes that the applicant has provided the required compliance certification.

Rule 20.5 – Power Plants

This rule requires that the District prepare a decision of Preliminary and Final Determinations of Compliance (PDOC and FDOC), which shall confer the same rights and privileges as an Authority to Construct only after successful completion of the Energy Commission's licensing process. The District has prepared the PDOC and FDOC.

Regulation IV – Prohibitions

Rule 50 – Visible Emissions

This rule prohibits air contaminant emissions into the atmosphere darker than Ringelmann Number 1 (20 percent opacity) for more than an aggregate of three minutes in any consecutive 60 minute time period. Compliance with this requirement is expected for the gas turbines and emergency fire pump engine.

Rule 51 – Nuisance

This rule prohibits the discharge of air contaminants that cause or have a tendency to cause injury, detriment, and nuisance or annoyance to people and/or the public or damage to any business or property. Compliance with this requirement is expected for the gas turbines and emergency fire pump engine.

Rule 52 – Particulate Matter

This rule is a general limitation for all sources of particulate matter to not exceed 0.10 grain per dry standard cubic foot (0.23 grams per dry standard cubic meter) of exhaust gas. The district calculated the maximum grain loading to be 0.004 grains per dry standard cubic foot, in compliance with the requirements of this rule.

Rule 53 – Specific Air Contaminants

This rule limits emissions of sulfur compounds (calculated as SO2) to less than or equal to 0.05 percent, by volume, on a dry basis. This rule also contains a limitation restricting particulate matter emissions from gaseous fuel combustion to less than or equal to 0.10 grains per dry standard cubic foot of exhaust calculated at 12 percent CO2. As shown above the project's particulate concentration is well below 0.1 grains per dry standard cubic foot, and the use of pipeline quality natural gas fuel would ensure compliance with the sulfur compound emission limitation of this rule.

Rule 55 – Specific Air Contaminants

This rule restricts visible dust from construction activities to reach beyond the property line for more than 3 minutes in any hour, and requires control of visible roadway dust from track-out/carry-out from truck wheels and truck spillage. This rule, which was adopted after publication of the PSA (June, 24, 2009), becomes effective on December 24, 2009. Staff recommended fugitive dust conditions (AQ-SC1 through AQ-SC4) are as stringent as or more stringent than the requirements of this rule.

Rule 62 – Sulfur Content of Fuels

This rule requires the sulfur content of gaseous fuels to contain no more than 10 grains of sulfur compounds, calculated as hydrogen sulfide, per 100 cubic feet of dry gaseous fuel (0.23 grams of sulfur compounds, calculated as hydrogen sulfide, per cubic meter of dry gaseous fuel), at standard conditions.

The use of pipeline quality natural gas would ensure compliance with this rule.

Rule 69.3 – Stationary Gas Turbines - Reasonably Available Control Technology

This rule limits NOx emissions from gas turbines greater than 0.3 MW to 42 ppm at 15 percent oxygen when fired on natural gas. The rule also specifies monitoring and record keeping requirements. Startups and shutdowns are excluded from compliance with these limits.

This rule's emission limits are less stringent than the BACT/LAER requirement of Rule 20.3(d)(1) for normal operation. The District has included conditions for the project to meet this emission limit during initial commissioning, low-load operation, tuning, and transient operation periods, such as during periods of major turbine load shifts.

Rule 69.3.1 – Stationary Gas Turbines - Best Available Retrofit Control Technology

This rule limits NOx emissions from existing and new gas turbines greater than 10 MW to 15 x (E/25) ppm when operating uncontrolled and 9 x (E/25) ppm at 15 percent oxygen when operating with controls and averaged over a one-hour period (where E is the percent thermal efficiency of the unit, typically between 30 to 40 percent for gas turbines). The District calculated this NOx standard to be equivalent to 21.9 ppm when uncontrolled and 12.6 ppm when controlled, based on a thermal efficiency for the turbines of 36.5 percent[9]. The rule also specifies monitoring and record keeping requirements. Startups and shutdowns are excluded from compliance with these limits.

This rule's emission limits are less stringent than the BACT/LAER requirement of Rule 20.3(d)(1) for normal operation. The District has included conditions for the project to meet this emission limit during initial commissioning, low-load operation, tuning, and transient operation periods, such as during periods of major turbine load shifts.

[9] This rule only considers the thermal efficiency of the turbine and does not include the additional efficiency of the heat recovery steam generator.

Rule 69.4.1 – Stationary Reciprocating Internal Combustion Engines – Best Available Retrofit Control Technology

This rule limits emissions of NOx and CO for diesel engines, has maintenance and recordkeeping requirements, and requires the use of California diesel fuel. NOx emissions are limited to 6.9 grams/bhp-hr, where the proposed emergency fire pump engine has an emission guarantee of 3.92 grams/bhp-hr. CO emissions are limited to 4500 ppmv at 15% oxygen, where the engine emissions are calculated to be 61.2 ppmv. This rule also exempts emergency engines from periodic source testing. The proposed engine meets the emission limits of this regulation and the District has included conditions to ensure compliance with the other applicable provisions of this regulation.

Regulation X – Standards of Performance for New Stationary Sources

Adopts federal New Source Performance Standards (NSPS, 40 CFR, Part 60) by reference. The relevant NSPS subparts for the CECP, Subpart KKKK (Stationary Combustion Turbines) and Subpart IIII (Stationary Compression Ignition Internal Combustion Engines) This rule's emission limits are less stringent than the BACT/LAER requirement of Rule 20.3(d)(1) for normal operation. The District's conditions would ensure compliance with the monitoring and recordkeeping requirements of this regulation.

Regulation XI – National Emission Standards for Hazardous Air Pollutants

Adopts federal standards for hazardous air pollutants (HAPs) by reference. The project, as being part of a major source of HAPs emissions, is subject to Subpart YYYY (Stationary Combustion Turbines) and Subpart ZZZZ (Compression Ignition Internal Combustion Engines). The District has incorporated conditions to ensure compliance with the emissions and operating limitations and monitoring requirements of these two regulations.

Regulation XII – Toxic Air Contaminants

Rule 1200 – Toxic Air Contaminants, New Source Review

This rule requires a health risk estimate for sources of toxic air contaminants. Toxics Best Available Control Technology (TBACT) must be installed if a Health Risk Assessment shows an incremental cancer risk greater than one in a million, and no source would be allowed to cause an incremental cancer risk exceeding ten in a million. The District found that the project, which was found to have an incremental cancer risk of less than one in a million, complied with the requirements of this rule. The Public Health Section of this Final Staff Assessment provides additional information on toxic air contaminants.

Regulation XIV – Title V Operating Permits

Rule 1401 – General Provisions

This regulation contains the requirements for federal Title V Operating Permits. The applicant is required to submit a revised Title V Operating Permit application no later

than 18 months after initial operation of the gas turbines. The Encina Power Station currently has a Title V Operating Permit and the applicant has submitted an application to the District to modify its Title V Operating permit to include the CECP.

Rule 1412 – Federal Acid Rain Program Requirements

This regulation contains the requirements for participation in the federal Acid Rain Program. The applicant is required to submit an Acid Rain Program application to the District 24 months prior to initial startup of the gas turbines. The applicant submitted the Acid Rain permit application to the District on September 4, 2008.

NOTEWORTHY PUBLIC BENEFITS

Three existing power boilers (Units 1 through 3) that total 314 MW of generation capacity would be shut down following the commissioning of the new units. The three existing boiler units would need to be shut down once the new gas turbines are in commercial operational in order for the new emissions of CECP to be allowed by the SDAPCD.

The proposed project would improve the overall thermal efficiency of the power plant due to the higher efficiency of the two new Siemens SGT6-PAC5000F gas turbines compared to the three existing power boilers. This along with an improved emission control system for the new Siemens SGT6-PAC5000F gas turbines leads to a reduction in emissions of most pollutants emitted per unit of electricity produced. It also leads to a reduction in amount of natural gas fuel consumed to generate the same amount of power. Additionally, facilities of this nature, with quick-start capabilities, are needed to support California's efforts to increase use of renewable resources that will reduce system wide criteria pollutant emissions from power generation.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

The response to agency and public comments on the PSA Air Quality Section are summarized in **Appendix AIR-2 Response to PSA Comments**. As indicated in **Appendix AIR-2**, a number of revisions were made to this staff assessment as part of the response to the agency and public comments.

CONCLUSIONS

Staff concludes that:

- The project would comply with applicable District Rules and Regulations, including New Source Review Best Available Control Technology (BACT) and offset requirements, and staff recommends the inclusion of the Districts FDOC conditions as Conditions of Certification **AQ-1** through **AQ-100**.
- The project's construction activities, if unmitigated, would likely contribute to significant adverse PM10 and ozone impacts. Staff recommends **AQ-SC1** to **AQ-SC5** to mitigate the potential impacts.

- The project's operation would not cause new violations of any NO_2, SO_2, PM2.5 or CO ambient air quality standards, and therefore, the project's direct operational NOx, SOx, PM2.5 and CO emission impacts are not significant.
- The project's direct, or secondary, emissions contribution to existing violations of the ozone and PM10 ambient air quality standards are potentially significant if unmitigated. The District will require offsets to mitigate the NOx emission increase (**AQ-5**) but does not require offsets for the other potential pollutant increases. Therefore, staff recommends **AQ-SC10** to mitigate the potential emission increases that do not require District offsets, so that all nonattainment pollutant and precursor emissions be offset at least one-to-one.
- The project would be consistent with the requirements of SB 1368 and the Emission Performance Standard for greenhouse gases (see **Appendix Air-1**).

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 additional conditions that are in addition to the permit conditions that the SDAPCD has proposed, or the other staff recommended conditions noted above. Condition **AQ-SC6** provides the administrative procedure requirements for project modifications. Condition **AQ-SC7** forbids onsite contaminated soil remediation activities, other than transport, as onsite soil remediation was not proposed or analyzed as part of the project. Condition **AQ-SC8** is a quarterly compliance reporting requirement. Condition **AQ-SC9** allows only one gas turbine at a time to undergo initial commissioning as proposed by the applicant and evaluated in the impact assessment.

Global climate change and greenhouse gas (GHG) emissions from the project are discussed and analyzed in **Appendix Air-1**. The Carlsbad Energy Center, as a peaking or mid-merit project with an enforceable operating capacity factor of less than 60 percent is not subject to the requirements of SB1368 and the Emission Performance Standard, although this highly efficient project would meet the CO_2 emission requirements of this standard. The project will emit over 0.8 million metric tonnes of carbon dioxide equivalent emissions and therefore will be subject to mandatory GHG reporting requirements. It may also be subject to GHG reductions or trading requirements as these regulations are implemented

PROPOSED CONDITIONS OF CERTIFICATION

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

STAFF CONDITIONS

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

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 and 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 runoff 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 the construction site shall be swept visually clean, using wet sweepers or air filtered dry vacuum sweepers, at least twice daily (or less during periods of precipitation) on days when construction activity occurs or on any other day when dirt or runoff from the construction site is visible on the public roadways.

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

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

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

N. Disturbed areas will be re-vegetated as soon as practical.

The fugitive dust requirements listed in this condition may be replaced with as stringent or more stringent methods as required by SDAPCD Rule 55.

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 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, (3) within 100 feet upwind of any regularly occupied structures not owned by the project owner, or (4) within 50 feet upwind of the I-5 freeway 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, other than those occurring upwind of the I-5 Freeway, 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.

The AQCMM or Delegate shall implement the following procedures for additional mitigation measures in the event that such visible dust plumes occurring upwind of the I-5 Freeway are observed:

Step 1: The AQCMM or Delegate shall immediately cease the activities causing the visible dust plumes if any obscuration of visibility is occurring to drivers on the I-5 freeway. The AQCMM or Delegate shall direct more intensive application of the existing mitigation methods immediately if the visible plumes are seen within 50 feet of the I-5 freeway but are not causing obscuration of visibility to drivers.

Step 2: The AQCMM or Delegate shall direct implementation of additional methods of dust suppression and monitor the start-up and/or continuation of the dust causing activities to ensure that the additional mitigation is effective.

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. 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 that could impact visibility on the I-5 Freeway will not occur upon restarting the shut-down source.

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

A. 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.

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

C. Construction equipment will employ electric motors when feasible.

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

AQ-SC6 The project owner shall submit to the CPM for review and approval any modification proposed by the project owner to any project air permit. The project owner shall submit to the CPM any modification to any permit proposed by the District or U.S. EPA, and any revised permit issued by the District or U.S. EPA, for the project.

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

AQ-SC7 The project owner shall not conduct any on-site remediation of contaminated soils at the project site, other than removal and transport.

Verification: The project owner shall provide transportation and disposition records of the contaminated soil removal and offsite remediation completion demonstrating compliance with this condition as part of the MCR until the contaminated soil removal is complete.

AQ-SC8 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 District, if requested by the District, no later than 30 days following the end of each calendar quarter.

AQ-SC9 Only one combustion turbine shall undergo commissioning at a time.

Verification: The project owner shall provide the CPM CEMS data demonstrating compliance with this condition as part of the monthly commissioning status report (**AQ-80**).

AQ-SC10 The project owner shall provide emission reduction mitigation to offset the project's PM (based on PM2.5) and VOC emission increases at a ratio of 1:1. These emission reductions are based on the following maximum annual emissions for the facility (tons/yr).

Emission Reduction Credits/Pollutant	**Tons/yr**
PM10	7.6
VOC	8.4
Total Tons	16.0

Emission reductions can be provided using any one of the following methods in the following order of preference of their use:

1. Additional enforceable emission reductions created at the Encina Power Station site, such as the permanent shutdown of the Encina gas turbine peaker.

2. The project owner can fund enforceable emission reductions through the Carl Moyer Fund in the amount of $16,000/ton, or the applicable ARB Carl Moyer Program Guideline cost effectiveness cap value at the time of funding the emission reductions, for the total ton quantity listed in the above table, minus any tons offset using the other two listed methods, with an additional 20% administration fee to fund the SDAPCD and/or other responsible local agencies with jurisdiction within 25 miles of the project site to be used to find and fund local emission reduction projects to the extent feasible. Emission reduction projects funded by this method will be weighted for evaluation and selection, within the funding guideline value of $16,000/ton of reduction, or revised current funding guideline limit value, based on the proximity of the emission reduction project and the relative health benefit to the local community surrounding the project site. Emission reduction project cost will not be a consideration for selection as long as the emission reduction project is within the approved 2008, or later year as applicable, Carl Moyer funding guideline value,

3. The project owner can fund other existing public agency regulated stationary or mobile source emission reduction programs or create a project specific fund to be administered through the SDAPCD or other local agency, which would provide enforceable surplus emission reductions. This funding shall include appropriate administrative fees as determined by the administering agency to obtain local emission reductions to the extent feasible. The project owner shall be responsible for demonstrating that the amount of such funding meets the emission reduction requirements of this condition. Emission reduction projects funding by this method will be weighted for evaluation and selection based on the proximity of the emission reduction project and the relative health benefit to the local community surrounding the project site.

4. 2.9 tons of PM10 ERCs currently owned by the applicant can be used to partially offset the PM emissions increase.

5. ERC certificates from other emission reductions occurring in the San Diego Air Basin can be purchased and used to offset each pollutant on a 1:1 offset ratio basis only if local emission reduction projects are clearly demonstrated to be unavailable using methods 1 to 3 to meet the total emission reduction burden required by this condition. ERCs can be used on an interpollutant basis for SOx for PM10 and NOx for VOC, where the project owner will provide a letter from the SDAPCD that indicates the District's allowed interpollutant offset ratio, or PM10 for SOx ERCs can be used on a 1:1 basis.

Carl Moyer or other emission reduction funding shall be provided to the responsible agencies prior to the initiation of on-site construction activities. The project owner shall work with the appropriate agencies to target emission reduction projects in the project area to the extent feasible. Emission reduction project selection information will be provided to the CPM for review and comment. Unused administrative fees shall be used for additional emission reduction program funding. ERC certificates, if used, will be surrendered prior to first turbine fire.

Verification: The project owner shall submit to the CPM confirmation that the appropriate quantity of Carl Moyer Project or other emission reduction program funding and/or ERCs have been provided prior to initiation of on-site construction activities for emission reduction program funding and at least 30 days prior to turbine first fire for ERCs. The project owner shall provide emission reduction project selection information to the CPM for review and approval at least 15 days prior to committing funds to each selected emission reduction project. The project owner shall provide confirmation that the level of emission reduction program funding will meet the emission reduction requirements of this condition.

DISTRICT FINAL DETERMINATION OF COMPLIANCE CONDITIONS (SDAPCD 2009)

District Application Number 985745
Power block Unit #6 consisting of one nominal 208 MW (219 MW with steam augmentation) natural-gas fired combined-cycle Siemens SGT6-PAC5000F combustion turbine generator, serial number to be determined, with an ultra low NOx (ULN) combustor, an evaporative inlet air cooler, a heat recovery steam generator with a selective catalytic reduction unit, an oxidation catalyst, and a steam turbine generator and associated air-cooled heat exchanger to condense the exhaust steam from the steam turbine.

District Application Number 985747
Power block Unit #7 consisting of one nominal 208 MW (219 MW with steam augmentation) natural-gas fired combined-cycle Siemens SGT6-PAC5000F combustion turbine generator, serial number to be determined, with an ultra low NOx (ULN) combustor, an evaporative inlet air cooler, a heat recovery steam generator with a selective catalytic reduction unit, an oxidation catalyst, and a steam turbine generator and associated air-cooled heat exchanger to condense the exhaust steam from the steam turbine.

GENERAL CONDITIONS

AQ-1 This equipment shall be properly maintained and kept in good operating condition at all times and, to the extent practicable, the project owner shall maintain and operate the equipment and any associated air pollution control equipment in a manner consistent with good air pollution control practices for minimizing emissions. [Rule 21 and 40 CFR §60.11]

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

AQ-2 The project owner shall operate the project in accordance with all data and specifications submitted with the application under which this license is issued and District Application Nos. 985745, 985747 and 985748. [Rule 14]

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

AQ-3 The project owner shall provide access, facilities, utilities, and any necessary safety equipment, with the exception of personal protective equipment requiring individual fitting and specialized training, for source testing and inspection upon request of the Air Pollution Control District. [Rule 19]

Verification: The project owner shall provide facilities, utilities, and safety equipment for source testing and inspections upon request of the District, ARB, and the Energy Commission.

AQ-4 The project owner shall obtain any necessary District permits for all ancillary combustion equipment including emergency engines, prior to on-site delivery of the equipment. [Rule 10]

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-5 Prior to the earlier of the initial startup dates for either of the two combustion turbines, the project owner shall surrender to the District Class A Emission Reduction Credits (ERCs) in an amount equivalent to 47.9 tons per year of oxides of nitrogen (NOx) to offset the net maximum allowable increase of 39.9 tons per year of NOx emissions for the two combustion turbines and the emergency fire pump engine described in District Application Nos. 985745, 985747, and 985748. [Rule 20.3(d)(8)]

Verification: The project owner shall submit to the CPM, within 15 days of ERC surrender to the District, information demonstrating compliance with this condition.

AQ-6 A rolling 12-calendar-month period is one of a series of successive consecutive 12-calendar-month periods. The initial 12-month-calendar period of such a series shall begin on the first day of the month in which the applicable beginning date for that series occurs as specified in this permit. [Rule 20.3 (d)(3), Rule 20.3(d)(8) and Rule 21].

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

AQ-7 Pursuant to 40 CFR §72.30(b)(2)(ii) of the Federal Acid Rain Program, the project owner shall submit an application for a Title IV Operating Permit at least 24 months prior to the initial startup of the combustion turbines. [40 CFR Part 72]

Verification: The project owner shall submit to the CPM copies of the acid rain permit application within five working days of its submittal by the project owner to the District.

AQ-8 The project owner shall comply with all applicable provisions of 40 CFR Part 73, including requirements to offset, hold and retire sulfur dioxide (SO_2) allowances. [40 CFR Part 73]

Verification: The project owner shall submit to the CPM and the District the CTG annual operating data and SO_2 allowance information demonstrating compliance with all applicable provisions of 40 CFR 73 as part of the Quarterly Operation Reports **(AQ-SC8)**.

AQ-9 All records required by this permit shall be maintained on site for a minimum of five years and made available to the District upon request. [Rule 1421]

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

COMBUSTION TURBINE CONDITIONS

Definitions

AQ-10 For purposes of determining compliance with the emission limits of this permit, a shutdown period is the period of time that begins with the lowering of the gross electrical output (load) of the combustion turbine below 114 megawatts (MW) and that ends five minutes after fuel flow to the combustion turbine ceases, not to exceed 35 consecutive minutes. [Rule 20.3 (d)(1)]

Verification: The project owner shall submit to the CPM the CTG shutdown event duration data demonstrating compliance with this condition as part of the Quarterly Operation Reports **(AQ-SC8)**.

AQ-11 A startup period is the period of time that begins when fuel flows to the combustion turbine following a non-operational period. For purposes of determining compliance with the emission limits of this permit, the duration of a startup period shall not exceed 60 consecutive minutes. [Rule 20.3(d)(1)]

Verification: The project owner shall submit to the CPM the CTG startup event duration data demonstrating compliance with this condition as part of the Quarterly Operation Reports **(AQ-SC8)**.

AQ-12 A non-operational period is any five-consecutive-minute period when fuel does not flow to the combustion turbine. [Rule 20.3(d)(1)]

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

AQ-13 Tuning is defined as adjustments to the combustion or emission control system that involves operating the combustion turbine or emission control system in a manner such that the emissions control equipment may not be fully effective or operational. Only one gas turbine shall be tuned at any given time. Tuning events shall not exceed 720 unit operating minutes in a calendar day nor exceed 40 hours in a calendar year for each turbine. The District compliance division shall be notified at least 24 hours in advance of any tuning event. For purposes of this condition, the number of hours of tuning in a calendar year is defined as the total unit operating minutes of tuning during the calendar year divided by 60. [Rule 20.3(d)(1)]

Verification: The project owner shall notify the District and CPM at least 24 hours in advance of any tuning event. The project owner shall submit to the CPM the CTG operating data demonstrating compliance with tuning limitations identified in this condition as part of the Quarterly Operation Reports **(AQ-SC8)**.

AQ-14 A Continuous Emission Monitoring System (CEMS) protocol is a document approved in writing by the District that describes the methodology and quality assurance and quality control procedures for monitoring, calculating, and recording stack emissions from the combustion turbine that is monitored by the CEMS. [Rules 69.3, 69.3.1, and 20.3(d)(1) and 40 CFR Part 60 Subpart KKKK, and 40 CFR Part 75]

Verification: The project owner shall maintain a copy of the CEMS protocol on site and provide it for inspection on request by representatives of the District, ARB, and the Energy Commission.

AQ-15 A transient hour is a clock hour during which the change in gross electrical output produced by the combustion turbine exceeds 50 MW per minute for one minute or longer during any period that is not part of a startup or shutdown period. [Rule 20.3(d)(1)]

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

AQ-16 For each combustion turbine, the commissioning period is the period of time commencing with the initial startup of that turbine and ending the sooner of 120 calendar days from the initial startup, after 415 hours of turbine operation, or the date the project owner notifies the District the commissioning period has ended. For purposes of this condition, the number of hours of turbine operation is defined as the total unit operating minutes during the commissioning period divided by 60. [Rule 20.3(d)(1)]

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

AQ-17 For each combustion turbine, the shakedown period is the period of time commencing with the initial startup that turbine and ending the sooner of 180 calendar days from the initial startup or the date the project owner notifies the District that the shakedown period has ended. [Rules 20.1(c)(16) and 21]

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

AQ-18 Turbine A is the combustion turbine as described on Applications No. 985745 or No, 98747, as applicable, that first completes its shakedown period. If both turbines complete their shakedown period on the same date, then Turbine A is the turbine described on Application No. 985745. [Rules 20.1(c)(16) and 21]

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

AQ-19 Turbine B is the combustion turbine as described on Application No. 985745 or No. 985747, as applicable, that last completes its shakedown period. If both turbines complete their shakedown period on the same date, then Turbine B is the turbine described on Application No. 985747. [Rules 20.1(c)(16) and 21]

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

AQ-20 Low load operation is a period of time that begins when the gross electrical output (load) of the combustion turbine is reduced below 114 MW and that ends 10 consecutive minutes after the combustion turbine load exceeds 114

MW, provided that fuel is continuously combusted during the entire period and one or more clock hour concentration emission limits specified in this permit are exceeded as a result of the low-load operation. For each combustion turbine, periods of operation at low load shall not exceed 130 unit operating minutes in any calendar day nor an aggregate of 780 unit operating minutes in any calendar year. No low load operation period shall begin during a startup period. [Rule 20.3(d)(1)]

Verification: The project owner shall submit to the CPM the engine operating data demonstrating compliance with this condition on request and shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

AQ-21 For each combustion turbine, a unit operating day, hour, and minute mean the following:

A. A unit operating day means any calendar day in which the turbine combusts fuel.

B. A unit operating hour means any clock hour in which the turbine combusts fuel.

C. A unit operating minute means any clock minute in which the turbine combusts fuel and any clock minute that is part of a shutdown period.

[Rule 21, 40 CFR Part 75, Rule 20.3(d)(1), 40 CFR Part 60 Subpart KKKK]

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

General Conditions

AQ-22 The exhaust stacks for each combustion turbine shall be at least 139 feet in height above site base elevation. [Rules 20.3(d)(2) and 1200]

Verification: The project owner shall submit to the CPM for review the exhaust stack specification at least 60 days before the installation of the stack.

AQ-23 The combustion turbines shall be fired on Public Utility Commission (PUC) quality natural gas. The project owner shall maintain, on site, quarterly records of the natural gas sulfur content (grains of sulfur compounds per 100 dscf of natural gas) and hourly records of the higher and lower heating values (btu/scf) of the natural gas; and provide records to District personnel upon request. [Rule 20.3(d)(1)]

Verification: The project owner shall submit the quarterly fuel sulfur content values in the in the Quarterly Operation Reports **(AQ-SC8)** and make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

AQ-24 Unless otherwise specified in this permit, all continuous monitoring data shall be collected at least once every minute. [Rules 69.3, 69.3.1, and 20.3(d)(1)]

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

Emission Limits

AQ-25 For purposes of determining compliance with emission limits based on source testing, the average of three subtests shall be used. For purposes of determining compliance with emission limits based on a Continuous Emission Monitoring System (CEMS), data collected in accordance with the CEMS protocol shall be used and the averages for averaging periods specified herein shall be calculated as specified in the CEMS protocol. [Rules 69.3, 69.3.1, and 20.3(d)(1) and 40 CFR Part 60 Subpart KKKK, and 40 CFR Part 75]

Verification: Source tests demonstrating compliance with this condition shall be provided to the CPM and are due within the timeframes specified in Conditions **AQ-53** and **AQ-54**. CEMS data summaries shall be submitted to the CPM as part of the Quarterly Operation Reports **(AQ-SC8)**.

AQ-26 For purposes of determining compliance with emission limits based on CEMS data, all CEMS calculations, averages, and aggregates shall be performed in accordance with the CEMS protocol approved in writing by the District. [Rules 69.3, 69.3.1, and 20.3(d)(1) and 40 CFR Part 60 Subpart KKKK, and 40 CFR Part 75]

Verification: CEMS data summaries shall be submitted to the CPM as part of the Quarterly Operation Reports **(AQ-SC8)**.

AQ-27 For each emission limit expressed as pounds, pounds per hour, or parts per million based on a one-hour or less averaging period or compliance period, compliance shall be based on using data collected at least once every minute when compliance is based on CEMS data. [Rules 69.3, 69.3.1, and 20.3(d)(1)]

Verification: CEMS data summaries shall be submitted to the CPM as part of the Quarterly Operation Reports **(AQ-SC8)**.

AQ-28 When a combustion turbine is combusting fuel (operating), the emission concentration of oxides of nitrogen (NOx), calculated as nitrogen dioxide (NO_2), shall not exceed 2.0 parts per million by volume on a dry basis (ppmvd) corrected to 15% oxygen, except during commissioning, low load operation, startup, shutdown, or tuning periods for that turbine. For purposes of determining compliance based on CEMS data, the following averaging periods calculated in accordance with the CEMS protocol shall apply:

a. For any transient hour, a 3-clock hour average, calculated as the average of the transient hour, the clock hour immediately prior to the transient hour and the clock hour immediately following the transient hour.

b. For all other hours, a 1-clock hour average.

[Rule 20.3(d)(1)]

Verification: The project owner shall provide CEMS emissions data to demonstrate compliance with this condition as part of the Quarterly Operation Reports **(AQ-SC8)**.

AQ-29 When a combustion turbine is operating, the emission concentration of carbon monoxide (CO) shall not exceed 2.0 ppmvd corrected to 15 % oxygen, except during commissioning, low load operation, startup, shutdown, or tuning periods for that turbine. For purposes of determining compliance based on CEMS data, the following averaging periods calculated in accordance with the CEMS protocol shall apply;

a. For any transient hour, a 3-clock-hour average, calculated as the average of the transient hour, the clock hour immediately prior to the transient hour and the clock hour immediately following the transient hour.

b. For all other hours, a 1-clock-hour average.

[Rule 20.3(d)(1)]

Verification: The project owner shall provide CEMS emissions data to demonstrate compliance with this condition as part of the Quarterly Operation Reports **(AQ-SC8)**.

AQ-30 When a combustion turbine is operating, the volatile organic compound (VOC) concentration, calculated as methane, measured in the exhaust stack, shall not exceed 1.5 ppmvd corrected to 15% oxygen, except during commissioning, low load operation, startup, shutdown, or tuning periods for that turbine. For purposes of determining compliance based on the CEMS, the District approved CO/VOC surrogate relationship, the CO CEMS data, and the following averaging periods calculated in accordance with the CEMS protocol shall be used:.

a. For any transient hour, a 3-clock-hour average, calculated as the average of the transient hour, the clock hour immediately prior to the transient hour and the clock hour immediately following the transient hour.

b. For all other hours, a 1-clock-hour average.

The CO/VOC surrogate relationship shall be verified and/or modified, if necessary, based on source testing. [Rule 20.3(d)(1)]

Verification: The project owner shall provide the CEMS data, using the appropriate CO/VOC surrogate relationship, to demonstrate compliance with this condition as part of the Quarterly Operation Reports **(AQ-SC8)**.

AQ-31 When a combustion turbine is operating, the ammonia concentration (ammonia slip), shall not exceed 5.0 ppmvd corrected to 15 % oxygen, except during commissioning, low load operation, startup, shutdown, or tuning periods for that turbine. [Rule 1200]

Verification: The project owner shall provide the estimated ammonia concentrations and ammonia emissions based on the annual source test data, the CEMS data and

SCR ammonia flow data to demonstrate compliance with this condition as part of the Quarterly Operation Reports **(AQ-SC8).**

AQ-32 When a combustion turbine is operating with post-combustion air pollution control equipment that controls oxides of nitrogen (NOx) emissions, the emission concentration NOx, calculated as nitrogen dioxide (NO_2), shall not exceed 12.9 ppmvd calculated over each clock hour period and corrected to 15% oxygen, except for periods of startup and shutdown, as defined in Rule 69.3.1. This limit does not apply during any period in which the facility is subject to a variance from the emission limits contained in Rule 69.3.1. [Rule 69.3.1]

Verification: The project owner shall provide CEMS emissions data to demonstrate compliance with this condition as part of the Quarterly Operation Reports **(AQ-SC8)**.

AQ-33 When a combustion turbine is operating without any post-combustion air pollution control equipment that controls oxides of nitrogen (NOx) emissions, the emission concentration of NOx calculated as nitrogen dioxide (NO_2) from each turbine shall not exceed 21.6 parts per million by volume on a dry basis (ppmvd) calculated over each clock hour period and corrected to 15% oxygen, except for periods of startup and shutdown, as defined in Rule 69.3.1. This limit does not apply during any period in which the facility is subject to a variance from the emission limits contained in Rule 69.3.1. [Rule 69.3.1]

Verification: The project owner shall provide CEMS emissions data to demonstrate compliance with this condition as part of the Quarterly Operation Reports **(AQ-SC8)**.

AQ-34 When a combustion turbine is operating, the emission concentration of oxides of nitrogen (NOx), calculated as nitrogen dioxide (NO_2) shall not exceed 42 ppmvd calculated over each clock hour period and corrected to 15% oxygen, on a dry basis, except during periods of startup and shutdown, as defined in Rule 69.3. This limit does not apply during any period in which the facility is subject to a variance from the emission limits contained in Rule 69.3. [Rule 69.3]

Verification: The project owner shall provide CEMS emissions data to demonstrate compliance with this condition as part of the Quarterly Operation Reports **(AQ-SC8)**.

AQ-35 For each rolling 30-day-unit-operating-day period, average emission concentration of oxides of nitrogen (NOx) for each turbine calculated as nitrogen dioxide (NO_2) in parts per million by volume dry (ppmvd) corrected to 15% oxygen or, alternatively, as elected by the project owner, the average NOx emission rate in pounds per megawatt-hour (lb/MWh) shall not exceed an average emission limit calculate in accordance with 40 CFR Section 60.3480(b)(3). The emission concentration and emission rate averages shall be calculated in accordance with 40 CFR Section 60.4380(b)(1). The average emission concentration limit and emission rate limit shall be based on an average of hourly emission limits over the 30-day-unit-operating-day period. The hourly emission concentration limit and emission rate limit shall be15 ppmvd corrected to 15% oxygen and 0.43 lb/MWh, respectively, for clock

hours when the combustion turbine load is equal to or greater than 156 megawatts at all times during the clock hour, respectively, and 96 ppmvd corrected to 15% oxygen and 4.7 lb/MWh for all other clock hours when the combustion turbine is operating, respectively. The average shall exclude all clock hours occurring before the Initial Source Test but shall include emissions during all other times that the equipment is operating including, but not limited to, emissions during low load operation, startup, shutdown, and tuning periods. For each six-calendar-month period, emissions in excess of these limits and monitor downtime shall be identified in accordance with 40 CFR Sections 60.4350 and 60.4380(b)(2), except that Section 60.4350(c) shall not apply for identifying periods in excess of a NOx concentration limit, and reported to the District and the federal EPA in accordance with Title V Operating Permit No. 974488. [40 CFR Part 60 Subpart KKKK]

Verification: The project owner shall provide CEMS emissions data to demonstrate compliance with this condition as part of the Quarterly Operation Reports **(AQ-SC8)**.

AQ-36 The emissions of particulate matter less than or equal to 10 microns in diameter (PM10) shall not exceed 9.5 pounds per hour for each combustion turbine. [Rule 20.3(d)(2)]

Verification: Source tests demonstrating compliance with this condition shall be provided to the CPM and are due within the timeframes specified in Conditions **AQ-53** and **AQ-54**.

AQ-37 The discharge of particulate matter from the exhaust stack of each combustion turbine shall not exceed 0.10 grains per dry standard cubic foot (0.23 grams/dscm). The District may require periodic testing to verify compliance with this standard. [Rule 53]

Verification: Source tests demonstrating compliance with this condition shall be provided to the CPM and are due within the timeframes specified in Conditions **AQ-53** and **AQ-54**.

AQ-38 Visible emissions from the lube oil vents and the exhaust stack of each combustion turbine shall not exceed 20% opacity for more than three (3) minutes in any period of 60 consecutive minutes. [Rule 50]

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

AQ-39 Mass emissions from each combustion turbine of oxides of nitrogen (NOx), calculated as NO_2; carbon monoxide (CO); and volatile organic compounds (VOC), calculated as methane, shall not exceed the following limits, except during commissioning, low load operation, startup, shutdown, or tuning periods for that turbine. A 1-clock-hour averaging period for these limits shall apply to CEMS data except for emissions during transient hours when a 3-clock-hour averaging period shall apply. [Rule 20.3(d)(2)]

Pollutant	*Emission Limit, lb*
a. NOx	*15.1*
b. CO	*9.2*
c. VOC	*4.0*

Verification: The project owner shall submit to the CPM operating data demonstrating compliance with this condition as part of the Quarterly Operation Reports **(AQ-SC8)**.

AQ-40 Excluding any minutes that are coincident with a shutdown period, cumulative mass emissions of oxides of nitrogen (NOx), calculated as NO_2; carbon monoxide (CO); and volatile organic compounds (VOC), calculated as methane, during a combustion turbine's startup period shall not exceed the following limits during any startup period, except during that turbine's commissioning period. [Rule 20.3(d)(1)]

Pollutant	*Emission Limit,lb*
a. NOx	*69.2*
b. CO	*545*
c. VOC	*15.5*

Verification: The project owner shall submit to the CPM operating data demonstrating compliance with this condition as part of the Quarterly Operation Reports **(AQ-SC8)**.

AQ-41 Cumulative mass emissions of oxides of nitrogen (NOx), calculated as NO_2; carbon monoxide (CO); and volatile organic compounds (VOC), calculated as methane, during a combustion turbine's shutdown period shall not exceed the following limits during any shutdown period, except during that turbine's commissioning period. [Rule 20.3(d)(1)]

Pollutant	*Emission Limit,lb*
a. NOx	*25.7*
b. CO	*277*
c. VOC	*6.2*

Verification: The project owner shall provide CEMS emissions data to demonstrate compliance with this condition as part of the Quarterly Operation Reports **(AQ-SC8)**.

AQ-42 The oxides of nitrogen (NOx) emissions from each combustion turbine shall not exceed 200 pounds per hour and total aggregate NOx emissions from both combustion turbines combined shall not exceed 286 pounds per hour, calculated as nitrogen dioxide and measured over each 1-clock hour period. These emission limits shall apply during all times one or both turbines are

operating, including, but not limited to, emissions during commissioning, low load operation, startup, shutdown, and tuning periods. [Rule 20.3(d)(2)]

Verification: The project owner shall provide CEMS emissions data to demonstrate compliance with this condition as part of the Quarterly Operation Reports **(AQ-SC8)**.

AQ-43 The carbon monoxide (CO) emissions from each combustion turbine shall not exceed 3813 pounds per hour and total aggregate CO emissions from both combustion turbines combined shall not exceed 4627 pounds per hour measured over each 1-clock hour period. This emission limit shall apply during all times that one or both turbines are operating, including, but not limited to emissions during commissioning, low load operation, startup, shutdown, and tuning periods. [Rule 20.3(d)(2)]

Verification: The project owner shall provide CEMS emissions data to demonstrate compliance with this condition as part of the Quarterly Operation Reports **(AQ-SC8)**.

AQ-44 Beginning with the initial startup dates for either combustion turbine, aggregate emissions of oxides of nitrogen (NOx), calculated as nitrogen dioxide (NO_2); carbon monoxide (CO); volatile organic compounds (VOCs), calculated as methane; particulate matter less than or equal to 10 microns in diameter (PM10); and oxides of sulfur (SOx), calculated as sulfur dioxide (SO_2), from the combustion turbines described in District Applications No. 985745 and 985747 and the emergency fire pump described in Application No. 985748, except emissions or emission units excluded from the calculation of aggregate potential to emit as specified in Rule 20.1 (d) (1), shall not exceed the following limits for each rolling 12-calendar-month period:

Pollutant	*Emission Limit, tons per year*
a. NOx	*72.11*
b. CO	*339.9*
c. VOC	*23.7*
d. PM10	*39.0*
e. SOx (calculated as SO_2)	*5.6*

In addition, beginning with the date on which both turbines have completed their commissioning periods aggregate emissions of CO and VOC from the equipment specified above in this condition shall not exceed 217.3 and 20.1 tons per year, respectively, for each rolling 12-calendar-month period.

The aggregate emissions of each pollutant shall include emissions during all times that the equipment is operating including, but not limited to, emissions during commissioning, low load operation, startup, shutdown, and tuning periods. [Rules 20.3(d)(3), 20.3(d)(8) and 21]

Verification: The project owner shall submit to the CPM and the District the facility annual operating and emissions data demonstrating compliance with this condition as part of the fourth quarter's Quarterly Operation Reports **(AQ-SC8)**.

AQ-45 For each calendar month, the project owner shall maintain records, as applicable, on a calendar monthly basis, of mass emissions during the calendar month of NOx (calculated as NO_2), CO, VOCs (calculated as methane), PM10, and SOx (calculated as SO_2), in tons, from each emission unit described in District Applications No. 985745, 985747, and 985748 , except for emissions or emission units excluded from the calculation of aggregate potential to emit as specified in Rule 20.1 (d) (1). These records shall be made available for inspection within 15 calendar days after the end of each calendar month. [Rules 20.3(d)(3), 20.3(d)(8) and 21]

Verification: The project owner shall provide emissions summary data in compliance with this condition as part of the Quarterly Operation Reports **(AQ-SC8)**. The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

AQ-46 For each calendar month and each rolling 12-calendar-month period, the project owner shall maintain records as applicable, on a calendar monthly basis, of aggregate mass emissions of NOx (calculated as NO_2), CO, VOCs (calculated as methane), PM10, and SOx (calculated as SO_2) in tons for the emission units described in District Applications No. 985745, 985747, and 985748, except for emissions or emission units excluded from the calculation of aggregate potential to emit as specified in Rule 20.1 (d) (1). These records shall be made available for inspection within 15 calendar days after the end of each calendar month. [Rules 20.3(d)(3), 20.3(d)(8) and 21]

Verification: The project owner shall provide emissions summary data in compliance with this condition as part of the Quarterly Operation Reports **(AQ-SC8)**. The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

AQ-47 For each combustion turbine, the number of startup periods occurring in each calendar year shall not exceed 1460. [Rules 1200 and 21]

Verification: The project owner shall submit facility annual operating data demonstrating compliance with this condition as part of the fourth quarter's Quarterly Operation Reports **(AQ-SC8).**

Ammonia – SCR

AQ-48 Not later than 90 calendar days prior to the start of construction, the project owner shall submit to the District the final selection, design parameters and details of the selective catalytic reduction (SCR) and oxidation catalyst emission control systems for the combustion turbines including, but not limited to, the minimum ammonia injection temperature for the SCR; the catalyst volume, space velocity and area velocity at full load with and without steam injection; and control efficiencies of the SCR and the oxidation catalyst CO at temperatures between 100 °F and 1000 °F at space velocities

corresponding to 100% (with steam injection) and 60% load. Such information may be submitted to the District as trade secret and confidential pursuant to District Rules 175 and 176. [Rules 20.3(d)(1) and 14]

Verification: The project owner shall submit to the CPM for review and District for approval final selection, design parameters and details of the SCR and oxidation catalyst emission control systems at least 90 days prior to the start of construction.

AQ-49 When a combustion turbine is operating, ammonia shall be injected at all times that the associated selective catalytic reduction (SCR) system outlet temperature is 450 degrees Fahrenheit or greater. [Rule 20.3 (d)(1)]

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

AQ-50 Continuous monitors shall be installed on each SCR system prior to their initial operation to monitor or calculate, and record the ammonia solution injection rate in pounds per hour and the SCR outlet temperature in degrees Fahrenheit for each unit operating minute. The monitors shall be installed, calibrated and maintained in accordance with a District approved protocol, which may be part of the CEMS protocol. This protocol, which shall include the calculation methodology, shall be submitted to the District for written approval at least 90 days prior to initial startup of the gas turbines with the SCR system. The monitors shall be in full operation at all times when the turbine is in operation. [Rule 20.3(d)(1)]

Verification: The project owner shall submit to the CPM for review and the District for approval a turbine operation monitoring protocol in compliance with this condition at least 90 days prior to the initial startup.

AQ-51 Except during periods when the ammonia injection system is being tuned or one or more ammonia injection systems is in manual control for compliance with applicable permit conditions, the automatic ammonia injection system serving the SCR system shall be in operation in accordance with manufacturer's specifications at all times when ammonia is being injected into the SCR system. Manufacturer specifications shall be maintained on site and made available to District personnel upon request. [Rule 20.3(d)(1)]

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

AQ-52 The concentration of ammonia solution used in the ammonia injection system shall be less than 20% ammonia by weight. Records of ammonia solution concentration shall be maintained on site and made available to District personnel upon request. [Rule 14]

Verification: The project owner shall maintain on site and provide on request of the CPM or District the ammonia delivery records that demonstrate compliance with this condition.

Testing

AQ-53 All source test or other tests required by this permit/license shall be performed by the District or an independent contractor approved by the District. Unless otherwise specified in this permit or authorized in writing by the District, if testing will be performed by an independent contractor and witnessed by the District, a proposed test protocol shall be submitted to the District for written approval at least 60 days prior to source testing. Additionally, the District shall be notified a minimum of 30 days prior to the test so that observers may be present unless otherwise authorized in writing by the District. [Rules 20.3(d)(1) and 1200 and 40 CFR Part60 Subpart KKKK and 40 CFR §60.8]

Verification: The project owner shall submit to the CPM for review and the District for approval the initial source test protocol at least 60 days prior to the initial source test. The project owner shall notify the CPM and District no later than 30 days prior to the proposed source test date and time.

AQ-54 Unless otherwise specified in this permit or authorized in writing by the District, within 45 days after completion of a source test or RATA performed by an independent contractor, a final test report shall be submitted to the District for review and approval. [Rules 20.3(d)(1) and 1200 and 40 CFR Part 60 Subpart KKKK, 40 CFR §60.8, and 40 CFR Part 75]

Verification: The project owner will submit all RATA or source test reports to the CPM for review and the District for approval within 45 days of the completion of those tests.

AQ-55 The exhaust stacks for each combustion turbine shall be equipped with source test ports and platforms to allow for the measurement and collection of stack gas samples consistent with all approved test protocols. The ports and platforms shall be constructed in accordance with District Method 3A, Figure 2, and approved by the District. Ninety days prior to construction of the turbine stacks the project owner shall provide the District for written approval detailed plan drawings of the turbine stacks that show the sampling ports and demonstrate compliance with the requirements of this condition. [Rule 20]

Verification: The project owner shall submit to the CPM for review and District for approval a stack test port and platform plan at least 60 days before the installation of the stack ports and platform.

AQ-56 Not later than 60 calendar days after completion of the commissioning period for each combustion turbine, an Initial Emissions Source Test shall be conducted on that turbine to demonstrate compliance with the NOx, CO, VOC, PM10, and ammonia emission standards of this permit. The source test protocol shall comply with all of the following requirements:

a. Measurements of NOx, CO concentrations and emissions and oxygen (O_2) concentration shall be conducted in accordance with U.S. Environmental Protection Agency (EPA) methods 7E, 10, and 3A,

respectively, and District source test Method 100, or alternative methods approved by the District and EPA;

b. Measurement of VOC emissions shall be conducted in accordance with EPA Methods 25A and/or 18, or alternative methods approved by the District and EPA;

c. Measurements of ammonia emissions shall be conducted in accordance with Bay Area Air Quality Management District Method ST-1B or an alternative method approved by the District and EPA;

d. Measurements of PM10 emissions shall be conducted in accordance with EPA Methods 201A and 202 or alternative methods approved by the district and EPA;

e. Source testing shall be performed at the normal load level, as specified in 40 CFR Part 75 Appendix A Section 6.5.2.1 (d), provided it is not less than 80% of the combustion turbine's rated load unless it is demonstrated to the satisfaction of the District that the combustion turbine cannot operate under these conditions . If the demonstration is accepted, then emissions source testing shall be performed at the highest achievable continuous power level. The District may specify additional testing at different load levels or operational conditions to ensure compliance with the emission limits of this permit and District Rules and Regulations;

f. Measurements of particulate matter emissions shall be conducted in accordance with SDAPCD Method 5 or an alternative method approved by the District and EPA; and

g. Measurements of opacity shall be conducted in accordance with EPA Method 9 or an alternative method approved by the District and EPA.

h. Unless otherwise authorized in writing by the District, testing for NOx, CO, VOC, PM10 and ammonia concentrations and emissions, as applicable, shall be conducted concurrently with the NOx and CO continuous emission measurement system (CEMS) Relative Accuracy Test Audit (RATA).

[Rule 20.3(d)(1) and 1200]

Verification: The project owner shall submit to the CPM for review and the District for approval the initial source test protocol and source test report within the timeframes specified in Conditions **AQ-53** and **AQ-54**.

AQ-57 A renewal source test and a NOx and CO Relative Accuracy Test Audit (RATA) test shall be periodically conducted on each combustion turbine to demonstrate compliance with the NOx, CO, VOC, PM10, and ammonia emission standards of this permit and applicable relative accuracy requirements for the CEMS systems using District approved methods. The renewal source test and the NOx and CO RATAs shall be conducted in accordance with the applicable RATA frequency requirements of 40 CFR75, Appendix B, Sections 2.3.1 and 2.3.3. The renewal source test shall be conducted in accordance with a protocol complying with all the applicable

requirements of the source test protocol for the Initial Emissions Source Test. [Rule 69.3, 69.3.1, and 20.3(d)(1) and 40 CFR Part 60 Subpart KKKK, and 40 CFR Part 75]

Verification: The project owner shall submit to the CPM for review and the District for approval the periodic RATA and source test protocols, and RATA source test reports within the timeframes specified in Conditions **AQ-53** and **AQ-54**.

AQ-58 Relative Accuracy Test Audit (RATAs) and all other required certification tests shall be performed and completed on the NOx CEMS in accordance with applicable provisions of 40 CFR Part 75 Appendix A and B and 40 CFR §60.4405 and on the CO CEMS in accordance with applicable provisions of 40 CFR Part 60 Appendix B and F. [Rule 21, Rule 20.3 (d)(1), 40 CFR Part 60 Subpart KKKK and 40 CFR Part 75]

Verification: The results and field data collected during source tests required by this condition shall be submitted to the CPM for review and the District for approval as required by Condition **AQ-54**.

AQ-59 Not later than 60 calendar days after completion of the commissioning period for each combustion turbine, an initial emission source test for toxic air contaminants shall be conducted on that turbine to determine the emissions of toxic air contaminants from the combustion turbines. At a minimum the following compounds shall be tested for, and emissions, if any, quantified:

a. Acetaldehyde
b. Acrolein
c. Benzene
d. Formaldehyde
e. Toluene
f. Xylenes

This list of compounds may be adjusted by the District based on source test results to ensure compliance with District Rule 1200 is demonstrated. The District may require one or more or additional compounds to be quantified through source testing as needed to ensure compliance with Rule 1200. Within 60 calendar days after completion of a source test performed by an independent contractor, a final test report shall be submitted to the District for review and approval. [Rule 1200]

Verification: The results and field data collected during source tests required by this condition shall be submitted to the CPM for review and the District for approval within 60 days of testing.

AQ-60 The District may require one or more of the following compounds, or additional compounds to be quantified through source testing periodically to ensure compliance with rule 1200:

a. Acetaldehyde

b. Acrolein

c. Benzene

d. Formaldehyde

e. Toluene

f. Xylenes

If the District requires the project owner to perform this source testing, the District shall request the testing in writing a reasonable period of time prior to the testing date. [Rule 1200]

Verification: The results and field data collected during source tests required by the District under this condition shall be submitted to the CPM for review and the District for approval within 60 days of testing.

AQ-61 The higher heating value of the combustion turbine fuel shall be measured by ASTM D1826–94, Standard Test Method for Calorific Value of Gases in Natural Gas Range by Continuous Recording Calorimeter or ASTM D1945–96, Standard Method for Analysis of Natural Gas by Gas Chromatography or an alternative test method approved by the District and EPA. [Rules 69.3, 69.3.1, and 20.3(d)(1) and 40 CFR Part 60 Subpart KKKK, and 40 CFR Part 75]

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

AQ-62 The sulfur content of the combustion turbine fuel shall be sampled not less than once each calendar quarter in accordance with a protocol approved by the District, which shall be submitted to the District for approval not later than 90 days before the earlier of the initial startup dates for either of the two combustion turbines and measured with ASTM D1072–90 (Reapproved 1994), Standard Test Method for Total Sulfur in Fuel Gases; ASTM D3246–05, Standard Test Method for Sulfur in Petroleum Gas by Oxidative Microcoulometry; ASTM D4468–85 (Reapproved 2000), Standard Test Method for Total Sulfur in Gaseous Fuels by Hydrogenolysis and Rateometric Colorimetry; ASTM D6228–98 (Reapproved 2003), Standard Test Method for Determination of Sulfur Compounds in Natural Gas and Gaseous Fuels by Gas Chromatography and Flame Photometric Detection; or ASTM D6667–04, Standard Test Method for Determination of Total Volatile Sulfur in Gaseous Hydrocarbons and Liquefied Petroleum Gases by Ultraviolet Fluorescence or an alternative test method approved by the District and EPA. [Rule 20.3 (d)(1), Rule 21, and 40 CFR Part 75]

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

Continuous Monitoring

AQ-63 The project owner shall comply with the applicable continuous emission monitoring requirements of 40 CFR Part 75. [40 CFR Part 75]

Verification: The project owner shall maintain a copy of the CEMS protocol required by **AQ-64** on site and provide it, other CEMS data, and the CEMS for inspection on request by representatives of the District, ARB, and the Energy Commission.

AQ-64 A continuous emission monitoring system (CEMS) shall be installed on each combustion turbine and properly maintained and calibrated to measure, calculate and record the following, in accordance with the District approved CEMS protocol:

A. Hourly average(s) concentration of oxides of nitrogen (NOX) uncorrected and corrected to 15% oxygen, in parts per million (ppmvd), necessary to demonstrate compliance with the NOx limits of this permit;

B. Hourly average concentration of carbon monoxide (CO) uncorrected and corrected to 15% oxygen, in parts per million (ppmvd), necessary to demonstrate compliance with the CO limits of this permit;

C. Percent oxygen (O_2) in the exhaust gas for each unit operating minute;

D. Average concentration of oxides of nitrogen (NOx) for each continuous rolling 3-hour period, in parts per million (ppmv) corrected to 15% oxygen;

E. Hourly mass emissions of oxides of nitrogen (NOx), in pounds;

F. Cumulative mass emissions of oxides of nitrogen (NOx) in each startup and shutdown period, in pounds;

G. Daily mass emissions of oxides of nitrogen (NOx), in pounds;

H. Calendar monthly mass emissions of oxides of nitrogen (NOx), in pounds;

I. Rolling 30-unit-operating-day average concentration of oxides of nitrogen (NOx) corrected to 15% oxygen, in parts per million (ppmvd);

J. Rolling 30-unit-operating-day average oxides of nitrogen (NOx) emission rate, in pounds per megawatt-hour (MWh).

K. Calendar quarter, calendar year, and rolling 12-calendar-month period mass emissions of oxides of nitrogen (NOx), in tons;

L. Cumulative mass emissions of carbon monoxide (CO) in each startup and shutdown period, in pounds

M. Hourly mass emissions of carbon monoxide (CO), in pounds;

N. Daily mass emission of carbon monoxide (CO), in pounds;

O. Calendar monthly mass emission of carbon monoxide (CO), in pounds;

P. Rolling 12-calendar-month period mass emission of carbon monoxide (CO), in tons;

Q. Average concentration of oxides of nitrogen (NOx) and carbon monoxide (CO) uncorrected and corrected to 15 percent oxygen, in parts per million (ppmvd), during each unit operating minute;

R. Average emission rate in pounds per hour of oxides of nitrogen (NOx) and carbon monoxide (CO) during each unit operating minute.

[Rules 69.3, 69.3.1, and 20.3(d)(1) and 40 CFR Part 60 Subpart KKKK, and 40 CFR Part 75]

Verification: The project owner shall submit to the CPM for review and the District for approval a CEMS protocol, as required by **AQ-64**, which includes description of the methods of compliance with the requirements of this condition. The project owner shall make the site available for inspection of records and equipment by representatives of the District, ARB, and the Energy Commission.

AQ-65 No later than 90 calendar days prior to initial startup of each combustion turbine, the project owner shall submit a CEMS protocol to the District, for written approval that shows how the CEMS will be able to meet all District monitoring requirements. [Rules 69.3, 69.3.1, and 20.3(d)(1) and 40 CFR Part 60 Subpart KKKK, and 40 CFR Part 75]

Verification: The project owner shall submit to the CPM for review and the District for approval a CEMS operating protocol at least 90 days prior to the operation the CEMS.

AQ-66 No later than the earlier of 90 unit operating days or 180 calendar days after each combustion turbine commences commercial operation, a Relative Accuracy Test Audit (RATA) and other required certification tests shall be performed an completed on the that turbine's NOx CEMS in accordance with 40 CFR Part 75 Appendix A and on the CO CEMS in accordance with 40 CFR Part 60 Appendix B. The RATAs shall demonstrate that the NOx and CO CEMS comply with the applicable relative accuracy requirements. At least 60 calendar days prior to the test date, the project owner shall submit a test protocol to the District for written approval. Additionally, the District and U.S. EPA shall be notified a minimum of 45 calendar days prior to the test so that observers may be present. Within 45 calendar days of completion of this test, a written test report shall be submitted to the District for approval. For purposes of this condition, commences commercial operation is defined as the first instance when power is sold to the electrical grid. [Rules 69.3, 69.3.1, and 20.3(d)(1) and 40 CFR Part 60 Subpart KKKK, and 40 CFR Part 75]

Verification: The project owner shall submit to the CPM for review and the District for approval the RATA certification test protocol at least 60 days prior to the RATA test and shall notify the CPM and District of the RATA test date at least 45 days prior to conducting the RATA and other certification tests. The project owner will submit all RATA or source test reports to the CPM for review and the District for approval within 45 days of the completion of those tests.

AQ-67 A monitoring plan in conformance with 40 CFR 75.53 shall be submitted to U.S EPA Region 9 and the District at least 45 calendar days prior to the

Relative Accuracy Test Audit (RATA), as required in 40 CFR 75.62. [40 CFR Part 75]

Verification: The project owner shall submit to the CPM for review and the District for approval a monitoring plan in compliance with this condition at least 45 days prior to the RATA test.

AQ-68 The oxides of nitrogen (NOx) and oxygen (O_2) components of the CEMS shall be certified and maintained in accordance with applicable Federal Regulations including the requirements of sections 75.10 and 75.12 of title 40, Code of Federal Regulations Part 75 (40 CFR 75), the performance specifications of Appendix A of 40 CFR 75, the quality assurance procedures of Appendix B of 40 CFR 75 and the CEMS protocol approved by the District. The carbon monoxide (CO) components of the CEMS shall be certified and maintained in accordance with 40 CFR 60, Appendices B and F, unless otherwise specified in this permit, and the CEMS protocol approved by the District. [Rule 69.3, 69.3.1 and 20.3(d)(1) and 40 CFR Part 60 Subpart KKKK, and 40 CFR Part 75]

Verification: The project owner shall submit to the CPM for review and the District for approval a CEMS protocol, as required by **AQ-64**, which includes description of the methods of compliance with the requirements of this condition. The project owner shall make the site available for inspection of records and equipment by representatives of the District, ARB, and the Energy Commission.

AQ-69 The CEMS shall be in operation in accordance with the District approved CEMs protocol at all times when the turbine is in operation a copy of the District approved CEMS monitoring protocol shall be maintained on site and made available to District personnel upon request. [Rules 69.3, 69.3.1, and 20(d)(1) and 40 CFR Part 60 Subpart KKKK, and 40 CFR Part 75]

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

AQ-70 When the CEMS is not recording data and the combustion turbine is operating, hourly NOx emissions for purposes of calendar year and rolling 12-calendar-month period emission calculations shall be determined in accordance with 40 CFR 75 Subpart C. Additionally, hourly CO emissions for rolling 12-calendar-month period emission calculations shall be determined using CO emission factors to be determined from source test emission factors, recorded CEMS data, and fuel consumption data, in terms of pounds per hour of CO for the gas turbine. Emission calculations used to determine hourly emission rates shall be reviewed and approved by the District, in writing, before the hourly emission rates are incorporated into the CEMS emission data. [Rules 20.3(d)(3) and 21 and 40 CFR Part 75]

Verification: The project owner shall provide the District for approval and the CPM for review all emission calculations required by this condition, in a manner and time required by the District, and shall provide notation of when such calculations are used in place of operating CEMS data in the Quarterly Operation Reports **(AQ-SC8)**.

AQ-71 Any violation of any emission standard as indicated by the CEMS shall be reported to the District's compliance division within 96 hours after such occurrence. [Rule 19.2]

Verification: The project owner shall notify the District regarding any emission standard violation as required in this condition and shall document all such occurrences in each Quarterly Operation Report **(AQ-SC8)**.

AQ-72 The CEMS shall be maintained and operated, and reports submitted, in accordance with the requirements of rule 19.2 Sections (d), (e), (f) (1), (f) (2), (f) (3), (f) (4) and (f) (5), and a CEMS protocol approved by the District. [Rule 19.2]

Verification: The project owner shall submit to the District the CEMS reports as required in this condition and shall make the site available for inspection of records and equipment by representatives of the District, ARB, and the Energy Commission.

AQ-73 Except for changes that are specified in the initial approved CEMS protocol or a subsequent revision to that protocol that is approved in advance, in writing by the District, the District shall be notified in writing at least thirty (30) calendar days prior to any planned changes made in the CEMS or Data Acquisition and Handling System (DAHS), including, but not limited to, the programmable logic controller, software which affects the value of data displayed on the CEMS / DAHS monitors with respect to the parameters measured by their respective sensing devices or any planned changes to the software that controls the ammonia flow to the SCR. Unplanned or emergency changes shall be reported within 96 hours. [Rules 69.3, 69.3.1, and 20.3(d)(1) and 40 CFR Part 60 Subpart KKKK, and 40 CFR Part 75]

Verification: The project owner shall submit to the CPM for review and the District for approval any revision to the CEMS/DAHS or ammonia flow control software, as required by this condition, to be approved in advance at least 30 days before any planned changes are made. The project owner shall notify the District regarding any unplanned emergency changes to these software systems within 96 hours and shall document all such occurrences in each Quarterly Operation Report **(AQ-SC8)**.

AQ-74 At least 90 calendar days prior to the Initial Emissions Source Test, the project owner shall submit a monitoring protocol to the District for written approval which shall specify a method of determining the CO/VOC surrogate relationship that shall be used to demonstrate compliance with all VOC emission limits. This protocol can be provided as part of the Initial Source Emissions Testing Protocol. [Rule 20.3 (d)(1)]

Verification: The project owner shall submit to the CPM for review and the District for approval the monitoring protocol as part of the initial source test protocol in compliance with requirements of this condition at least 90 days prior to the initial source test.

AQ-75 Fuel flowmeters shall be installed and maintained to measure the fuel flow rate, corrected for temperature and pressure, to each combustion turbine. Correction factors and constants shall be maintained on site and made

available to the District upon request. The fuel flowmeters shall meet the applicable quality assurance requirements of 40 CFR Part 75, Appendix D, and Section 2.1.6. [Rule 69.3, 69.3.1, and 20.3(d)(1) and 40 CFR Park 60 Subpart KKKK, and 40 CFR Part75]

Verification: The project owner shall submit to the CPM the natural gas usage data from the fuel flow meters as part of the Quarterly Operation Report (**AQ-SC8**).

AQ-76 Each combustion turbine shall be equipped with continuous monitors to measure, calculate and record unit operating days and hours and the following operational characteristics:

A. Date and time;

B. Natural gas flow rate to the combustion turbine during each unit operating minute, in standard cubic feet per hour;

C. Total heat input to the combustion turbine based the fuels higher heating value during each unit operating minute, in million British thermal units per hour (MMBtu/hr);

D. Higher heating value of the fuel on an hourly basis, in million British thermal units per standard cubic foot (MMBtu/scf);

E. Stack exhaust gas temperature during each unit operating minute, in degrees Fahrenheit;

F. Combustion turbine energy output during each unit operating minute in megawatts hours (MWh); and

G. Steam turbine energy output during each unit operating minute in megawatts hours (MWh).

The values of these operational characteristics shall be recorded each unit operating minute. The monitors shall be installed, calibrated, and maintained in accordance with a turbine operation monitoring protocol, which may be part of the CEMS protocol, approved by the District, which shall include any relevant calculation methodologies. The monitors shall be in full operation at all times when the combustion turbine is in operation. Calibration records for the continuous monitors shall be maintained on site and made available to the District upon request. [Rules 69.3, 69.3.1, and 20.(d)(1) and 40 CFR Part 60 Subpart KKKK, and 40 CFR Part 75]

Verification: The project owner shall submit to the CPM for review and the District for approval a turbine operation monitoring protocol in compliance with this condition and within the timeframes specified in **AQ-77** and the project owner shall make the site available for inspection of records and equipment required in this condition by representatives of the District, ARB, and the Energy Commission.

AQ-77 At least 90 calendar days prior to initial startup of the each combustion turbine, the project owner shall submit a turbine monitoring protocol to the District for written approval. This may be part of the CEMS protocol. [Rule

69.3, 69.3.1, and 20.3 (d)(1) and 40 CFR Part 60 Subpart KKKK, and 40 CFR Part75]

Verification: The project owner shall submit to the CPM for review and the District for approval a turbine monitoring protocol in compliance with this condition at least 90 days prior to the initial startup of each combustion turbine.

AQ-78 Operating logs or Data Acquisition and Handling System (DAHS) records shall be maintained to record the beginning and end times and durations of all startups, shutdowns, and tuning periods to the nearest minute, quantity of fuel used in each clock hour, calendar month, and 12-calendar-month period in standard cubic feet; hours of operation each day; and hours of operation during each calendar year. For purposes of this condition, the hours of turbine operation is defined as the total minutes the turbine is combusting fuel during the calendar year divided by 60. [Rules 69.3, 69.3.1, and 20.3(d)(1) and 40 CFR Part 60 Subpart KKKK, and 40 CFR Part 75]

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

Commissioning and Shakedown

AQ-79 Before the end of the commissioning period for each combustion turbine, the project owner shall install post-combustion air pollution control equipment on that turbine to minimize NOx and CO emissions. Once installed, the post-combustion air pollution control equipment shall be maintained in good condition and shall be in full operation at all times when the turbine is combusting fuel and the air pollution control equipment is at or above its minimum operating temperature. [Rule 20.3(d)(1)]

Verification: The project owner shall provide the CPM District records demonstrating compliance with this condition as part of the monthly commissioning status report **(AQ-80)**.

AQ-80 Thirty calendar days after the end of the commissioning period for each combustion turbine, the project owner shall submit a written progress report to the District. This report shall include, at a minimum, the date the commissioning period ended, the periods of startup and shutdown, the emissions of NOx and CO during startup and shutdown, and the emissions of NOx and CO during steady state operation. This report shall also detail any turbine or emission control equipment malfunction, upset, repairs, maintenance, modifications, or replacements affecting emissions of air contaminants that occurred during the commissioning period. All of the following continuous monitoring information shall be reported for each minute and, except for cumulative mass emissions, averaged over each hour of operation:

A. Concentration of oxides of nitrogen (NOx) uncorrected and corrected to 15% oxygen, in parts per million (ppmvd);

B. Concentration of carbon monoxide (CO) uncorrected and corrected to 15% oxygen, in parts per million (ppmvd);

C. Percent oxygen (O_2) in the exhaust gas;

D. Mass emissions of oxides of nitrogen (NOx), in pounds;

E. Cumulative mass emissions of oxides of nitrogen (NOx) in each startup and shutdown period, in pounds;

F. Cumulative mass emissions of carbon monoxide (CO) in each startup and shutdown period, in pounds

G. Mass emissions of carbon monoxide (CO), in pounds;

H. Total heat input to the combustion turbine based on the fuel's higher heating value, in million British thermal units per hour (MMBtu/hr);

I. Higher heating value of the fuel on an hourly basis, in million British thermal units per standard cubic foot (MMBtu/scf);

J. Gross electrical power output of the turbine, in megawatts hours (MWh) for each hour; and

K. SCR outlet temperature, in degrees Fahrenheit; and

L. Stack exhaust gas temperature, in degrees Fahrenheit.

The hourly average information shall be submitted in writing and in an electronic format approved by the District. The minute-by-minute information shall be submitted in an electronic format approved by the District. [Rules 69.3, 69.3.1, 20.3(d)(1) and 20.3(d)(2)]

Verification: A log of the dates, times, and cumulative unit operating hours when fuel is being combusted during the commissioning period shall be maintained by the project owner. The project owner shall submit, commencing one month from the time of gas turbine first fire, a monthly commissioning status report throughout the duration of the commissioning phase that demonstrates compliance with the requirements listed in this condition. The monthly commissioning status report shall be submitted to the CPM by the 10th of each month for the previous month, for all months with turbine commissioning activities following the turbine first fire date. The project owner shall also provide the reporting required by this condition to the District and CPM within 30 day of completing commissioning of each turbine. The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

AQ-81 The three utility boilers described on District Permits to Operate No. 791, 792, and 793 shall not operate at any time one or both combustion turbines are operating. [Rules 20.3(d)(3), 20.3(d)(8) and 21 and 40 CFR §52.1]

Verification: The project owner shall submit to the CPM and the District the facility operating and emissions data demonstrating compliance with this condition, while the boilers regulated by this condition are still operational, as part of the monthly commissioning status report (**AQ-80**).

AQ-82 Beginning with the initial startup of Turbine A, aggregate emissions of oxides of nitrogen (NOx), calculated as nitrogen dioxide (NO_2); carbon monoxide (CO); volatile organic compounds (VOCs), calculated as methane; particulate matter less than or equal to 10 microns in diameter (PM10); and oxides of sulfur (SOx), calculated as sulfur dioxides (SO_2), from Turbine A and the emergency fire pump described in Application No. 985748, except emissions or emission units excluded from the calculation of aggregate potential to emit as specified in Rule 20.1(d)(1), shall not exceed the following limits for each rolling 12-calendar-month period:

Pollutant	*Emission Limit, tons per year*
a. NOx	*36.05*
b. CO	*169.95*
c. VOC	*11.85*
d. PM10	*19.5*
e. SOx	*2.8*

The aggregate emissions of each pollutant shall include emissions during all times that the equipment is operating including, but not limited to, emissions during commissioning, low load operation, startup, shutdown, and tuning periods. This condition will not apply on and after the date Turbine B completes its shakedown period. [Rules 20.3(d)(3), 20.3(d)(8) and 21]

Verification: The project owner shall submit to the CPM and the District the facility 12-month rolling operating and emissions data demonstrating compliance with this condition as part of the monthly commissioning status report (**AQ-80**).

AQ-83 Beginning with the date Turbine A completes its shakedown period, aggregate emissions of carbon monoxide (CO); particulate matter less than or equal to 2.5 microns in diameter (PM2.5); and particulate matter less than or equal to 10 microns in diameter (PM10) from the three utility boilers described on District Permits to Operate No. 791, 792, and 793, shall not exceed the following limits for each rolling 12-calendar-month period:

Pollutant	*Emission Limit, tons per year*
a. CO	*198.75*
b. PM2.5	*21.80*
c. PM10	*26.89*

The aggregate emissions of each pollutant shall include emissions during all times that the equipment is operating including, but not limited to, emissions during commissioning, low load operation, startup, shutdown, and tuning periods. [Rules 20.3(d)(3), 20.3(d)(8) and 21]

Verification: The project owner shall submit to the CPM and the District the facility 12-month rolling operating and emissions data demonstrating compliance with this condition as part of the monthly commissioning status report (**AQ-80**).

AQ-84 On and after the date that Turbine B completes its shakedown period, the three utility boilers described on District Permits to Operate No. 791, 792, and 793 shall not operate. [Rules 20.3(d)(3), 20.3(d)(8) and 21]

Verification: The project owner shall submit to the CPM and the District information that the boiler regulated by this condition are no longer operational, or the steps being taken to ensure that they will not be operated, once Turbine B completes its shakedown period as part of the final monthly commissioning status report (**AQ-80**).

AQ-85 For each calendar month and each rolling 12-calendar-month period, the project owner shall maintain records on a calendar monthly basis, of aggregate mass emissions of NOx (calculated as NO_2), CO, and PM10 in tons, for Turbine A and the emergency generator described on Application No. 985748, except for emissions or emission units excluded from the calculation of aggregate potential to emit as specified in Rule 20.1(d)(1). There records shall be made available for inspection within 15 calendar days after the end of each calendar month. [Rules 20.3(d)(3), 20.3(d)(8) and 21]

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

AQ-86 For each calendar month, the project owner shall maintain records on a calendar monthly basis, of mass emissions during each calendar month of NOx (calculated as NO_2), CO, PM10, and PM2.5, in tons, from each emission unit described on District Permits to Operate No. 791, 792, and 793. These records shall be made available for inspection within 15 calendar days after the end of each calendar month. [Rules 20.3(d)(3), 20.3(d)(8) and 21]

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

AQ-87 For each calendar month and each rolling 12-calendar-month period, the project owner shall maintain records on a calendar monthly basis, of aggregate mass emissions of NOx (calculated as NO_2), CO, PM10, and PM2.5, in tons, for the emission units described in District Permits to Operate No. 791, 792, and 793. There records shall be made available for inspection within 15 calendar days after the end of each calendar month. [Rules 20.3(d)(3), 20.3(d)(8) and 21]

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

AQ-88 No later than 18 months before the initial startup of either combustion turbine, the project owner shall submit an application to the District for a significant Title V permit modification to limit the aggregate emissions of oxides of nitrogen (NOx), calculated as nitrogen dioxide; carbon monoxide (CO); particulate matter less than or equal to 10 microns in diameter (PM10); and particulate matter less than or equal to 2.5 microns in diameter (PM2.5), from

the three utility boilers described on District Permits to Operate No. 791, 792, and 793 in each rolling 12-calendar-month period as specified in this permit. The application shall include a proposed emissions calculation protocol to calculate the emissions from each emission unit. Where applicable, this protocol may rely in whole or in part on the CEMS or other monitoring protocols required by this permit. [Rules 20.3(d)(3), 20.3(d)(8), 1410 and 21]

Verification: The project owner shall submit copies of all applications and protocols required by this condition to the CPM for review within 5 days of their submittal to the District and no later than 18 months before the initial startup of either combustion turbine.

AQ-89 For each combustion turbine, the project owner shall submit the following notification to the District and U.S. EPA, Region IX:

a. A notification in accordance with 40 CFR Section 60.7(a)(1) delivered or postmarked not late than 30 calendar days after construction has commenced;

b. A notification in accordance with 40 CFR Section 60.7 (a)(3) delivered or postmarked within 15 calendar days after initial startup; and

c. An Initial Notification in accordance with 40 CFR Section 63.6145(c) and 40 CFR Section 63.9(b)(2) submitted no later than 120 calendar days after the initial startup of the turbine.

In addition, the applicant shall notify the District when: (1) construction is complete by submitting a Construction Completion Notice before operating any unit that is the subject of this permit, (2) each combustion turbine first combusts fuel by submitting a First Fuel Fire Notice within five calendar days of the initial operation of the unit, and (3) each combustion turbine first generates electrical power that is sold by providing written notice within 5 days of this event.

Verification: [Rules 24 and 21 and 40 CFR Part 75, 40 CFR Part 60 Subpart KKKK, 40 CFR Part §60.7, 40 CFR Part 63 Subpart YYYY, and 40 CFR Part §63.9]The project owner shall provide notification to the District and U.S. EPA Region IX as required by this condition and shall provide copies of these notifications as part of the final monthly commissioning status reports (**AQ-80**) due the month after the notifications are sent.

District Application Number 985093
An emergency fire pump engine, Cummins diesel engine, Model CFP6E-F35, as preliminarily proposed, rated at 246 brake horsepower.

CONDITIONS FOR EMERGENCY FIRE PUMP ENGINE

AQ-90 The engine shall be EPA certified to the 2009 model year or later requirements for emergency fire pump engines of 40 CFR Part 60 Subpart IIII, Standards of Performance for Stationary Compression Ignition Internal

Combustion Engines. [Rule 20.3(d)(1), 40 CFR Part 60 Subpart III, and 40 CFR Part 63 Subpart ZZZZ]

Verification: The project owner shall provide to the CPM for review and approval engine documentation demonstrating compliance with the condition at least 30 days prior to purchasing the engine.

AQ-91 Engine operation for maintenance and testing purposes shall not exceed 50 hours per calendar year. (ATCM reportable) [Rule 20.3(d)(1) and 17 CCR §93115]

Verification: The project owner shall submit to the CPM the fire pump engine operating data demonstrating compliance with this condition as part of the Quarterly Operation Report **(AQ-SC8)**.

AQ-92 The engine shall only use CARB Diesel Fuel. [Rule 20.3(d)(1), 69.4.1, and 17 CCR §93115]

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

AQ-93 Visible emissions including crankcase smoke shall comply with Air Pollution Control District Rule 50. [Rule 50]

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

AQ-94 The equipment described above shall not cause or contribute to public nuisance. [Rule 51]

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

AQ-95 This engine shall not operate for non-emergency use during the following periods, as applicable:

A. Whenever there is any school sponsored activity, if engine is located on school grounds or

B. Between 7:30 and 3:30 PM on days when school is in session, if the engine is located within 500 feet of, but not on school grounds.

This condition shall not apply to an engine located at or near any school grounds that also serve as the student's place of residence. (ATCM reportable) [17 CCR §93115]

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

AQ-96 A non-resettable engine hour meter shall be installed on this engine, maintained in good working order, and used for recording engine operating hours. If a meter is replaced, the Air Pollution Control District's Compliance

Division shall be notified in writing within 10 calendar days. The written notification shall include the following information:

A. Old meter's hour reading.

B. Replacement meter's manufacturer name, model, and serial number if available and current hour reading on replacement meter.

C. Copy of receipt of new meter or of installation work order.

A copy of the meter replacement notification shall be maintained on site and made available to the Air Pollution Control District upon request. [Rules 69.4.1, 17 CCR §93115, and 40 CFR Part 60 Subpart IIII]

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

AQ-97 The owner or operator shall conduct periodic maintenance of this engine and add-on control equipment, if any, as recommended by the engine and control equipment manufacturers or as specified by the engine servicing company's maintenance procedure. The periodic maintenance shall be conducted at least once each calendar year. [Rule 69.4.1]

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

AQ-98 The owner or operator of the engine shall maintain the following records on site for at least the same period of time as the engine to which the records apply is located at the site:

A. Documentation shall be maintained identifying the fuel as CARB diesel;

B. Manual of recommended maintenance provided by the manufacturer, or maintenance procedures specified by the engine servicing company; and

C. Records of annual engine maintenance, including the date the maintenance was performed.

These records shall be made available to the Air Pollution Control District upon request. [Rule 69.4.1]

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

AQ-99 The owner or operator of this equipment shall maintain a monthly operating log containing, at a minimum, the following:

A. Dates and times of engine operation, indicating whether the operation was for maintenance and testing purposes or emergency use; and, the nature of the emergency, if known;

B. Hours of operation for all uses other than those specified above and identification of the nature of that use.

[Rule 69.4.1, and 17 CCR §93115]

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

ADDITIONAL TITLE V CONDITIONS

AQ-100 The project owner shall submit to the District and to the federal EPA a compliance certification for the new equipment subject to this permit, in a manner or form approved in writing by the District, within one year of completing construction of that equipment, that includes the identification of each applicable term or condition of the final permit for which the compliance status is being certified, the current compliance status and whether the modified equipment was in continuous or intermittent compliance during the certification period, identification of the applicable permitted method used to determine compliance during the certification period, and any other information required by the District to determine the compliance status. [Rule 1421]

Verification: The project owner shall submit to the District and U.S. EPA required Title V submittals and will provide the cover letters of these submittals to the CPM within 15 days of their submittal.

ACRONYMS

AAQS	Ambient Air Quality Standard
AERMOD	ARMS/EPA Regulatory Model
AFC	Application for Certification
APCD	Air Pollution Control District (SDAPCD)
AQCMM	Air Quality Construction Mitigation Manager
AQCMP	Air Quality Construction Mitigation Plan
AQMP	Air Quality Management Plan
AQIA	Air Quality Impact Assessment
ARB	California Air Resources Board
ARM	Ambient Ratio Method
ATC	Authority to Construct
ATCM	Airborne Toxic Control Measure
BACT	Best Available Control Technology
BARCT	Best Available Retrofit Technology
bhp	brake horsepower
BOP	Balance of Plant
Btu	British thermal unit
CAAQS	California Ambient Air Quality Standard
CCR	California Code of Regulations
CEC	California Energy Commission (or Energy Commission)
CECP	Carlsbad Energy Center Project
CEQA	California Environmental Quality Act
CEM	Continuous Emission Monitor
CEMS	Continuous Emission Monitoring System
CFR	Code of Federal Regulations
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CTG	Combustion Turbine Generator
CPM	(CEC) Compliance Project Manager
DAHS	Data Acquisition and Handling System
dscf	dry standard cubic foot
dscm	dry standard cubic meter
EIR	Environmental Impact Report
ERC	Emission Reduction Credit
FDOC	Final Determination Of Compliance
FSA	Final Staff Assessment
GHG	Greenhouse Gas
gpd	gallons per day
gr	Grains (1 gr $\cong$ 0.0648 grams, 7000 gr = 1 pound)
HAP	Hazardous Air Pollutant
hp	horsepower
H_2S	Hydrogen Sulfide
ISCST3	Industrial Source Complex Short Term, version 3
LAER	Lowest Achievable Emission Rate
lbs	pounds
LORS	Laws, Ordinances, Regulations and Standards

MCR	Monthly Compliance Report
mgd	million gallons per day
mg/m^3	milligrams per cubic meter
MMBtu	Million British thermal units
m/s	meters per second
MW	Megawatts (1,000,000 Watts)
NAAQS	National Ambient Air Quality Standard
NH_3	Ammonia
NO	Nitric Oxide
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
PM	Particulate Matter
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
PVMRM	Plume Volume Molar Ratio Method (NO_2 dispersion modeling method)
RATA	Relative Accuracy Test Audit
scf	Standard Cubic Feet
SCR	Selective Catalytic Reduction
SDAB	San Diego Air Basin
SDAPCD	San Diego Air Pollution Control District
SIP	State Implementation Plan
SO_2	Sulfur Dioxide
SO_3	Sulfate
SOx	Oxides of Sulfur
T-BACT	Best Available Control Technology for Toxics
ULN	Ultra Low NOx
U.S. EPA	United States Environmental Protection Agency
$\mu g/m^3$	Microgram per cubic meter
VOC	Volatile Organic Compounds

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APPENDIX AIR-1

Greenhouse Gas Emissions

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

INTRODUCTION AND SUMMARY OF CONCLUSIONS

The Carlsbad Energy Center Project (CECP) burns natural gas for fuel and thus has greenhouse gas (GHG) emissions that contribute cumulatively to climate change. However, CECP is an intermediate (or mid-merit)[1] project that will operate on an as needed basis to provide local grid reliability support. This will allow the closure of existing older units (Encina units 1, 2, and 3) that are less efficient, and displace in the dispatch order other peaking power plants that burn natural gas less efficiently. Thus, CECP decreases the overall amount of GHG emissions[2] per megawatt-hour for both California and the Western Interconnect[3].

While CECP would emit GHG emissions, the relative efficiency of CECP 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 plant, like CECP, affects all other power plants in the interconnected system. The operation of the CECP facility will have an impact upon system operation and GHG emissions in several ways:

- CECP would replace aging and inefficient boiler units, and displace less efficient peaking or mid-merit capacity in the dispatch order of gas-fired facilities that are required to provide electricity reliability in the local reliability area (LRA).
- CECP would provide flexible peaking or mid-merit power necessary to integrate the growing generation from intermittent renewable sources, such as wind and solar generation.
- CECP would in some measure replace out of state high GHG-emitting electricity generation that must be phased out to meet the State's new Emissions Performance Standard.

[1] A mid-merit generating plant is generally defined as a plant that operates to meet system loads between minimum daily load, where base load plants generally provide load up to that point, and the start of peak load, where peaking plants operate to meet peak demand. Mid-merit plants include, but are not limited to, one or more of the following characteristics: quick-starting, rapid response to changing loads, high turndown ranges, good efficiency, and no cogeneration obligations that might limit dispatch. Most California natural gas-fired plants, except dedicated peaking and cogeneration plants, are mid-merit plants.

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

[3] The Western Interconnect is the interconnected power plant and transmission system of which California is a part. This system, which is coordinated by the Western Electricity Coordinating Council (WECC), electrically connects the western states of the U.S., plus parts of western Canada and Mexico.

- CECP would replace peaking or mid-merit generation provided by aging power plants that use once-through cooling that currently provide necessary local reliability.

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 emission of greenhouse gases during construction would be sufficiently reduced by best practices and would not be significant.

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 would be permitted to have more than 800,000 metric tons of carbon dioxide equivalent emissions and would be subject to additional reporting requirements (and possibly GHG reductions or trading requirements as these regulations are more fully developed and implemented).

The project would be consistent with the requirements of SB 1368 (Perata, Chapter 598, Statutes of 2006) and the Greenhouse Gas Emission Performance Standard even though the project, as a peaking or mid-merit project with an enforceable operating limitation less than 60 percent of capacity, is not subject to the requirements of SB 1368 and the Greenhouse Gas Emission Performance Standard.

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 Resources Board (ARB) to enact standards that will reduce GHG emission to 1990 levels by the year 2020. Electricity production facilities will be regulated.
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.)

Applicable Law	Description
State	
Title 20, California Code of Regulations, section 2900 et seq.; CPUC Decision D0701039 in proceeding R0604009	This regulation prohibits 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 mt CO_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 substantially) 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[4] 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 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.[5] To achieve this, ARB has a mandate to define the 1990 emissions levels 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 1 megawatt (MW) capacity, and the due date for initial reports by existing facilities this first year was June 1, 2009.

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

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

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 statewide 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 points of regulation within the sector 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 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,[6] also 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 Greenhouse Gas Emission Performance Standard of 0.500 metric tonnes CO_2 per megawatt-hour[7] (1,100 pounds CO_2/MWh). Specifically, the SB 1368 Emission Performance Standard (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.[8] 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 complies with 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, CECP is not required to comply with the SB 1368 EPS.

[6] Public Utilities Code § 8340 et seq.

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

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

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[9] 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.

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.

[9] See CEC 2009b, page 95.

The generation of electricity using fossil fuels, including natural gas, can produce air emissions known as greenhouse gases in addition to the criteria air pollutants that have been traditionally regulated under the federal and state Clean Air Acts. Greenhouse gas emissions contribute to the warming of the earth's atmosphere, leading to climate change. 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 (CO2E) metric tonnes (MT) for ease of comparison.

PROJECT CONSTRUCTION

Construction of industrial facilities such as power plants requires coordination of a variety of equipment and personnel. The concentrated on-site activities result in short-term, unavoidable increases in vehicle and equipment emissions that include greenhouse gases. The construction duration for the CECP is scheduled to last 25 months if built in one phase, but would be longer if the construction is separated into two phases for Units 6 and 7. **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 (MTCO2E) and totaled for the proposed 25 month construction schedule.

Greenhouse Gas Table 2
CECP Estimated Potential Construction Greenhouse Gas Emissions

Construction Element	CO_2 Equivalent (MTCO2E) [a]
Tank Demolition and Remediation	135
Site Grading and Preparation	260
Main Site Construction	3,410
Berm Work	512
Ocean Water Purification System	154
Switchyard Construction	215
Construction Total	4,686

Source: Staff estimate based on construction data provided by the applicant (CECP 2007a and SR 2007d, 2008a, 2008f, 2008h) where staff used the latest ARB GHG emission factor recommendations (ARB 2008a).
Note:
[a] One metric tonne (mt) equals 1.1 short tons or 2,204.6 pounds or 1,000 kilograms

PROJECT OPERATIONS

The proposed Carlsbad Energy Center Project would be a rapid-response combined cycle facility that would be limited to an equivalent of 4,100 hours of full load operation.

The two Siemens SGT6 gas turbines are fired with natural gas and the gas turbines are the primary sources of GHG emissions. There will also be a small amount of GHG emissions from the diesel fuel consumed in the new emergency fire pump engine, and sulfur hexafluoride emissions from electrical component equipment. The employee and delivery traffic GHG emissions are not included in the operating emission GHG totals and are negligible in comparison with the gas turbine GHG emissions.

Greenhouse Gas Table 3 shows what the proposed project, as permitted, could potentially emit in greenhouse gases on an annual basis. All emissions are converted to CO_2-equivalent and totaled. Electricity generation GHG emissions are dominated by CO_2 emissions from the carbon-based fuels; other sources of GHG 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 large relative global warming potentials.

Greenhouse Gas Table 3
CECP Estimated Potential Operating Greenhouse Gas Emissions

	Project Emissions (metric tonnes [a] per year)	Global Warming Potential [b]	CO_2-equivalent (MTCO2E per year)
Carbon Dioxide (CO_2)	844,091	1	844,091
Methane (CH_4)	14.4	21	302
Nitrous Oxide (N_2O)	1.6	310	495
Hexafluoride (SF_6)	0.05	23,900	1,188
Hydrofluorocarbons (HFCs)	0	--- [c]	0
Perfluorocarbons (PFCs)	0	7,850 [d]	0
Total Project GHG emissions – MTCO2E per year			846,076
Total Project MWh per year (net) [e]			2,089,764
Project CO_2 Emissions Performance - MTCO2/MWh			0.404
Project GHG Emissions Performance - MTCO2E per MWh			0.405

Sources: CECP 2007a and SR 2007b, where staff updated the natural gas GHG emissions factors to use the latest ARB recommendations (ARB 2008a).
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 value shown is based on the emission factors from the latest ARB GHG emission factor recommendations (ARB 2008a).
[c] Can vary from 150 to 10,000, depending on the specific HFC.
[d] This figure is an average Global Warming Potential for the two PFCs, CF_4 and C_2F_6.
[e] This reflects net base load power without power augmentation, and includes staff's parasitic power consumption estimated for the on-site desalination unit (1,236 MWh/year).

The proposed project would be permitted, on an annual basis, to emit over 800,000 metric tonnes of CO_2-equivalent per year if operated at its maximum permitted level. Since the project's permit limits operation to less than a 60 percent annual capacity factor, the project is not subject to requirements of SB 1368 and the Greenhouse Gas Emission Performance Standard. However, the Carlsbad Energy Center Project, at 0.405 MTCO2E/MWh, would meet the requirements of SB 1368 and the Greenhouse Gas Emission Performance Standard of 0.500 MTCO2/MWh.

Because the proposed project is an addition to an existing power plant station, staff evaluated past GHG-emissions performance of the existing units. The recent year CO_2-equivalent emissions for existing boilers 1 through 3 are provided in **Greenhouse Gas Table 4**. The emissions are combined for Units 1 thought 3 since they will all be replaced by the proposed CECP Units 6 and 7.

Greenhouse Gas Table 4
Existing Carlsbad Units 1-3 Operations and CO_2 Emissions

Year	Net MWh	CO2 Emissions (MTCO2)	CO2 Rate (MTCO2/MWh)
2002	497,122	315,791	0.635
2003	459,332	295,421	0.643
2004	715,503	443,422	0.620
2005	483,535	308,148	0.637
2006	241,505	161,081	0.667
2007	175,137	111,632	0.637
2008	104,368	69,162	0.663
Averages	382,357	243,523	0.637

Source: Staff based on QFER data, where GHG emission factors are based on latest ARB recommendations (ARB 2008a).

As this table shows the existing boiler GHG emission rate is calculated to be on average almost 60 percent higher than the estimated CECP GHG emission rate. This difference might be slightly lower under real project operating conditions, which would include a reduced actual CECP capacity factor and slightly lower efficiencies for the new facility due to additional startups and shutdowns.

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). CECP 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 emissions, 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 would 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 CECP's replacement of the existing three power boilers furthers the state's strategy to promote generation system 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.23):

> 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). CECP, with its lower heat rate than most other dispatchable gas-fired generation in the state, would be cheaper, operated preferentially, and lower GHG emitting.

The Integrated Electric System And Displacement Of Emissions

The Western Interconnect

As previously indicated, the term Western Interconnect is often used to describe the interconnected transmission and generation system in the Western United States, western Canada, and small parts of northern Mexico. It is this system that allows California to import power from distant places both inside and outside of California. This includes out-of-state hydro power (much of it from the northwest), coal power (much of it from the mountain states and southwest), nuclear power (from Arizona), and increasingly renewable power generation (from the Southwest). Although imported power averages about 30 percent of the electricity used within the state, the majority of the megawatt-hours consumed in California are also generated in California (CEC 2009b, p. 23). The mix of imported electricity varies seasonally (hydro imports from the northwest occur mainly in the summer) and year to year, based on hydro conditions, snow pack, and other factors.

Old and New Power Plants

Roughly 45 percent of California's in-state generation is gas-fired (CEC 2009b, p. 23). This gas-fired generation comes from power plants that range widely in size, technology, and age. The oldest gas-fired plants were built in the 1950s, and many of these older plants use boilers and once-through cooling. Most of the older facilities were built as base-load facilities that were intended to operate more than 80 percent of the hours of the year. However, as other resources were added to the system, many boiler units were modified to allow them to operate as the mid-merit units (dispatchable, load following, with high turndown ranges). Some units operate infrequently throughout the year while other units sit in standby status to be ready for the few hundred hours of the year when demand is highest (usually afternoons in summer or early fall) or for an emergency such as the forced outage of one of the nuclear facilities. Because they use large boilers with inherently lengthy startup times, many boiler facilities operate at minimum load (e.g., 5 percent of rated capacity) overnight to be able to follow the load curve up the next day. As a consequence, these older facilities have some emissions even at night. Newer gas-fired facilities employing gas turbines rather than boilers, can be turned off when not in use, and are generally much more efficient than older gas-fired units.

Although, as described previously, California's electric system is being rapidly changed by renewable generation, gas-fired plants are necessary to provide reliability. This is because electricity demand is instantaneous and because electricity cannot be stored in large quantities. Load serving entities must have capacity that they can quickly dispatch to meet fluctuating demand, including for emergencies and for peak load summer days. Some of this gas generation must be in the form of peakers that provide power when demand is highest, but it is also necessary to have load following generation that can run in place of intermittent renewable generation when such renewables are not generating (i.e., when the wind doesn't blow, when it is cloudy, or after dark). Gas-fired facilities serve this purpose in California.

The Role of CECP in Local Generation Displacement

Local Capacity Requirements in the San Diego Basin

Capacity is the total amount of electric generation (expressed in MW) needed to meet instantaneous demand. A reliable electric system must have enough capacity to meet load demand on a hot summer afternoon when air conditioning demand is high in a given area. Many urban areas have intense electricity loads that surpass what can be delivered purely from transmission from more distant places. These load pockets can only have reliable electric service if, based on utility reliability criteria (adopted by the federal government), additional capacity can be generated by power plants within the load pockets. These load pocket requirements are also called local capacity requirements.

The California Independent System Operator (CAISO) is responsible for electricity grid system reliability, among other issues. CAISO has performed a study that estimates the amount of capacity needed in the San Diego area to meet local reliability needs (CAISO 2008). This study estimates that San Diego needs 2,418 MW of capacity to meet local reliability requirements in 2013 assuming that the Sunrise Powerlink is completed.[10]

Currently the San Diego area has 2,942 MW of generation capacity. This includes a total of 1,668 MW at two facilities: Encina (960 MW) and South Bay (708 MW). Encina generation is from boiler facilities that started operation in the 1950s (Units 1-3) and 1970s (Units 4 and 5) and are currently operating as mid-merit units under contract with CAISO. South Bay generation is from boilers that started operation in the 1960s (Unit 4 started operation in 1971). Local load pockets have transmission constraints as to how much power can be imported from outside the pocket, so some units are required to operate within the pocket to meet load or maintain grid stability—even if these reliability units are old, inefficient, and expensive generating units. The units—South Bay and Encina—have RMR (reliability must run) contracts with the CAISO for this purpose. The 2005 IEPR and 2007 IEPR identified these as among the aging facilities that the state needs to shut down, repower, or replace, while preserving system reliability in the San Diego load pocket. This policy is endorsed by the CAISO, the California Public Utilities Commission, and the State Water Resources Control Board; the latter agency insists that all once-through cooling facilities (like those at South Bay and Encina) eventually be replaced by power plants that do not use this form of cooling technology.

Shutting down Encina and South Bay would remove 1,668 MW of generation from the San Diego load pocket. On the other hand, several generation projects other than CECP are currently being constructed or are in the licensing process and these will increase load pocket generation. These are depicted in the following table:

[10] Until the Sunrise Powerlink is completed, San Diego needs roughly and additional 1000 MW of capacity.

Greenhouse Gas Table 5: Pending Projects in San Diego Basin

Project Name	Technology	MW	Status
Otay Mesa	NG combined cycle	561	Under Construction
Orange Grove	NG peakers	94	Under Construction
Wellhead Margarita	NG peaker	44	On Hold
Bull Moose	Biomass	27	Undergoing Permit Review
Lake Hodges	Pump Storage Hydro	40	Under Construction

Source: CAISO 2008. Status determined by Energy Commission staff.

Assuming the addition of all the new facilities shown in the above table, 766 MW will be added to the San Diego load pocket prior to 2013. Retirement of Encina and South Bay would nevertheless constitute a net reduction of capacity in San Diego of 902 MW, leaving 2,022 MW of local capacity. This is 396 MW less than that estimated by the CAISO as necessary to meet local capacity requirements. The capacity provided by CECP will allow for the retirement of the Encina units (1-3) and (with the Sunrise Powerlink) South Bay; it should also reduce operation of Encina Units 4-5, and facilitate their future retirement.

Efficiency and GHG Emissions

CECP would be more efficient than the Encina and South Bay units. CECP would have a net heat rate as low as 7,147 Btu/kWh[11] and an estimated annual GHG performance factor of 0.405 MTCO2/MWh. The heat rate, energy output and GHG emissions of local fossil fueled generation resources[12] in the greater San Diego area and the heat rates of these other local units are listed in **Greenhouse Gas Table 6**. Compared to other units in the San Diego control area, CECP would be more efficient, and emit fewer GHG emissions during any hour of operation than every peaking unit or boiler unit. It is expected that CECP would dispatch before most of these peaking units or boiler units in most situations. The dispatch, or loading order of generation resources, is clearly shown in **Greenhouse Gas Table 6**. Those units with the best, or lowest heat rate or lowest MTCO2/MWh rate, generally operate more than other units with higher heat rates, as shown by the relative amount of energy (GWh) produced in 2008 from these generating units in the Greater San Diego Area. 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. These deviations, however, are likely to occur infrequently.

[11] Based on the High Heating Value (HHV) of the fuel(s) used. The theoretical heat rate does not include start-up and low load operations fuel use that will result in a higher actual heat rate. HHV is used for all heat rate and fuel conversions to GHG mass emissions that are discussed in this document.

[12] All fossil fueled sources over 10 net MW of generation.

Greenhouse Gas Table 6
Greater San Diego Area, Local Generation Heat Rates and 2008 Energy Outputs

Plant Name	Capacity (MW)	Capacity Factor	2008 Heat Rate (Btu/kWh)[a]	2008 Energy Output (GWh)	GHG Performance (MTCO2/MWh)
Palomar Energy Center	559	73.1%	6,959	3,590.37	0.368
South Bay Power Plant (1-4) [b]	696	16.7%	11,534	1,015.24	0.610
Encina Power Plant (1-5) [b]	951	12.0%	12,360	997.01	0.654
Larkspur Energy LLC (1-2) [c]	90	8.0%	10,019	63.22	0.530
CalPeak Power - Border [c]	50	3.4%	10,772	14.73	0.570
CalPeak Power - Enterprise [c]	49	3.0%	10,743	12.92	0.568
CalPeak Power - El Cajon [c]	49	2.8%	10,961	12.04	0.580
Kearny (1-3D) [c]	127	0.4%	16,723	4.46	0.885
MMC Chula Vista, LLC [c]	44	0.5%	16,596	1.92	0.878
MMC Escondido, LLC [c]	44	0.4%	18,391	1.73	0.973
Miramar (1A-1B) [c]	33	0.3%	18,018	0.89	0.953
El Cajon [c]	13	0.6%	19,851	0.67	1.050
South Bay Peaking Turbine [c]	13	0.5%	16,234	0.54	0.859
Encina Peaking Turbine [c]	14	0.3%	17,634	0.37	0.933

Source: Energy Commission Staff
Note:
a. Based on the Higher Heating Value or HHV of the fuel. The heat rate includes start-up and low load operations fuel use.
b. Boiler facilities.
c. Peaker facilities.

The Role of CECP in Local Boiler Generation Displacement

Carlsbad Energy Center project would operate to replace energy and capacity from the existing three boiler units (Encino Units 1-3) that will be retired, as well as displace other less efficient local peaking power and old coastal boiler generation sources in San Diego County, including that Encina Units 4 and 5 that would remain after CECP begins operation, and the South Bay Power Plant.

Greenhouse Table 7 provides the historic use, heat rate, and GHG performance for the nine total Encina and South Bay boiler units.

Greenhouse Gas Table 7
Encina and South Bay Boiler 2002-2008 Generation,
Average Heat Rates and GHG Performance

Plant Name	Capacity (MW)	Energy Output (GWh)							2002-2008 Average Heat Rate (Btu/kWh)[a]	2002-2008 Average GHG Performance (MTCO2/MWh)
		2002	2003	2004	2005	2006	2007	2008		
Encina 1	107	140	115	170	146	43	56	7	12,146	0.642
Encina 2	104	177	141	216	157	87	40	32	12,268	0.649
Encina 3	110	181	203	330	180	112	79	65	11,788	0.623
Encina 4	300	870	886	1,153	806	470	202	289	11,817	0.625
Encina 5	330	985	1,095	1,237	576	542	327	604	11,146	0.589
South Bay 1	136	423	406	519	546	387	167	211	10,670	0.564
South Bay 2	136	442	440	649	410	322	190	206	10,598	0.560
South Bay 3	210	299	409	548	435	129	241	400	10,961	0.580
South Bay 4	214	77	46	235	126	89	150	216	12,877	0.681
Total/Average	1,647	3,593	3,743	5,057	3,383	2,181	1,451	2,031	11,330	0.599

Source: Energy Commission Staff
Note:
a. Based on the Higher Heating Value or HHV of the fuel. The heat rate includes start-up and low load operations fuel use.

The total generation for the Encina[13] and South Bay boilers has steadily been decreasing over time, and showed a marked reduction when the Palomar Energy Center started operation in 2006. This trend should continue into the future with the potential for marked reductions with the Otay Mesa Power Plant starting operation in October 2009, and if and when the CECP is built and starts operation. With the addition of the Sunrise Power Link the need for in-basin capacity is reduced and with the addition of Palomar and Otay Mesa projects the South Bay facility can be retired. However, these three projects do not provide adequate capacity to retire Encina and the addition of the CECP should hasten the permanent shutdown of both South Bay and Encina facilities. The 2002 to 2008 average GHG emissions per megawatt of power

[13] The capacity factor for the entire Encina facility averaged 21.8 percent from 2002 through 2008, with the maximum of 37.2 percent occurring in 2004 and the minimum of 8.5 percent occurring in 2007. The capacity factors for Units 1 through 3 averaged 13.6 percent from 2002 through 2008, with the maximum of 25.4 percent occurring in 2004 and the minimum of 3.7 percent occurring in 2008. The capacity factors for Units 4 and 5 averaged 30.0 percent from 2002 through 2008, with the maximum of 43.2 percent occurring in 2004 and the minimum of 9.6 percent occurring in 2007.

production, or in other words, the thermal efficiency and economic competiveness, of these boiler units is over 45 percent higher, or worse than the CECP project's best forecast performance; therefore, any generation displacement of these boiler units by CECP generation would reduce the GHG emissions generated from San Diego area generating facilities.

The above figures do not fully capture the foreseeable impact of CECP replacing the older units at Encina and South Bay as the provider of local reliability services. Local reliability requires that generating capacity be available for dispatch in amounts that are determined by the peak load forecast for the day. On days when steam turbines at Encina or South Bay have been needed to meet local capacity requirements, these older units have been run at minimum output for hours—often entire nights—before being called on for their capacity. By contrast, CECP can be called on to run at the time it is actually needed for reliability. **Greenhouse Gas Table 8** indicates the share of hours than Encina and South Bay units operated in 2007 between 10 pm and 6 am.

Greenhouse Gas Table 8
Hours of Operation Between 10:00 p.m. and 6:00 a.m.
Encina 1-5 and South Bay 1-4, 2007

Unit	Hours Operated	Hours Operated 10:00 pm – 6:00 am	Percent of Hours Operated
Encina 1	1,307	415	31.8%
Encina 2	880	272	30.9%
Encina 3	1,735	546	31.5%
Encina 4	2,740	891	32.5%
Encina 5	3,463	1,134	32.7%
South Bay 1	2,710	881	32.5%
South Bay 2	3,026	988	32.7%
South Bay 3	3,682	1,207	32.8%
South Bay 4	1,813	573	31.6%

The Role of CECP 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 generation (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[14] and fast starting[15] fossil fuel generation resources (CAISO 2007, p. 14).

[14] 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.

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

CECP, as a peaking or mid-merit facility, would provide flexible, dispatchable, and fast start power that would not obstruct penetration of renewable energy. In general, combustion turbines can startup quickly, but the output of a large-scale combined cycle facility can be limited by the steam turbine to about 15 MW per minute.[16] The CECP rapid response turbines, under hot start conditions, would be capable of ramping up to 150 MW of output within ten minutes and capable of a 45 minute complete startup cycle. Intermittent renewable sources of energy would be accommodated by CECP varying its energy output as needed to integrate the renewable sources, which enables CECP to play a role in most system operating scenarios.[17]

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 goal established for 2020 by Governor Schwarzenegger in Executive Order S-14-08 will require even more dispatchable generation to integrate renewable generation. 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 9** 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 over 36,000 GWh/year. In other words, all growth[18] 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 they currently do, given the expected growth in retail sales.

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.[19] 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 goal.

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[16] 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).

[17] 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.

[18] There is a difference between annual generation and peak short term generation needs. While there is a need to increase in the short term fast ramping and starting fossil fuel fired generation sources like CECP its operation will normally be needed when intermittent renewable generation is low and as required to displace older less efficient facilities.

[19] 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.

Greenhouse Gas Table 9
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 between 2008 to 2020 [c]	32,440	72,489
Resulting Change in Non-Renewable Energy [d]	13,876	(-36,173)

Source: Energy Commission staff
Notes:
a. Not including eight percent transmission and distribution losses
b. Based eight 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 eight percent transmission and distribution losses.
d. Based on net energy (including eight percent transmission and distribution losses), not based on retail sales.

This gradual decline in the use of gas-fired *energy* in California has been projected by the Energy Commission and the CPUC, based on the state's loading order, efficiency programs, and RPS goals. The 2007 IEPR scenario analysis estimates a significant decline under any electric system demand-supply scenario other than business as usual; gas-fired energy generation is forecast to decline as a proportion of total generation by 2020 by as much as 50 percent (CEC 2007, Figure 2-14, p. 49). Likewise, the Energy Commission/CPUC Joint Decision projects that aggressive RPS and energy efficiency goals should reduce GHG emissions from electricity 27 percent as compared to 1990, and by 38 percent compared to business as usual projections for 2020 (CPUC 2008, p. 112). Notably, these decreases are projected in the absence of any implementation of cap and trade provisions which might be required by ARB as they implement AB 32 requirements.

Thus, gas-fired generation is needed in significant amounts to integrate large amounts of renewable generation that will soon be added to the electricity system. However, this gas-fired generation will not supplant renewable generation, nor will it add to the overall amount of carbon from the electricity system as a whole. Rather, it will reduce it, or enable renewable electricity generation to do so.

The Role of CECP in the Retirements/Replacements

CECP would be capable of annually providing over 2,000 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 generation, 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.

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 10**.

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[20], all the coal contracts (including those in **Greenhouse Gas Table 10**, 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 economically 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 not be able to contract with California utilities due to the 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, or about two times as much as new peaker projects and two and a half times more than new gas-fired combined-cycle projects like CECP. This will result in a significant net reduction in GHG emissions from the California electricity sector.

Greenhouse Gas Table 10
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 Qualifying Facilities [a]	2009-2019	4,086
LADWP	Intermountain [b]	2009-2013	3,163
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 in this table are located out-of-state except for the Miscellaneous In-state Qualifying Facilities.

[20] 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.

b. Estimated annual reduction in energy provided to LADWP by Utah utilities from their entitlement by 2013.
c. Contract not subject to Emissions 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 capacity like CECP 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 2007, these units collectively produced over 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 OTC 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-complete aging plants and would displace the energy provided by OTC facilities and likely accelerate their retirement.

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. For the Greater San Diego Area there was a total of 1,567 MW of merchant capacity and 2,000 GWh of merchant energy in 2008. **Greenhouse Gas Table 11** provides a summary of the statewide utility and merchant energy supplies affected by the OTC regulations.

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 are less efficient, higher GHG emitting than a new natural gas-fired combined-cycle project like CECP. 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 CECP that is located in a coastal load pocket, like the Greater San Diego 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 would emit greenhouse gases and, therefore, has been analyzed as a potential cumulative impact in the context of its effect on the electricity system, resulting GHG emissions from the system, and existing GHG regulatory requirements and GHG energy policies.

Greenhouse Gas Table 11
Units Utilizing Once-Through Cooling: Capacity and 2008 Energy Output [a]

Plant, Unit Name	Owner	Local Resource Area	Aging?	Capacity (MW)	2008 Energy Output (GWh)	GHG Performance ($MTCO_2$ /MWh)
Diablo Canyon 1, 2	Utility	None	No	2,232	17,090,526	Nuclear
San Onofre 2, 3	Utility	L.A. Basin	No	2,246	15,391,825	Nuclear
Broadway 3 [b]e	Utility	L.A. Basin	Yes	75	89,899	0.648
El Centro 3, 4 [b]	Utility	None	Yes	132	237,581	0.814
Grayson 3 - 5 [b]	Utility	LADWP	Yes	108	149,746	0.799
Grayson CC [b]	Utility	LADWP	Yes	130	27,297	0.896
Harbor CC	Utility	LADWP	No	227	203,034	0.509
Haynes 1, 2, 5, 6	Utility	LADWP	Yes	1,046	1,529,287	0.578
Haynes CC	Utility	LADWP	No	560	3,423,312	0.376
Humboldt Bay 1, 2 [a]	Utility	Humboldt	Yes	107	507,094	0.683
Olive 1, 2 [b]	Utility	LADWP	Yes	110	11,400	1.008
Scattergood 1 – 3	Utility	LADWP	Yes	803	1,327,166	0.618
Utility-Owned				**7,776**	**39,988,167**	**0.693**
Alamitos 1 – 6	Merchant	L.A. Basin	Yes	1,970	2,532,746	0.661
Contra Costa 6, 7	Merchant	S.F. Bay Area	Yes	680	159,556	0.615
Coolwater 1 – 4 [b]	Merchant	None	Yes	727	576,224	0.633
El Segundo 3, 4	Merchant	L.A. Basin	Yes	670	507,761	0.576
Encina 1 – 5	Merchant	San Diego	Yes	951	997,011	0.674
Etiwanda 3, 4 [b]	Merchant	L.A. Basin	Yes	666	848,441	0.631
Huntington Beach 1, 2	Merchant	L.A. Basin	Yes	430	915,677	0.591
Huntington Beach 3, 4	Merchant	L.A. Basin	No	450	620,141	0.563
Mandalay 1, 2	Merchant	Ventura	Yes	436	596,705	0.528
Morro Bay 3, 4	Merchant	None	Yes	600	83,386	0.524
Moss Landing 6, 7	Merchant	None	Yes	1,404	1,375,335	0.661
Moss Landing 1, 2	Merchant	None	No	1,080	5,790,706	0.378
Ormond Beach 1, 2	Merchant	Ventura	Yes	1,612	783,061	0.573
Pittsburg 5 – 7	Merchant	S.F. Bay Area	Yes	1,332	179,572	0.673
Potrero 3	Merchant	S.F. Bay Area	Yes	207	530,220	0.587
Redondo Beach 5 - 8	Merchant	L.A. Basin	Yes	1,343	316,660	0.810
South Bay 1 - 4	Merchant	San Diego	Yes	696	1,015,242	0.611
Merchant-Owned				**15,254**	**17,828,444**	**0.605**
Total In-State OTC				**23,030**	**57,816,611**	

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, startup and enter commercial operation.
b. Units are aging but are not OTC.

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 Energy Commission, but also the older, higher-emitting facilities not subject to any GHG reduction standard that this agency could presently 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.

This project would be subject to ARB's mandatory reporting requirements and potentially other future requirements mandating compliance with AB 32 that are being determined 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 be consistent with the policies described above and the regulations that ARB adopts and provide the information to demonstrate compliance with any applicable new or revised EPS that could be enacted in the next few years. Since this power project would be permitted for less than a 60 percent annual capacity factor[21] and could be considered a peaking/mid-merit generating facility, the project is not subject to the requirements of SB 1368 and the current Emission Performance Standard. Regardless, CECP's GHG emission performance would be well below the SB 1368 EPS.

[21] While SB 1368 regulates separate generating units, where CECP Units 6 and 7 are separate units and Encina Units 4 and 5 are separate units under this regulation, even if the regulation were to regulate all of these separate units as a combined entity there is no reasonable potential that the entire facility could exceed a 60 percent capacity factor as Encina Units 4 and 5 would have to exceed a capacity factor of 70 percent for that to occur. Encina Units 4 and 5 have only averaged a combined 30 percent capacity factor from 2002 to 2008, and have had a combined maximum capacity factor of 43.2 percent during that period. Additionally, as long as slightly more than half of the site total generation comes from CECP Units 6 and 7, which would be expected due to its significantly higher efficiency, then the site total GHG emission performance would be below the SB 1368 EPS limit of 0.500 MTCO2/MWh.

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 estimated. Operation of one power plant, like CECP, affects all other power plants in the interconnected system. The operation of the CECP facility will have an impact upon system operation and general reduction in system-wide GHG emissions in several ways:

CECP would displace three existing power boilers (Units 1 through 3) with a total 321 MW of generation capacity that would be permanently shut down following the commissioning of the new units. The proposed project would improve the overall thermal efficiency of the generation mix due to the higher efficiency of the two new natural gas-fired Siemens SGT6 gas turbines as compared to the three existing natural gas-fired power boilers. This leads to a reduction in greenhouse gas emissions, emitted per unit of electricity produced at the facility.

- CECP 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.
- CECP would provide flexible, dispatchable power necessary to integrate the growing generation from intermittent renewable sources, such as wind and solar generation.
- CECP would facilitate to some degree the replacement of out-of-state, high GHG-emitting (e.g., coal) electricity generation that must be phased out to conform to the State's new Emissions Performance Standard.
- CECP would facilitate to some extent the replacement of generation provided by other aging power plants that use once-through cooling that are currently being used to provide necessary local power reliability, and could help facilitate/hasten to some extent the eventual permanent shutdown of all of the Encina and South Bay power boilers.

The project would reduce GHG emissions across the electricity system providing energy and capacity to California. Thus, 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 not result in impacts that are adverse or cumulatively significant. Moreover, the project is consistent with AB 32 goals.

The energy displaced by the CECP would result in a reduction in GHG emission from the electricity system. In other system roles, as described in **Greenhouse Gas Table 12**, CECP would minimize its GHG impacts by filling nearly all of the expected future roles for local gas-fired generation, in a high-renewables, low-GHG system.

Greenhouse Gas Table 12
CECP, Summary of Role in Providing Energy and Capacity Resources

Services Provided by Generating Resources	CECP Role:
Integration of Renewable Energy	• Would provide fast startup 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 ability to provide regulation and reserves.
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 response to agency and public comments on the PSA Air Quality Section, including response to comments on **Appendix AIR-1 Greenhouse Gas Emissions**, are summarized in **Appendix AIR-2 Response to PSA Comments**. As indicated in **Appendix AIR-2**, a number of revisions were made to this Final Staff Assessment appendix as part of the response to the agency and public comments.

CONCLUSIONS

The Carlsbad Energy Center Project (CECP), as an addition to the California electricity system, would be a mid-merit/peaking power project that would operate primarily during periods of high local electricity demand and need for local grid reliability support. The CECP project would directly replace less efficient existing facilities with lower emissions of CO_2/MWh and would replace generation from other less efficient boiler or peaking facilities. The project's GHG emissions per MWh are expected to be lower than those of the generation that the project would displace and, thus, would contribute to continued improvement of the California and overall Western Electricity Coordinating Council system's greenhouse gas (GHG) emissions and GHG emission rate average. AB 32 emphasizes that GHG emissions reductions must be big picture reductions that do not lead to leakage of such reductions to other states or countries. If a gas-fired power peaking/mid-merit plant is not built in California, electricity to serve the load would come from another generating source.

This 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 CECP would also provide other potential GHG benefits by filling nearly all of the expected future roles for local gas-fired generation, in a high-renewables, low-GHG system.

Staff notes that mandatory reporting of GHG emissions per Air Resource Board greenhouse gas regulations would occur, and this would enable the ARB to gather the information needed to regulate CECP in trading markets if required by the regulations implementing the California Global Warming Solutions Act of 2006 (AB 32). The project will be subject to reporting requirements and may become subject to GHG reductions or trading requirements as these requirements become 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 would increase fuel efficiency 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 emissions from construction vehicles and equipment. For all these reasons, staff concludes that the short-term emission of greenhouse gases during construction would be sufficiently reduced and would, therefore, not be significant.

Since this power project would be permitted for less than a 60 percent annual capacity factor, and could be considered a peaking/mid-merit generating facility, it is not subject to the requirements of SB 1368 and the Emission Performance Standard. Regardless, the proposed project's CO_2 emissions would be well below the Emission Performance Standard.

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.

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SR 2008h – Stoel Rives/J McKinsey (tn: 47257) Project Enhancement and Refinement Document (12 copies); Effects on Bio Resources of Agua Hedionda Lagoon (4 copies); Revised AQ Modeling Files (6 CDs); Cal ISO Study Report. 7/25/2008.

APPENDIX AIR-2

Air Quality/Greenhouse Gas Comment Response

Testimony of William Walters, P.E.

INTRODUCTION

The agency and public comments on the CECP PSA Air Quality section and Appendix Air-1 Greenhouse Gases are provided below in the following order by commenting party. Some comments have been summarized for clarity and brevity.

- City of Carlsbad
- Power of Vision
- Kerry Siekmann
- California Unions for Reliable Energy
- Earthjustice

The FSA Air Quality section and Appendix Air-1 Greenhouse Gas Emissions have been updated as noted in the responses provided below.

CITY OF CARLSBAD 1/30/09 COMMENT LETTER

Comment Page 4 – PDOC Comments

The City provided extensive comments on the Preliminary Determination of Compliance to the San Diego Air Pollution Control District.

Staff Response

Comments noted. Staff has incorporated revisions as necessary from the District's FDOC in the FSA.

Comment Pages 4, 5 – I-5 Widening and Additional Project Information

Additional information regarding the I-5 widening and other CEC air quality staff requested information will be supplied from the applicant to the Energy Commission and the City anticipates commenting on these submittals.

Staff Response

Staff has incorporated the information from the I-5 widening and air quality submittals from the applicant as appropriate to complete the air quality FSA section. The City can provide comments on the FSA at the workshop and in writing.

Comment Page 5 – PSA Page 4.1-1

The CECP has indicated that the SDAPCD PDOC terms are unacceptable. Please indicate that the timing and content of an FDOC is uncertain.

Staff Response

The FSA has been published only after publication of the FDOC that has, to the extent the District considered reasonable, incorporated comments from CECP and other

parties including the CEC staff. CEC staff is satisfied with the content and conditions of the FDOC and has incorporated these conditions into the FSA.

Comment Page 5 – PSA Page 4.1-1

The City is unclear if the 60 percent capacity factor trigger for the SB 1368 Environmental Performance Standard would apply to each turbine individually or collectively.

Staff Response

The SB1368 definition of a power plant is as follows:

(l) "Power plant" means a facility for the generation of electricity, and is:
- (1) a single generating unit; or
- (2) multiple generating units that meet the following conditions:
  - (A) the generating units are co-located;
  - (B) each generating unit utilizes the same fuel and generation technology; and
  - (C) one or more of the generating units are operationally dependent on another.

This regulatory definition considers each combustion turbine and associated steam turbine to be a separate power plant unit for the purposes of SB1368. Therefore, the proposed project consists of two separate SB1368 power plant units – Carlsbad Unit 6 and Carlsbad Unit 7. Regardless, each CECP power plant unit would have CO_2 emission performance that would meet the EPS whether it needs to meet the EPS or not. See Appendix Air-1.

Comment Page 5 – PSA Page 4.1-22

The City notes that the applicant's proposed 24-hour construction work schedule is unacceptable and requests that the construction work schedule be revised to reflect City of Carlsbad Municipal Code 8.48.

Staff Response

Staff assumes this comment to mean that the City is asking staff to impose a Condition of Certification in the Air Quality FSA section to limit construction hours. However, staff notes that the cited Municipal Code section addresses noise impacts not air quality impacts. Compliance with this Municipal Code is properly addressed in the Noise Section of the PSA/FSA in Condition of Certification **NOISE-6**.

A worst-case 24-hour construction basis was assessed in the air quality analysis to be conservative in case 24-hour construction would occur either based on an exception granted as allowed in Section 8.48.020 of the Municipal Code, or on the basis that the construction activities that do occur outside of the hours listed in Section 8.48.010 of the Municipal Code would only be those that would not be done in a "manner as to create disturbing, excessive or offensive noise" that could violate the Municipal Code.

Comment Page 5 – PSA Page 4.1-25

Please confirm from the manufacturer that the emission performance for the CTGs is based on an emission smokestack of 139 feet.

Staff Response
Please see the response to Power of Vision Air Quality Comment 6 (second paragraph).

Comment Page 5 – PSA Page 4.1-27
The City is unclear as to what is the limiting factor of the CECP – air emissions or operating time. Please clarify.

Staff Response
The limiting annual operating characteristic for air quality is criteria pollutant emissions as limited by Air Quality Condition of Certification **AQ-44**. If this project is licensed, any changes to these limits would require formal approval from the District and the Energy Commission.

Comment Page 5 – PSA Page 4.1-97
The City disagrees with Staff's conclusion that the CECP would not result in a significant GHG cumulative impact. The CECP will produce more than 850,000 metric tons of CO2E per year, which greatly exceeds any threshold level currently contemplated for identifying significant GHG emitters.

Staff Response
Please see below for staff's responses to Earthjustice Consolidated GHG Analysis comments. Also, please see the revised **Appendix Air-1** analysis.

Comment Page 6 – PSA Pages 4.1-101, 102
Please adjust GHG Tables 2, 3, and 4 to reflect the information provided by the applicant in their January 26, 2009 data response, including the Encina Units 1-3 GHG emissions for 2007 and 2008 that are consistent with the reduced level during 2006 and significantly lower than the emissions produced in 2002-2005.

Staff Response
The Greenhouse Gas Table 2 has been revised to include the new and revised data from the applicant on construction GHG emissions. Greenhouse Gas Table 3 has been revised to include additional information on parasitic power demand and net MW generation for the proposed CECP. Greenhouse Gas Table 4 has been updated to include 2007 and 2008 historic GHG emission estimates and is now based on the same consistent data source (the Commission's Quarterly Fuel and Energy Report) as that used for all tables providing historic GHG emissions, capacity, and generation data.

Comment Page 6 – PSA Page 4.1-103
The City disagrees with the PSA statement that "the project would not result in a net increase in global GHG emissions". The applicant's data responses indicate that the project would serve new generation procurement needs of SDG&E and would therefore result in a net increase of GHG emissions of approximately 400,000 metric tons per year. The analysis should be amended to note this net GHG emission increase.

Staff Response
Staff has reviewed systemwide GHG emission impacts and has amended the GHG section to provide additional information to support staff's analysis and findings. We believe that the proposed CECP, with its direct and indirect replacement of generation from other less efficient higher GHG emitting fossil fuel fired generation sources, is necessary for the system integration of low GHG emitting renewable energy sources and would allow the reduction of systemwide GHG emissions.

Comment Page 6 – PSA Page 4.1-104
GHG Figure 1 is misleading as it does not show that total GHG emissions have been increasing over time. The core purpose of AB 32 is to reduce the gross amount of GHGs produced, which the CECP fails to achieve.

Staff Response
In staff's amended GHG analysis GHG Figure 1 has been removed. Also please see the response directly above relating to systemwide GHG emissions impacts.

Comment Page 6 – PSA Page 4.1-106
The City disagrees with the findings of the GHG cumulative impact section. The project represents a growth of energy capacity and thus GHG emissions. The cumulative impact section should be amended to reflect the project's GHG emissions increase.

Staff Response
Please see staff's amended GHG analysis and the response above to the City's GHG analysis comment on PSA page 4.1-103.

Comment Page 6, 7 – PSA Page 4.1-107
The City disagrees with the statements in the Noteworthy Public Benefits section of the GHG analysis. The City is more concerned with the total GHG emissions than emissions per MWh. The analysis should be amended to reflect that the project will increase GHG emissions by more than 400,000 metric tonnes per year.

Staff Response
The Noteworthy Public Benefits section has been amended with the rest of the GHG analysis with additional information and support of staff's overall findings for the proposed project. Staff does not believe when assessing global GHG impacts anything less than a system-wide GHG impact analysis is reasonable. Staff believes that this assessment must include the type of project and how it could/would operate, its relative GHG emission rate per MWh, and its overall system-wide impact. The total potential emissions of a specific power plant project considered in a vacuum are not relevant to determining the impacts for this global issue; the relevant assessment is the project's overall impact to the system.

Comment Page 7 – PSA Page 4.1-107
The CECP would be a significant emitter of GHG emissions under any threshold developed. The analysis does not include an analysis of the impacts of global warming such as rise of sea level, etc.

Staff Response
Please see the response to the Earthjustice Consolidated GHG Analysis comments.

The negative consequences of global warming are briefly noted in the Global Climate Change and Electricity Production section of the GHG analysis.

POWER OF VISION 1/30/09 COMMENT LETTER

Air Quality Comment 1
The summary of conclusions for greenhouse gases is misleading because, while the proposed CECP project is more efficient than the existing Encina Units 1-3, the proposed CECP project would likely operate considerably more than Encina Units 1-3 would and therefore would produce more greenhouse gas emissions.

Staff Response
The staff's finding has been clarified to note that the generation from the CECP would replace other dispatchable fossil-fuel fired generation, which would include Encina Units 1 through 3 and other existing resources such as South Bay and older area peaking power plants, that on average would have a higher GHG emission profile. Therefore, the CECP project would not result in a cumulative greenhouse gas impact. Additionally, dispatchable generation from low-GHG emitting projects such as CECP are necessary for the system-wide integration of non-dispatchable, intermittent renewable energy sources as their total capacity and percent of overall generation continue to rise.

Air Quality Comment 2
The applicant has not been able to provide adequate mitigation for NOx. This must be determined before permits are granted.

Staff Response
The FSA and the SDAPCD FDOC both detail the complete NOx mitigation proposal that has been provided by the project applicant.

Air Quality Comment 3
The plant should meet the same NOx emissions requirements (without the applicant requested waivers for transient load operations) as permitted for other similar power plants.

Staff Response
The SDAPCD has not allowed the applicant's request for significantly increased NOx emissions during transient load operation, and have only allowed an increase in the compliance period from a one-hour average to a three-hour average during transient load operation. Staff concurs with the District and has provided additional information about the request for transient load emission levels and the District's denial of the applicant's request in the FSA.

Air Quality Comment 4
The applicant should provide actual data for the same plant as proposed for this project and under the same modes of operations (Staff notes this is a follow-up of Air Quality Comment 3).

Staff Response
Actual data for this type of plant/turbine in commercial operation does not yet exist. Please also see the response to Comment 3 directly above.

Air Quality Comment 5
Please account for increase in greenhouse gas emissions; mitigation requirements and health effects on surrounding residents

Staff Response
The exact intent of this comment is not clear; however, as noted in the FSA staff does not believe that this project, as a very efficient dispatchable power source, would cause an increase in greenhouse gas emissions system-wide. Greenhouse gas mitigation requirements for the power sector that may be required by ARB as they develop AB 32 requirements are not currently known. However, they might include a cap and trade system that would likely include this facility. Greenhouse gas pollutants are not toxic air pollutants and would not have significant direct, localized health impacts on surrounding residents at the concentrations emitted by the facility. The health impacts of the toxic air pollutants are separately described in the Public Health section of the FSA.

Air Quality Comment 6
The maximum annual project NOx emissions and NOx emission reduction credit given for the shutdown of Units 1, 2, and 3 are both suspect, should be reviewed and should be based on 2004 through 2008 rather than 2002 through 2006.

It is not clear if the Siemens emission guarantee applies for the proposed stack height of 139 feet that is set 40 feet down in a depression.

Staff Response
The dates for the emission calculation for emission netting purposes under SDAPCD New Source Review regulations for Encina Units 1 through 3 are tied to the original permit application submittal date which occurred in 2007, so 2002 through 2006 is the appropriate time period for determination of the baseline emissions for Encina Units 1 through 3. The District has performed a significant re-analysis of the emission baseline and has revised the baseline in the FDOC. Staff has reviewed the FDOC and finds that the District's baseline re-analysis is comprehensive and complete.

The exact stack height, the proposed change to the stack height, and fact that the facility is located in a slight depression do not impact the turbine operations, the control technology effectiveness, or the gas turbine emissions guarantees. The stack height was raised from 100 to 139 feet by the applicant solely to meet physical design requirements for testing port locations to comply with EPA stack testing regulations.

Air Quality Comment 7
The methodology for meeting the staff recommended PM10/PM2.5 and VOC emission offsets needs to be determined and the offsets should occur prior to issuance of the FSA.

Staff Response
Staff has accepted the applicant's proposal to offset these emissions by using existing held emission reduction credits and creating new emission reductions funded as specified in staff recommended Condition of Certification **AQ-SC10**. The FSA details staff's review and findings on this CEQA offset mitigation proposal.

Air Quality Comment 8
The license should add a condition that requires the project be subject to the requirements of SB 1368 if it ever exceeds a 60 percent capacity factor in any rolling twelve month period.

Staff Response
A condition regarding compliance with the SB 1368 Emission Performance Standard (EPS) is not required for this project as it has specific operating limitations that would not allow the facility to have an annual capacity factor above the 60 percent trigger level to define it as a base load facility. If at any time in the future the project owner were to want to expand operating limits, they would have to come before the commission to amend their license. At that time the Energy Commission staff would analyze all greenhouse gas regulations then in force and would require adding appropriate conditions to the license. However, as noted in the FSA, this proposed project would have CO_2 emissions well below the SB 1368 EPS requirements due to its efficiency and fuel type.

KERRY SIEKMANN 1/29/09 COMMENT LETTER

Page 1 Comment 1
The proposed CECP Facility and remaining Encina boilers would create one large facility that should fall under the requirements of SB 1368.

Staff Response
SB 1368 regulations are clear that the CECP and Encina Units are not considered to be a combined power plant. The SB1368 definition of a power plant is as follows:

(l) "Power plant" means a facility for the generation of electricity, and is:
- (1) a single generating unit; or
- (2) multiple generating units that meet the following conditions:
  - (A) the generating units are co-located;
  - (B) each generating unit utilizes the same fuel and generation technology; and
  - (C) one or more of the generating units are operationally dependent on another.

This regulatory definition considers each combustion turbine and associated steam turbine to be a separate power plant unit for the purposes of SB1368. Therefore, the proposed project consists of two separate SB1368 power plant units – Carlsbad Unit 6

and Carlsbad Unit 7.The CECP and existing Encina Units (Encina 4 and 5) would also not be defined as the same power plant under SB 1368 because they do not use the same generation technology and they are not operationally dependent.

Even if staff could consider the CECP and the Encina boilers as a single power plant for the purposes of SB 1368 compliance, the emission performance standard would not apply to this combined facility as it would not have a capacity factor above 60 percent.

Page 1 Comment 2
The PSA does not mention in the climate description (p. 4.1-4,5) or appear to evaluate important meteorological conditions such as the persistent marine layer and fog conditions that occur on the coast.

Staff Response
Staff has clarified the climate description on p. 4.1-5 in the FSA to include additional information regarding the local climate phenomena as well as providing additional information about the coastal meteorological data set used to evaluate local impacts from the project and it appropriateness to evaluate such phenomena. The meteorological data used to assess impacts is from Oceanside, within 6.5 miles of the project site, at a location that is approximately one-half mile from the surf zone and within one-third mile from the I-5 freeway. These characteristics are very similar to and representative for assessing impacts from the CECP project operation. Additionally, the potential impacts from short-term inversion breakup and shoreline fumigation events were evaluated separately (see **Air Quality Table 24**).

Page 1 Comment 3
The San Diego Air Basin is nonattainment of state and federal ozone standards and state PM10 and PM2.5 standards. The CECP will increase these pollutants in the neighborhoods surrounding the site, which will impact the health of the area residents. How can the CEC approve projects that increase emissions in an area surrounded by neighborhoods?

Staff Response
Staff reviews applications that are submitted to determine if they would comply with all laws, ordinances, regulations, and standards (LORS) and determine whether the project would create significant air quality impacts. In many if not most power plant siting cases there are neighborhoods nearby the proposed project. In many of these siting cases, the existing air quality is considerably worse than it is in Carlsbad, such as in the Los Angeles Basin or San Joaquin Valley. In the case of this project, staff has found that the project would comply with all LORS and would not create significant air quality impacts.

Staff acknowledges that the San Diego Air Basin is in non-attainment of the federal ozone, and state ozone and PM10/PM2.5 standards and has recommended emission mitigation measures, above and beyond those required by the San Diego Air Pollution Control District, that staff considers appropriate due to the nonattainment status of the air basin. The proposed project analyzed by staff includes mitigation in the form of emission reductions, both onsite (shutdown of Units 1-3) and offsite (District ERCs), as

well as additional local emission reductions recommended by staff to be funded by the applicant.

The health risk assessment for the project in the Public Health section of the FSA shows that the local health impacts to area residents are below all health based significance standards endorsed by the California State Office of Environmental Health Hazard Assessment (OEHHA).

Page 1 Comment 4
Has the analysis included assessment of worst-case emissions of proposed Units 6 and 7 along with worst-case emission of existing Units 4 and 5 along with worst-case emissions from the I-5 during rush hour cumulatively, as required by CEQA?

Staff Response
Yes, the modeling analysis has included an assessment of the cumulative impacts of the new proposed CECP emission sources, along with the existing Encina units 4 and 5, along with worst-case ambient pollutant background conditions (see **Air Quality Table 27**). In the Air Quality PSA this table just reported short-term impacts for NOx and CO, but in the Air Quality FSA, Table 27 has been amended to include all relevant Ambient Air Quality Standards and averaging periods.

Page 1 Comment 5
Is it appropriate to use Oceanside for background CO levels, considering the local CO impacts of the I-5 during rush hour and the existing Encina plant, for the modeling of startup and shutdown worst-case CO impacts for proposed CECP Units 6 and 7?

Staff Response
The background CO concentrations, and PM10 and PM2.5 background concentrations, used in the PSA were collected at the Escondido monitoring station, a valley monitoring located near the I-15 and Hwy 78. These data are considered conservative in comparison with the coastal project location. Camp Pendleton (i.e. Oceanside) monitoring data were used for NO_2 background concentrations, because that is the only criteria pollutant currently monitored at the Camp Pendleton monitoring station.

Using **Air Quality Table 7** to compare the available older Oceanside CO ambient monitor data (1990-1998) with the more recent Escondido CO ambient monitor data (1999-2007) clearly shows that the coastal CO concentrations around the project site can be expected to be lower than the CO background concentrations taken from the Escondido site. Staff also notes that CO ambient air quality exceedances would not have been predicted for any operating scenario of the CECP regardless which site was used for background CO concentrations. Additionally, the significant improvements in CO emissions from automobiles, which are the primary source of CO emission impacts, will continue over time reducing CO background concentrations throughout San Diego and California.

In all of the air dispersion modeling cases, other than selected refined NO_2 modeling analyses noted in the FSA, the worst-case ambient concentration for a specific pollutant and time frame (such as CO for one-hour) over a three year period was used as the

background even though the specific meteorological conditions that occurred during the worst-case ambient background period would not match the meteorological conditions necessary for the worst-case project emission impacts. This conservative approach provides a measure of safety in determining whether there would be any localized significant impacts from the project.

Page 1 Comment 6

Is it appropriate to use Camp Pendleton Oceanside for background NO_2 levels, considering the distance from the project site and the fact that the Encina stack is 400 feet and the CECP stack is 300 feet shorter?

Staff Response

The Camp Pendleton monitoring station is considered representative as it is near the I-5 freeway (within 1/3 mile) and has both nearby marina and Camp Pendleton mobile emission sources (including on-road and off-road vehicles of many types that do not have or need to meet California on-road or off-road emission standards) that will influence the worst-case ground level NO_2 concentrations. Considering all of these factors, the Camp Pendleton monitoring location is considered a reasonable source of data for background NO_2 concentrations.

Additionally, as noted above in the response to Comment 4, the cumulative NO_2 and other pollutant impacts from the CECP and the Encina Power Station, including the ambient background concentrations, were assessed and were found not to create new exceedances or significantly contribute to existing exceedances of ambient air quality standards.

Finally, the modeling analysis considers the actual stack height and all of the other stack parameters for all of the modeled CECP and Encina Power Station emission sources.

Pages 1, 2 Comment 7

The 400 foot height of the Encina stack disperses emissions from the existing plant which has also reduced fuel oil use in favor of natural gas use that has reduced impacts from the existing facility. The ambient measurement tables in the PSA are based on this 400 foot tall stack, while the emissions from the CECP will be emitted out of stacks only 100 feet above ground level. Doesn't this mean the historical data used for modeling is inappropriate since it is based on a stack four times higher than the CECP stacks?

Staff Response

The only historical data used in the air dispersion modeling analysis is the selected worst-case background concentrations, which included the effects of fuel oil firing at Encina Units 1 -5. Staff believes that the selected worst-case background concentrations used in the modeling analysis are appropriate and conservative (see responses to Comments 5 and 6). Additionally, the modeling analysis inputs include the actual stack heights and included the Encina stack emissions (and included an oil firing case, even though only natural gas firing is currently permitted to be used at Encina Units 4 and 5) along with the CECP stack emissions in a cumulative modeling analysis. The use of worst-case background concentrations plus the worst-case impacts from the

CECP and Encina stacks combined provide a very conservative basis to predict the worst-case localized impacts.

Page 2 Comment 8

The operation of Units 1, 2, and 3 at the Encina power station has declined in recent past years. Wouldn't the past two years be more appropriate for the San Diego Air District to use to calculate the proposed CECP 6 and 7 pollution credits?

Staff Response

First, staff notes that while we have commented on certain specifics of the PDOC, we do not argue the general appropriateness of the District's regulations that are approved both by CARB and U.S.EPA to implement the state and federal Clean Air Acts, including the those regulations that cover methods of how to calculate net emission changes. The District addressed Energy Commission staff's comments and concerns regarding this issue during the discovery phase of the project and has dealt with the emission estimation basis issues for years 2002 and 2003 and has painstakingly gone over the emission estimates, including the most recent proposed reductions in the NOx emission estimate provided by the applicant, to determine the appropriate emission reductions from the closure of Encina Units 1, 2, and 3.

Second, NRG could have operated Units 1, 2, and 3 to the exclusion of Units 4 and 5 to significantly increase their baseline emissions for these units after they knew they were going to propose the CECP, but they did not.

Third, it is possible that Encina Units 1, 2, and 3 would need to increase its capacity factor and emissions in the future, at least for some period of time, if the CECP or other proposed new power plants were not built.

Finally, staff is in agreement with the methods that the District used to determine the emission baseline for Units 1, 2 and 3.

Page 2 Comment 9

Greenhouse Gas Table 3 shows 846,076 metric tons per year of greenhouse gas emissions while Encina Units 1-3 only emitted 162,545 metric tons in 2006. This is a large emission increase and greenhouse gas emissions are a grave concern.

Staff Response

These two values should not be compared directly as the first value is the permitted maximum GHG emissions for the CECP while the second is the actual annual GHG emission for Encina Units 1-3 during 2006. While staff recognizes that the CECP, if licensed, would almost certainly operate more than Encina Units 1-3, it is not known at what proportion of its permitted capacity it will actually operate over project life. For comparison purposes, the maximum GHG emission potential for Encina Units 1-3, based on permit limitations, is approximately 1,650,000 metric tons per year[1], or about twice the potential for CECP; and the GHG emission performance of these units is

[1] This is based on the assumption that the emission performance for Units 1-3 would be reduced to approximately 0.600 MT CO2E/MWh if operated at its highest efficiency at maximum permitted output and capacity.

calculated to be 0.637 metric tons CO2E/MWh averaged over 2002 to 2008, which is approximately 50 to 55 percent higher than the CO2E/MWh for the proposed CECP, which is 0.405 metric tons CO2E/MWh.

Please also see the response to the Earthjustice Consolidated GHG Analysis comments and the response to Comment 10 directly below.

Page 2 Comment 10
The net GHG emission performance, noted to be 0.405 MTCO2E/MWh in the PSA, does not include the power consumption of the desalination plant.

Staff Response
Staff has corrected the net MWh assumption to include the power generation from the steam injection power augmentation system and the power consumption of the desalination unit (estimated to be 1,236 MWh), which has revised the net GHG emission performance from 0.4046 to 0.4049 MT CO2E/MWh. This is a very small increase, and both values round to 0.405 MT CO2E/MWh.

Page 2 Comment 11
The construction emissions will occur over a long period for this project and will impact the children and elderly living in the local neighborhoods that surround the project site.

Staff Response
Staff evaluated the construction emission impacts for both the potential short-term peak and annual criteria pollutant concentrations, as well as evaluated the acute and long-term chronic and carcinogenic health impacts from air toxics in the Public Health Section of the PSA.

In response to the potential impacts from construction, including localized PM impacts and regional ozone impacts, staff recommends extensive construction mitigation measures including both fugitive dust control measures and off-road equipment engine emission control measures that will significantly reduce the emission potential from the project's construction. With implementation of these mitigation measures, measures that are much more extensive than those typically required outside of the Energy Commission process, and the required full-time onsite compliance monitoring, staff has found that there would be no significant impacts to local area residents resulting from the project's construction emissions.

Page 2 Comment 12
The CECP will increase air pollution in Carlsbad and is not needed to be located near the coast, as was the case for the existing Encina Plant with its once-through cooling, so an alternative project location rather than this location should be found.

Staff Response
Staff recognizes that the project, taken alone, would increase air pollution in area surrounding the project site, as it would around any alternative project site location. However, staff did not find that the proposed project's contributions to ambient pollutant

levels, after mitigating the emission increases for all non-attainment pollutants and their precursors, would create significant air quality impacts.

Additional response to comments on the project alternatives analysis are included in the updated Alternatives Section of the FSA.

CALIFORNIA UNIONS FOR RELIABLE ENERGY 1/29/09 AND 1/30/09 COMMENT LETTERS

Note: There are five essentially identical air quality comment topics listed in the 1/29/09 and 1/30/09 comment letters. The numbering and title of the comments is based on the format provided in the 1/29/09 comment letter.

Comment I. Definition of Startup Period

The definition of a startup period is flawed as it does not address the variability in the startup period that will occur depending on turbine and HRSG temperatures (hot, warm, cold) and is overly lenient based on the turbine manufacturer data in the AFC that shows a startup interval of 22 minutes. More information is necessary to assess unit startups under all startup scenarios (hot, warm, cold) to provide more stringent startup time limits during which the turbines do not have to meet the 2 ppm NOx emission limit.

Staff Response

The Siemens manufacturer startup data is an estimate and not a guarantee as noted in the AFC; therefore, the applicant has provided safety margins in the duration and event emissions that they are willing to stipulate to as adequate to guarantee compliance under all non-upset, normal startup scenarios. Typical startup periods for Frame F gas turbines range from 90 minutes to 6 hours, depending on the type of start with permitted startup event emissions that are several times, if not an order of magnitude, higher than the startup event emissions proposed for the CECP gas turbines. Additionally, District condition **AQ-49** would require that the SCR system ammonia injection system be operating as soon as the outlet of the SCR reaches 450°F which would effectively start the control of NOx emissions regardless of the difference in duration of the startup based on whether it is a hot/warm/cold start. Therefore, staff believes that the startup emissions and SCR operating requirements are limited appropriately regardless of the type of startup, and additional conditions or emission limits for hot/warm/cold starts are unnecessary for this rapid response gas turbine.

Comment II. Number of Startup and Shutdown Events

The number of startups and shutdowns in the permit conditions do not match the emission calculation basis. The potential for significantly increased startup/shutdown emissions and their potential to dominate the total allowed annual emissions and reduce allowed normal operating time is a concern, so the startup/shutdown emissions should be limited in a revised condition.

Staff Response

Staff considers the annual emission limit to be the overriding limitation on annual operations. The amount of startup/shutdown events and normal operating hours are not considered fixed numbers, just values used to determine the annual emissions limits.

The actual operation of CECP will be required to meet (i.e., will be limited by) the annual emission limits, regardless of variation with these startups events and operations hours. Condition **AQ-47** was written by the District to provide a very high limit on the number of starts and stops. However, economics will dictate how the facility is actually operated while maintaining annual emission below the conditioned annual emissions limits. The impact analysis considered all of the appropriate short-term emission events such as startup and shutdown. Staff does not believe any additional conditions are necessary.

Comment III. Transient Load Changes

The request from the applicant for increased emission limits during load transients are a concern and additional information regarding these emissions and the potential for load transient events to exceed the applicant's proposed 15 hours per year needs to be evaluated.

Staff Response

Please see the response to Power of Vision Air Quality Comment 3.

Comment IV. Rapid Response Startup and Shutdown Times

The startup and shutdown periods and emissions for the El Segundo Redevelopment project, using the same rapid response turbine technology as the CECP, are different than those proposed for the CECP. This discrepancy needs to be explained.

Staff Response

Staff recognizes that there are differences between the El Segundo and CECP gas turbine startup information. However, the startup interval information provided by the applicant for this case clearly comes from Siemens (Table 5.1B-8 of the AFC Appendix 5.1B). The reason for the difference in the cases could be due to revised estimates by Siemens, differences in the combustors or other gas turbine design parameters, or other unknown factors. Regardless, neither set of manufacturer's data was given as a guarantee, so the applicant has provided safety margins to the startup interval and emission limits to which it is willing to stipulate.

Also, please see the response to Comment II. provided above.

Comment V. Secondary PM10 Emissions

The PSA states that PM10 emissions "are not estimated to be higher or lower during startup and shutdown events than during normal operations". However, PM10 precursor emissions (NOx) are higher during startup, so the applicant should be required to quantify the potential formation of secondary particulate and the information should be incorporated in the PSA.

Staff Response

In the citation, the PSA is referring to the stack emissions of PM10, not to the secondary PM10 formation that will be occur after stack exhaust is released into the atmosphere. Also, staff notes that PM10 emissions during startup and shutdown events are likely to be lower than normal operations, and other applicants have assumed fuel use proportionality for their PM10 emissions during startup and shutdown events, which has not been assumed for this project.

Secondary particulate formation is discussed in the PSA (see pages 4.1-40, 41). The specific amount of secondary particulate formation cannot be reasonably estimated, either during short-term startup events or over the long term, due to the complexity of the reactions that cause secondary particulate formation and the variability of the ambient conditions that influence this process.

Through a combination of the District required NOx offsets; the shutdown of Encina Units 1, 2, and 3; and staff's required offsets for PM10 and VOC there will be no permitted emission increases of particulate emission or criteria pollutant particulate precursor emissions.

EARTHJUSTICE 1/30/09 AND 2/6/09 COMMENT LETTERS

Consolidated GHG Analysis Comments

A) The greenhouse gas significance finding is misplaced and contrary to CEQA. ARB has proposed that emissions of more than 7,000 tons of GHG for an industrial facility are significant.

B) Staff's impact assessment methods are flawed and should conform to other projects as identified in case law[2]. The CECP's higher efficiency than the retired boilers and other existing power plants does not address the CECP's impacts over the next forty years and the opportunity for project alternatives to reduce the GHG impacts.

C) The dependence on AB 32 as the proper forum to address GHG emissions for the project and using the SB 1368 EPS as a significance criteria are flawed and do not address the impacts for the life of the project. AB 32 only regulates emissions through 2020 and compliance with the SB 1368 EPS is not an appropriate significance criteria.

D) The GHG emission estimate for the CECP is incomplete and should include lifecycle emissions.

E) Construction GHG emission impacts are improperly dismissed.

F) The CECP will supplement future growth in energy use. Feasible mitigation and alternatives should be adopted.

G) Impacts of Global Warming on the CECP are not analyzed.

Staff Response

A) This issue is very complex for the power generating sector since the proposed plans for GHG reduction for the sector include not just the integration of renewable resources and increased energy efficiency, but also relies on the replacement of older fossil-fuel fired resources with newer, more efficient fossil-fuel fired resources, as well as the implementation of future AB 32 regulations that will require overall reductions in this sector's GHG emissions. Staff's GHG impacts findings are consistent with CEQA

[2] Several lawsuits were cited by Earthjustice, none of which concern power plants.

requirements. GHG impacts are a global impact, not a local impact, and staff has assessed the project in its system-wide global context as appropriate for this global impact.

The CEQA Lead Agency for this project is the Energy Commission. The ARB document that is cited but not referenced in this comment is a preliminary draft document from the ARB. This document, the *Recommended Approaches for Setting Interim Significance Thresholds for Greenhouse Gases under the California Environmental Quality Act* (ARB 2008x), specifically notes the following:

> ARB staff's proposed recommendations for GHG thresholds address projects for which local agencies are typically the CEQA lead agency. In addition to the CEC, other State agencies also serve as lead agencies under CEQA. ARB is coordinating with these State agencies on their approaches to thresholds of significance.

So it is clear that this ARB document's draft significance thresholds are not relevant to power plant projects.

B) The lawsuits cited in this comment are in fact not analogous to the CECP project. The CECP project is both a replacement project and is part of a whole interconnected sector, which needs dispatchable resources for integration of renewable energy. The CECP project will be regulated as part of the whole electricity generation sector-wide GHG emission reductions. This is certainly not the case for residential and commercial projects that were the subjects of the cited lawsuits. Therefore, staff believes the lawsuits cited in the comments are not applicable to the CECP and thus the arguments are likewise not applicable.

C) Staff has provided additional information to justify the GHG CEQA findings for the proposed CECP project in FSA, which we believe provides substantial evidence to make the conclusion that the project has a less than significant impact on climate change. While AB 32 and compliance with the SB 1368 EPS are discussed, they are discussed as LORS compliance issues and are not the basis for the significance determination.

D) Staff believes the emission estimates provided for the project are adequate for the system-wide impact analysis that uses the same emission estimate basis. If a lifecycle emission estimate were to be performed, which staff believes would have to rely on unreliable speculative assumptions, that similar life-cycle analysis would have to be performed system-wide, which would result in the same overall conclusion regarding GHGs.

E) Staff continues to conclude that the construction GHG emissions are negligible and not significant after implementation of best practices for construction. In comparison with the project's operating emissions, even if they were all applied to the first year of operation, and that first year of operation is limited to one-half of maximum permitted operating levels, the increase in GHG emission would be less than 0.5 percent.

F) Staff believes that the CECP will do more than supplement future growth in energy use. It will provide a lower emitting option than the existing boiler and peaker facilities and with its rapid response capability it will help with the system-wide integration of renewable energy sources. The CECP does not serve to stop deployment of expanded energy conservation, other energy use reductions or other GHG mitigation measures.

G) No impacts of Global Warming to the CECP site are expected. The site is surrounded by an area that is approximately 50 feet above sea level, with the lowest point 30 feet above sea level. Staff is not aware of any forecasts in sea level rise anywhere near 30 feet over the next 40 or so years of the project's proposed life.

2/6/09 Letter Page 5 Comment.
Staff should incorporate into their air analysis the new proposed moderate designation of the San Diego Air Basin for the 8-hour ozone National Ambient Air Quality Standard.

Staff Response
Staff has incorporated the proposed revision in the federal 8-hour ozone nonattainment designation into the setting of the air quality section of the FSA.

BIOLOGICAL RESOURCES

Testimony of Heather Blair

SUMMARY OF CONCLUSIONS

Carlsbad Energy Center, LLC proposes to construct and operate the Carlsbad Energy Center Project (CECP), a 540-megawatt natural gas-fired facility on approximately 23 acres within the existing Encina Power Station (EPS) in the city of Carlsbad. The proposed project area is highly disturbed, and does not support sensitive biological resources (e.g., wetlands) or provide suitable habitat for special-status species. However, the adjacent Agua Hedionda Lagoon is included in the North County Multiple Habitat Conservation Program (MHCP) and the Habitat Management Plan (HMP) for Natural Communities in the city of Carlsbad, and provides habitat (including critical habitat) for several special-status species. Implementation of staff's proposed conditions of certification would avoid or minimize potential impacts to terrestrial biological resources.

The proposed project would be air-cooled and would not employ once-through ocean water cooling; however, seawater would be purified (desalinated) for industrial use and dilution purposes. The water used for desalination would come from the discharge flows of the existing EPS Units 4 and 5. The proposed CECP would not withdraw water from Agua Hedionda Lagoon, and therefore would not result in impingement or entrainment impacts. The National Marine Fisheries Service (NMFS), U. S. Fish and Wildlife Service (USFWS), and the California Department of Fish and Game (CDFG) concur with staff's determination (Chesney 2009; Koski 2009; Paznokas 2009).

Staff concludes that the proposed CECP would not result in any significant unmitigated impacts to biological resources with implementation of the Conditions of Certification and would be in compliance with applicable laws, ordinances, regulations, and standards (LORS), as presented in this analysis.

INTRODUCTION

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

This analysis is based, in part, on information provided in the application for certification for the CECP (CECP 2007a), the Project Enhancement and Refinements supplemental information (SR 2008a), a staff site visit conducted on December 13, 2007, and discussions with NMFS, USFWS, and CDFG.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The applicant shall abide by the following LORS during project construction and operation as listed in **Biological Resources Table 1**. The CECP is not subject to federal Clean Water Act 316(b) regulations because it would not require additional intake of ocean water beyond what is currently permitted for the existing EPS; rather, discharge water from EPS Units 4 and 5 use would be utilized.

Biological Resources Table 1
Laws, Ordinances, Regulations, and Standards

Applicable Law	Description
Federal	
Clean Water Act of 1977 (Title 33, United States Code, sections 1251–1376, and Code of Federal Regulations, part 30, Section 330.5(a)(26))	Prohibits the discharge of dredged or fill material into the waters of the United States without a permit. The administering agency is the U.S. Army Corps of Engineers.
Endangered Species Act (Title 16, United States Code, sections 1531 et seq.; Title 50, Code of Federal Regulations, part 17.1 et seq.)	Designates and provides for the protection of threatened and endangered plant and animal species and their critical habitat. The administering agency is USFWS.
Migratory Bird Treaty Act (Title 16, United States Code, sections 703–711)	Prohibits the take or possession of any migratory nongame bird (or any part of such migratory nongame bird), including nests with viable eggs. The administering agency is USFWS.
State	
California Endangered Species Act (Fish and Game Code, sections 2050 et seq.)	Protects California's rare, threatened, and endangered species. The administering agency is CDFG.
California Code of Regulations (Title 14, sections 670.2 and 670.5)	Lists the plants and animals that are classified as rare, threatened, or endangered in California. The administering agency is CDFG.
Fully Protected Species (Fish and Game Code, sections 3511, 4700, 5050, and 5515)	Designates certain species as fully protected and prohibits take of such species. The administering agency is CDFG.
Native Plant Protection Act (Fish and Game Code, section 1900 et seq.)	Designates rare, threatened, and endangered plants in California and prohibits the taking of listed plants. The administering agency is CDFG.
Nest or Eggs (Fish and Game Code, section 3503)	Prohibits take, possession, or needless destruction of the nest or eggs of any bird. The administering agency is CDFG.
Birds of Prey (Fish and Game Code section 3503.5)	Specifically protects California's birds of prey in the orders Falconiformes and Strigiformes by making it unlawful to take, possess, or destroy any such birds of prey or to take, possess, or destroy the nest or eggs of any such bird. The administering agency is CDFG.
Migratory Birds	Prohibits take or possession of any migratory nongame bird as

Applicable Law	Description
(Fish and Game Code, section 3513)	designated in the Migratory Bird Treaty Act or any part of such migratory nongame bird. The administering agency is CDFG.
Water Quality Control Plan, Ocean Waters of California	Acts as the State's water quality control plan for ocean waters. The plan is reviewed every three years per federal law (Section 303(c) (1) of the Clean Water Act] and State law [Section 13170.2(b) of the California Water Code. Proposed amendments include establishing a numeric water quality objective for salinity. The administering agency is the State Water Resources Control Board (SWRCB).
Porter-Cologne Water Quality Control Act California Water Code, Division 7, section 13142.5(b)	Requires coastal industrial installations that use seawater for cooling, heating, or industrial processing to implement best available site, design, technology, and mitigation measures to minimize intake and mortality of all forms of marine life. The administering agency is the SWRCB.
Local	
North County Multiple Habitat Conservation Plan (MHCP)	A long-term conservation program that addresses existing biological resources, proposed urban growth, habitat losses, and indirect, direct, and cumulative effects on sensitive species throughout the San Diego region. The CECP project lies within the planning area covered by the North County MHCP.
Habitat Management Plan (HMP) for Natural Communities in the city of Carlsbad	Comprises the Carlsbad subarea plan required by the North County MHCP in order for specific jurisdictions to obtain take authorization. Additionally, the HMP proposes a comprehensive, citywide program to preserve habitat diversity and protect sensitive biological resources while allowing for additional development consistent with the city's General Plan and Growth Management Plan. The CECP is located within the HCP's Local Facilities Management Zone (LFMZ) 1 and Core Area 4. Conservation goals within Zone 1 include conservation of the majority of sensitive habitats in or contiguous with biological core areas, including no net loss of wetlands and preservation of habitat adjacent to the Agua Hedionda Lagoon.
Local Coastal Program (LCP) & Agua Hedionda Land Use Plan (LUP)	The city of Carlsbad's LCP includes the city's land use plans, policies, and standards and an implementing ordinance for the city's Coastal Zone. The LCP meets the requirements and implements the provisions and policies of the California Coastal Act. The CECP is located within planning area of the Agua Hedionda LUP, which has been incorporated into the LCP.
City of Carlsbad General Plan – Open Space and Conservation Element	Provides a planning framework for protection and enhancement of open space and natural resources. The proposed project is located within the city of Carlsbad.

SETTING

REGIONAL SETTING

The proposed CECP site is located within the existing 95-acre Encina Power Station in the city of Carlsbad in western San Diego County. Historically, this area was composed of coastal salt marsh, but it has been converted to residential and industrial uses including electric generation units at the existing Encina Power Station, which began

commercial operations in 1954. The nearest significant natural habitat areas are the Pacific Ocean, approximately 0.3 miles west of the CECP site, and Agua Hedionda Lagoon, approximately 0.1 mile north and east of the CECP site, on the opposite side of Interstate 5.

PROJECT, SITE, AND VICINITY DESCRIPTION

The proposed CECP site is located within the northeastern portion of the existing Encina Power Station (EPS), which is bordered to the east by Interstate 5, to the south by the San Diego Gas & Electric switchyard and the city of Carlsbad, to the west by the Pacific Ocean, and to the north by the Agua Hedionda Lagoon. The existing EPS property, which comprises the proposed CECP site, consists primarily of structures and facilities for electricity generation, transmission and associated access or staging areas. The proposed CECP site is disturbed or developed by large above-ground storage tanks, and therefore provides low-quality habitat for plant and wildlife species. However, the adjacent Agua Hedionda Lagoon is high-quality habitat for a wide variety of species.

Existing Vegetation and Wildlife

Surveys of the proposed CECP site and vicinity include an aquatic survey of Agua Hedionda Lagoon for San Diego Gas and Electric (SDG&E) in 1994 and 1995, a biological resource survey of the entire Encina Power Station in 2003, and a reconnaissance-level survey conducted by the applicant, which included the CECP site and a one-mile buffer, in August 2007. The applicant's survey of the proposed CECP site included an inventory of all plant and wildlife species observed and an assessment of potential habitat suitability for special-status species. The following description of biological resources presents the results of previous surveys of the CECP site and vicinity as well as observations from staff's site visit on December 13, 2007.

The CECP site is highly disturbed and/or developed due to ongoing operations within the existing Encina Power Station. The majority of the CECP footprint is composed of bare ground or a combination of bare ground and gravel with scattered ruderal vegetation. Plant species observed include iceplant (*Mesembryanthemum* sp.), tocalote (*Centaurea melitensis*), horseweed (*Conyza* sp.), black mustard (*Brassica nigra*), fountain grass (*Pennisetum setaceum*), wild oat (*Avena fatua*), foxtail chess (*Bromus madritensis* ssp. *rubens*), tree tobacco (*Nicotiana glauca*), western marsh-rosemary (*Limonium californicum*), salt heliotrope (*Heliotropium curasavicum*), buckwheat (*Eriogonum* sp.), and cudweed (*Gnaphalium* sp.). Eucalyptus (*Eucalyptus* sp.) plantings occur along the northern and eastern perimeter of the CECP site and serve as visual screens of the Encina Power Station. These plantings are mature eucalyptus trees greater than 45 feet in height and of sufficient canopy cover to potentially support nesting raptors.

Due to the frequency and intensity of disturbance from operation of the Encina Power Station, the proposed CECP site does not provide habitat capable of supporting a diverse assemblage of wildlife. Direct wildlife observations in the project area include common species such as California ground squirrel (*Spermophilus beecheyi*) and a variety of bird species typically found in disturbed and developed areas such as house finch (*Carpodacus mexicanus*), northern mockingbird (*Mimus polyglottus*), mourning

dove (*Zenaida macroura*), rock dove (*Columba livia*), European starling (*Sturnus vulgaris*), house sparrow (*Passer domesticus*), and American crow (*Corvus branchyrhynchos*). Additional common bird species observed within the proposed CECP site include Anna's hummingbird (*Calypte anna*), black phoebe (*Sayornis nigricans*), common yellowthroat (*Geothlypis trichas*), and California towhee (*Pipilo crissalis*).

A storm drain within the proposed CECP site contains hydrophilic vegetation including cattails (*Typha* sp.), sedge (*Carex* sp.), and umbrella-plant (*Cyperus involucratus*). This storm drain likely supports common amphibian species such as California toad (*Bufo boreas*) and Pacific treefrog (*Hyla regilla*).

Special-Status Species

Special-status species include those listed as threatened or endangered under the federal or state endangered species acts, species proposed for listing, California species of special concern, and other species that have been identified by the USFWS or CDFG or other agency as unique or rare.

Special-status plant and wildlife species were not observed within the CECP site during biological surveys, and the proposed project area does not provide suitable habitat for special-status species. However, the adjacent Agua Hedionda Lagoon provides suitable nesting and foraging habitat for various special-status species that have the potential to be affected by construction and operation of the proposed project. **Biological Resources Table 2** identifies the special-status species reported to potentially occur within one mile of the project area, based on surveys of the proposed project area and vicinity, searches of the California Natural Diversity Database (CNDDB), and California Native Plant Society's (CNPS) Inventory of Rare and Endangered Plants. Staff's analysis considers potential impacts to all species listed in **Biological Resources Table 2**.

Biological Resources Table 2
Special-Status Species Reported or Suspected to Occur within One Mile of CECP

Common Name	Scientific Name	Status
Plants		
California adolphia	*Adolphia californica*	CNPS List 2
Coast woolly-heads	*Nemacaulis denudata* var. *denudate*	CNPS List 2
Cliff spurge	*Euphorbia misera*	CNPS List 2; HMP
Orcutt's pincushion	*Chaenactis glabriuscula* ssp. *Orcuttiana*	CNPS List 1B
South Coast saltscale	*Atriplex pacifica*	CNPS List 1B
Wart-stemmed ceanothus	*Ceanothus verrucosus*	CNPS List 2; HMP
Insects and Crustacea		
Saltmarsh skipper butterfly	*Panoquina errans*	HMP
San Diego fairy shrimp	*Branchinecta sandiegonensis*	FE; HMP
Fish		
Tidewater goby	*Eucyclogobius newberryi*	FE; CSC
Reptiles		
Southwestern pond turtle	*Emys marmorata pallida*	CSC
Birds		
American peregrine falcon	*Falco peregrinus anatum*	FD; CE, HMP
Belding's savannah sparrow	*Passerculus sandwichensis beldingi*	CE; HMP
California brown pelican	*Pelecanus occidentalis californicus*	FE; CE, FP; HMP
California least tern	*Sterna antillarum browni*	FE; CE, FP; HMP
Coastal California gnatcatcher	*Polioptila californica californica*	FT; CSC; HMP
Cooper's hawk	*Accipiter cooperi*	WL; HMP
Elegant tern	*Sterna elegans*	WL; HMP
Light-footed clapper rail	*Rallus longirostris levipes*	FE; CE, FP; HMP
Osprey	*Pandion haliaetus*	WL; HMP
Western snowy plover	*Charadrius alexandrinus nivosus*	FT; CSC; HMP
White-faced ibis	*Plegadis chihi*	WL; HMP
Mammals		
Pocketed free-tailed bat	*Nyctinomops femorosaccus*	CSC

Source: Carlsbad 2004, CH2M Hill 2007, CDFG 2007, CNPS 2008

State Status
CE = State-listed as endangered
CT = State-listed as threatened
CSC = California species of special concern
FP = Fully protected
WL = Watch list

Federal Status
FE = Federally listed as endangered
FT = Federally listed as threatened
FD = Federally delisted

CNPS Status
CNPS List 1B = Plants rare, threatened, or endangered in California and elsewhere
CNPS List 2 = Plants rare, threatened, or endangered in California, but more common elsewhere

HMP for Natural Communities in the City of Carlsbad
HMP = covered species

Sensitive Habitat

Agua Hedionda Lagoon

Regular maintenance dredging of Agua Hedionda Lagoon began in 1954 to supply cooling water to the Encina Power Station and to ensure adequate tidal flow to maintain the overall lagoon health. The coastal lagoon has a permanent opening to the Pacific Ocean and is therefore primarily saltwater with associated estuarine habitat. Source waters include Agua Hedionda Creek and Calavera Creek (Carlsbad 2004). The Agua Hedionda Lagoon system is comprised of the Inner Lagoon, Middle Lagoon, and Outer Lagoon; the Outer Lagoon is the location of the existing Encina Power Station intake.

Habitats include open water, sand and mud substrates, rock revetment, pilings, and aquaculture grow-out floats, which support diverse infaunal, bird, and fish communities. Recent impingement surveys at the Encina Power Station intake structures recorded 96 taxa, demonstrating that the lagoon is a highly productive and diverse system (Tenera 2008). Additionally, the Agua Hedionda Lagoon supports important populations of special-status species such as the southwestern pond turtle, white-faced ibis, and western snowy plover and provides foraging habitat for American peregrine falcon and osprey. The estuarine and marsh habitat surrounding the lagoon provides suitable nesting habitat for special-status species such as the California least tern, elegant tern, Belding's savannah sparrow, California brown pelican, and coastal California gnatcatcher.

The lagoon also provides various recreational opportunities (e.g., YMCA youth camp, water skiing, and boating) and mariculture resources (e.g., mussels, oysters, and sea bass).

Due to its biodiversity of plants and animals as well as suitable habitat for special-status species, Agua Hedionda Lagoon is regionally significant and is located within an existing hardline conservation area,[1] as designated by the Habitat Management Plan (HMP) for Natural Communities in the city of Carlsbad (Carlsbad 2004).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

Determining the threshold of significance is based on the biological resources present or potentially present within the project area in consideration of the proposed project description. A proposed project would have a significant impact to biological resources if it would:

- have an adverse impact, either directly through take, or indirectly through habitat modification or interruption of migration corridors, on any state- or federally listed species;
- have a direct or indirect adverse effect on any sensitive natural community or conservation area identified in federal, state, or local plans, policies, or regulations;

[1] An area that has already been or is slated to be preserved.

- conflict with applicable federal, state, or local laws, ordinances, regulations, and standards protecting biological resources, as listed in **Biological Resources Table 1**.

DIRECT/INDIRECT IMPACTS AND MITIGATION

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

Applicant-proposed mitigation measures have been incorporated into the project description and are considered part of the proposed project to reduce impacts to biological resources. These measures are separate from the conditions of certification, which are proposed in addition to the project description for mitigating significant impacts. In addition to the applicant-proposed mitigation measures, the applicant also proposed conditions of certification (CECP 2007a, p. 5.2-22 through 28). These applicant-proposed conditions of certification are superseded by staff's conditions of certification, which contain additional detail and are presented at the end of this section. All applicant-proposed mitigation measures are incorporated by reference into staff's conditions of certification.

Construction Impacts and Mitigation

The project consists of various components related to the generation and transmission of electricity, including those described below. With the exception of a portion of the reclaimed water pipeline, all other project components would be within the existing Encina Power Station property boundary.

- **Power Plant Site.** The CECP would permanently occupy 23 acres within the existing 95-acre Encina Power Station. The two proposed units (Units 6 and 7), each comprising one natural gas-fired combustion turbine generator and one steam turbine generator, would be constructed at a location currently occupied by three fuel oil tanks, which are proposed for demolition and site remediation.
- **Laydown and Parking Area.** The construction laydown area, which would accommodate equipment/material staging, would be located on approximately 7 acres of the existing Encina Power Station property. Approximately 3 acres within the existing Encina Power Station property would be available during construction for parking.
- **Electric Interconnection.** The electricity generated by the CECP would be transferred to the grid via existing and upgraded SDG&E 138-kilovolt (kV) and 230-kV transmission facilities located on Encina Power Station property and adjacent San Diego Gas & Electric (SDG&E) Canon Substation switchyard property. A 1,800-foot part overhead and part underground transmission line would connect Unit 6 to a new 230-kV switchyard, and a 2,059-foot overhead transmission line would connect

Unit 7 to the existing 138-kV switchyard. All proposed electrical interconnection facilities would be located within the fence lines of the existing Encina Power Station site and adjacent SDG&E Cannon Substation switchyard.

- **Water Supply and Wastewater Discharge.** Operation of the CECP would use potable water supplied by the Carlsbad Municipal Water District for drinking and showering, and desalinated seawater to satisfy the proposed project's industrial water supply requirements. Operation of the CECP would require a maximum of 4.32 million gallons per day (mgd) of seawater, which it would take from the existing Encina Power Station cooling water discharge system. Some of the seawater (13.6%) would be purified by desalination for industrial uses, and the remainder would be used to dilute the brine from the desalination process before discharge via the existing Encina Power Station outfall. Sanitary wastewater disposal of potable water would be to the city of Carlsbad's sanitary sewer system through a new 12-inch sanitary sewer line that would be approximately 1,100 feet long.
- **Natural Gas Pipeline.** Natural gas would be delivered through a new 18-inch pipeline that would extend approximately 1,000 feet from an existing Southern California Gas Company (SoCalGas) transmission pipeline that is located immediately adjacent to the western boundary of the Encina Power Station site, parallel to the Atchison Topeka and Santa Fe Railway.

Staff recommends that a Designated Biologist and biological monitor(s) be assigned to ensure avoidance and minimization of the impacts described below and protection of the sensitive biological resources described above. Selection of the Designated Biologist and biological monitor(s) is described in Conditions of Certification **BIO-1** (Designated Biologist Selection) and **BIO-3** (Biological Monitor Qualifications); their duties and authority are described in Conditions of Certification **BIO-2** (Designated Biologist Duties) and **BIO-4** (Designated Biologist and Biological Monitor Authority), respectively. The Designated Biologist and/or biological monitor(s) would be responsible, in part, for developing and implementing the Worker Environmental Awareness Program (WEAP) (see Condition of Certification **BIO-5**), which is a mechanism for training the workers on protection of the biological resources described in this document.

Construction Impacts to General Vegetation

Construction impacts to vegetation could occur in a variety of ways, including the direct removal of plants during construction. As these impacts are generally localized and are primarily temporary, they are not usually considered significant unless the habitat type is regionally unique or is known to support special-status species. The CECP site is characterized by developed areas with disturbed habitat and ornamental landscaping. Regionally unique habitat or habitat capable of supporting special-status species is not present at the proposed CECP site. Construction activities, including equipment laydown, would require the removal of weedy vegetation and some ornamental plantings (e.g., eucalyptus). Significant impacts to native vegetation would not occur, and no mitigation is proposed.

Construction Impacts to General Wildlife

Direct loss of small mammals, reptiles, and other less mobile species could occur during construction of the proposed project. This would result primarily from the use of construction vehicles at the CECP site, which could collapse underground burrows or drive over animals. Construction activities and increased human presence may temporarily disrupt breeding or foraging activities of some common wildlife species.

The CECP site provides marginally suitable nesting habitat for a variety of common bird species. Birds could nest in the eucalyptus trees along the eastern border of the CECP site. Additionally, some bird species adapted to disturbed environments could nest in equipment or other available substrate in the areas surrounding the site. The compacted dirt and sparse vegetation associated with the barren areas of the CECP site provide nesting substrate for small songbirds and some ground-nesting species (e.g., killdeer). Construction activities during the nesting season (March through August) could adversely affect breeding birds through direct take or indirectly through disruption or harassment. The applicant has proposed the following to avoid impacts to nesting birds (CECP 2007a, pp. 5.2-19 and 5.2-22):

- Nesting substrate for songbirds (taller plants) would be removed outside of the breeding season (September through February) before construction activities begin.
- Open areas requiring grading would be graded prior to March 1 and would be routinely inspected for nesting activities throughout construction and demolition.
- Surveys would be conducted by a qualified biologist for nesting raptors within 300 feet of the project site prior to the start of construction between January 1 and August 31. Should a raptor nest be observed within 300 feet of the CECP site, a qualified biologist would determine whether or not construction activities could potentially disturb nesting raptors and implement appropriate measures (e.g., on-site monitor, timing restriction) to adequately protect nesting raptors.
- Any nests found in or adjacent to disturbance areas would be flagged and the area immediately around the nest protected from construction equipment. Construction activities would not be affected by nests on site; rather the protection and monitoring of the nests would allow construction activities to continue. The nests would be monitored and the results included in the monthly compliance reports to the Energy Commission Compliance Unit.

Staff agrees with these applicant-proposed mitigation measures, which are incorporated by reference into Condition of Certification **BIO-6** (Biological Resources Mitigation Implementation and Monitoring Plan). Additionally, staff recommends a survey for migratory birds if work is proposed between March 15 and August 31, and additional measures to protect nesting birds, as presented in Condition of Certification **BIO-8** (Mitigation Management to Avoid Harassment or Harm), which would ensure compliance with the Migratory Bird Treaty Act. With implementation of the applicant-proposed mitigation measures above and Conditions of Certification **BIO-6** and **BIO-8**, significant impacts to nesting birds would not result from proposed project construction activities.

Wildlife could become entrapped in open trenches during construction, especially if trenches remain open during inactive construction periods. Staff recommends Condition of Certification **BIO-8** (Mitigation Management to Avoid Harassment or Harm), which would require exclusion measures for open trenches (e.g., fencing or covering), inspection of trenches prior to resuming construction activities each day, and installation of escape ramps so that animals that fall in the trench could escape. Implementation of this measure would mitigate adverse impacts to wildlife from entrapment.

Construction Impacts to Special-Status Species

Plants

Special-status plants are not expected to occur in the project area. Six special-status plants are known to occur within 1 mile of the project area, but none were identified during field surveys of the CECP site. Habitat suitability for special-status plants is generally poor at the CECP site, which is inhabited by common, non-native plant species. Therefore, significant adverse impacts to special-status plants would not occur from construction of the proposed CECP.

Wildlife

The CECP site is characterized as developed with disturbed areas and ornamental landscaping. The proposed CECP would be constructed within the existing Encina Power Station site at a location currently occupied by three fuel oil tanks. The proposed project area does not provide suitable habitat for special-status wildlife species, and none were identified during surveys of the proposed project area. However, the adjacent Agua Hedionda Lagoon provides suitable nesting and foraging habitat for various special-status animals. The nearest recorded occurrence of a special-status species is for nesting coastal California gnatcatchers within Diegan coastal sage scrub approximately 2,100 feet east-northeast of the proposed CECP site. Construction activities would not directly affect Agua Hedionda Lagoon; indirect impacts to nesting special-status birds that occur within the marsh, scrub, and estuarine habitat associated with Agua Hedionda Lagoon are discussed under “General Construction Impacts” below.

Critical Habitat

Critical habitat is a formal designation under the federal Endangered Species Act. It is a specific area designated as essential to the conservation and recovery of a federally listed species. These areas may require special management consideration or protection. Critical habitat for the tidewater goby and coastal California gnatcatcher exists within 1 mile of the proposed CECP site. Critical habitat for tidewater goby comprises the outer, middle, and inner portions of the Agua Hedionda Lagoon, which is approximately 110 feet north of the proposed CECP site. Critical habitat for the coastal California gnatcatcher has been designated approximately 3,200 feet east of the CECP site. Because the upland habitat associated with Agua Hedionda Lagoon would not be adversely affected by the proposed project, there would be no impacts to critical habitat for the coastal California gnatcatcher, or other federally listed species.

General Construction Impacts

Construction activities, including noise and lighting impacts, have the potential to create a variety of temporary impacts to biological resources.

Noise

Construction activities would result in a short-term, temporary increase in the ambient noise level. Existing operations at the Encina Power Station, traffic on Interstate 5, and the Atchison Topeka and Santa Fe Railway/North County Transit District rail corridor create elevated ambient noise to which most local wildlife species have acclimated. However, excessive construction noise has the potential to disrupt the nesting, roosting, or foraging activities of sensitive wildlife, especially wildlife in the middle lagoon of Agua Hedionda, which is approximately 110 feet north of the CECP site. For land uses adjacent to estuarine habitat, the HMP specifies standard best management practices, which require attenuation measures for activities that generate noise levels greater than 60 decibels (dBA) occurring within 200 feet of important breeding habitat during the breeding season (Carlsbad 2004). Further, the following applicant-proposed mitigation measures would minimize impacts to sensitive species in Agua Hedionda Lagoon resulting from excessive construction noise (CECP 2007a, pp. 5.2-13 and 5.2-21):

- To avoid the riparian bird nesting season, excessively noisy construction activities would not occur between March 15 and August 31 if possible, especially during dusk and early morning hours if birds are nesting in the middle lagoon (the limit of the 200-foot MHCP boundary). Construction equipment will be in good working condition with properly operated and maintained mufflers.
- If construction cannot avoid the nesting season, then a qualified biologist would conduct a preconstruction survey within the CECP site and the middle lagoon of Agua Hedionda prior to ground disturbance and construction activities between March 15 and August 31. The survey would be conducted no more than two weeks prior to construction activities and would be conducted by a qualified biologist familiar with the identification and vocalizations for coastal California gnatcatcher and other estuarine species.
- If nesting bird species are detected, noise monitoring and mitigation would be incorporated. Should average noise levels exceed 60 dBA during the breeding season, feasible noise reduction measures would be implemented to reduce noise levels to below 60 dBA. Noise reduction measures could include locating stationary equipment away from biologically sensitive areas and/or shielding nesting sites by installing sound barriers. Once the average noise level returns to below 60 dBA, the construction activities could resume. Educational programs to enhance employee awareness would be implemented as necessary.

Impacts to sensitive species, especially breeding birds, from excessive construction noise would be mitigated to a less-than-significant level through implementation of these applicant-proposed mitigation measures. These applicant-proposed mitigation measures are incorporated by reference into Condition of Certification **BIO-6** (Biological Resources Mitigation Implementation and Monitoring Plan). For a complete analysis of noise impacts, see the **Noise** section of this Staff Assessment.

Lighting

Project construction activities are planned to occur between 7:00 a.m. and 7:00 p.m.; however, during some construction periods, and during the start-up phase of the project, construction activities could continue 24 hours a day. Bright lighting at night could disturb the resting, foraging, or mating activities of wildlife and make wildlife more visible to predators. Additionally, night lighting could be disorienting to migratory birds and, if placed on tall structures, may increase the likelihood of collision, as discussed below. Although existing operations at the Encina Power Station and traffic on Interstate 5 provide an elevated ambient level of lighting to which local species have acclimated, potentially significant impacts to sensitive wildlife from increased night lighting could occur.

If night construction were required, task-specific lighting would be used to the extent practicable, and lighting would be shielded and pointed toward the center of where the activities are occurring (CECP 2007a, p. 5.13-12). Further, the HMP specifies that direct lighting within 200 feet of Agua Hedionda must be directed away from the lagoon (Carlsbad 2004). These measures are incorporated into Condition of Certification **BIO-7** (Impact Avoidance Mitigation Features). With implementation of these measures, impacts to wildlife from temporary construction night lighting would be less than significant.

Operation Impacts and Mitigation

Potential impacts resulting from operation of the CECP include bird collision with and/or electrocution by the interconnection facilities and disturbance to wildlife due to increased noise and lighting, and impacts to aquatic resources in Agua Hedionda Lagoon due to operation of the proposed ocean water purification system and industrial wastewater discharge.

Avian Collision and Electrocution

The adjacent Agua Hedionda Lagoon is considered a concentration area for resident and migratory birds because of abundant foraging opportunities and proximity to the Pacific Ocean. This concentration of birds creates the potential for direct impacts through collision or electrocution with CECP exhaust stacks, transmission lines, and transmission support structures. The proposed project would include two units, each with an associated 139-foot-tall, 20-foot-diameter exhaust stack. It is estimated that electrical interconnection would be comprised of nine transmission support structures. All transmission support structures would range in height between 67 and 106 feet, and they would be sited within the existing Encina Power Station complex. The tallest existing exhaust stack at the Encina Power Station is approximately 400 feet tall.

Collision

Bird collisions with power lines and structures generally occur when a power line or other structure transects a daily flight path used by a concentration of birds and these birds are traveling at reduced altitudes and encounter tall structures in their path (Brown 1993). Collisions typically result when the structures are invisible (e.g., bare power lines or guy wires at night), deceptive (e.g., glazing and reflective glare in windows), or confusing (e.g., light refraction or reflection from mist) (Jaroslow 1979). Collision rates

generally increase in low light conditions, during inclement weather, during strong winds, and during panic flushes when birds are startled by a disturbance or are fleeing from danger. Collisions are more probable near wetlands, within valleys that are bisected by power lines, and within narrow passes where power lines run perpendicular to flight paths (APLIC 1996).

Neotropical nocturnal migrants comprise the majority of birds killed in bird strikes with man-made structures; although, smaller numbers of waterfowl and shorebirds have been documented (Kerlinger 2000; Longcore et al 2008). In a review of existing nuclear power plants with natural draft cooling towers[2], it was determined that waterfowl and permanent or summer residents rarely collide with power plant structures (NRC 1996).

It is possible that bird collisions with the CECP exhaust stacks and other facilities would occur. The two proposed exhaust stacks, which would be the tallest component of the CECP, would be approximately 139 feet tall and the existing EPS exhaust stacks are approximately 400 feet tall. Structures over 500 feet tall present a greater risk to migratory songbirds than shorter structures (Kerlinger 2000); bird mortality is significantly lower at towers shorter than 350 feet (Karlsson 1977; Longcore et al 2008). Because the CECP exhaust stacks would be significantly shorter than 350 feet tall and shorter than the existing 400-foot-tall EPS exhaust stacks, the proposed CECP exhaust stacks would pose a relatively low collision risk to migrating birds.

It is likely that increased lighting as required by FAA or other regulations exacerbates mortality at structures taller than 200 feet. Because of its proximity to Palomar Airport, the CECP exhaust stacks may require FAA aviation strobe lighting (SR 2008a, Data Response #110). Condition of Certification **VIS-4** recommends white strobe lighting, which results in far less mortality than steady burning colored and flashing colored lights (Longcore et al 2008). Additionally, Condition of Certification **VIS-4** recommends lighting be designed so that it does not illuminate the night sky or cause excessive reflected glare. Implementation of this condition would further reduce the potential for bird collision with CECP facilities.

Although collision may occur, it is not likely that bird mortality due to collision with CECP transmission lines and facilities would significantly reduce the population numbers of any bird species or that the reduction in numbers within any population would impair its function within the local ecosystem. Because the proposed CECP exhaust stacks are significantly shorter than 350 feet (the height above which is considered dangerous to migrating birds), and shorter than the existing built environment (e.g., EPS exhaust stacks), and with implementation of Condition of Certification **VIS-4**, impacts resulting from bird collisions with CECP structures would be less than significant.

Bird collisions with the overheard ground wire and transmission lines conductors have also been reported as a significant man-made cause of bird mortality (APLIC 2006).

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[2] Natural draft cooling towers are approximately 500-600 feet tall and 400 feet in diameter at the base. Mechanical draft towers, which are approximately 100-125 feet tall, were considered to “cause negligible mortality” and have “little risk to migrating birds” (NRC 1996).

Transmission line ground wires are smaller in diameter and significantly less visible than transmission line conductors. The applicant has proposed to install bird flight diverters (high-impact PVC spirals) on the proposed 230-kV transmission line (CECP 2007a, p. 5.2-16). In addition, Condition of Certification **BIO-7** (Impact Avoidance Mitigation Features) recommends the installation of bird flight diverters on the 138-kV transmission line and clarifies that the bird flight diverters should be installed on the overhead ground wires rather than the conductors. If overhead ground wires are not installed, the bird flight diverters should be installed on the conductors. Bird flight diverters are intended to make transmission lines more visible to birds by increasing the profile of the ground wire or conductor. Implementation of these measures would reduce potential impacts to birds from collision with CECP facilities to a less-than-significant level.

Electrocution

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

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

Potential impacts to wildlife resulting from electrocution by transmission lines may be mitigated by incorporating the construction design recommendations provided in *Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 2006* (APLIC 2006). The applicant would construct the proposed transmission lines according to APLIC's "raptor-friendly" guidelines. Specifically, the transmission lines would have a minimum of 5.5 feet between conductor wires (CECP 2007a, p. 5.2-16). This applicant-proposed mitigation measure has been incorporated into Condition of Certification **BIO-7** (Impact Avoidance Mitigation Features). Implementation of Condition of Certification **BIO-7** would prevent bird mortality from electrocution.

Noise

The proposed CECP site is surrounded by a variety of industrial and commercial land uses. Wildlife species near the proposed project are accustomed to elevated ambient noise levels because of operation of the existing Encina Power Station, traffic on Interstate 5, and the Atchison Topeka and Santa Fe Railway. Although operation of the CECP would create additional noise, significant impacts to biological resources are not expected.

Light

Existing Encina Power Station energy facilities and vehicles traveling on Interstate 5 provide an elevated ambient level of light to which local wildlife have adapted. Facility lighting would be required for safety and security purposes and would be directed downward and downshielded or capped to reduce glare and backscatter (CECP 2007a, p. 5.13-11 and 5.13-12). Additionally, the HMP specifies that direct lighting within 200 feet of Agua Hedionda must be directed away from the lagoon (Carlsbad 2004). Further, Condition of Certification **VIS-4** recommends lighting be designed so that it does not illuminate the night sky or cause excessive reflected glare. Although operation of the proposed CECP would create additional light, with implementation of applicant proposed measures and staff's conditions of certification, significant impacts to biological resources would not occur.

Aquatic Species

The CECP would implement dry-cooling technology, and therefore would not require intake or outflow of ocean or lagoon water for once through-cooling purposes, and would not produce a thermal plume. The CECP would require a maximum of 4.32 million gallons/day (mgd) of seawater for its industrial use and dilution purposes. Like the adjacent Carlsbad Seawater Desalination Project (CSDP), which will use 304 mgd of sea water, the source of CECP sea water would likewise be from the existing Encina Power Station water discharge stream. CECP's ocean purification component of desalination proposes using a reverse osmosis and ion exchange purification system. Approximately 0.59 mgd (13.6 percent) would be purified into freshwater by desalination for industrial use, and the remainder would be used to dilute the brine from the desalination process to National Pollutant Discharge Elimination System (NPDES)-permitted levels before discharge into the Pacific Ocean via the existing Encina Power Station outfall.

Regardless of EPS' daily electrical generation output, the power plant maintains a minimum operation of sea water intake through one service pump. This process of sea water intake maintenance utilizes less than .5% of its permitted daily withdraw allotment of sea water, resulting in a neglible intake flow rate from Agua Hedionda Lagoon of approximately 3 mgd (SR2008h 5.15.3.3).

The proposed CECP would not withdraw water from Agua Hedionda Lagoon for project-specific uses, and therefore would not result in impingement or entrainment impacts. NMFS, USFWS, and CDFG concur with staff's determination (Chesney 2009; Koski 2009; Paznokas 2009). However, if EPS Units 4 and 5 were to cease operations altogether, and their service and auxillary water pumps were no longer needed, the CECP would require intake water from Agua Hedionda Lagoon. If this were to occur, coordination with the resource agencies regarding consistency with Clean Water Act Section 316(b) and the federal and state endangered species acts would be required (refer to Condition of Certification **BIO-9** [Future Agency Coordination]).

As described above, the majority of the intake feedwater from EPS would be used to dilute the brine solution from the CECP desalination process before discharge through the existing Encina Power Station outfall structures into the Pacific Ocean.

It is anticipated that the average salinity values in the brine plume would be 37.8 parts per thousand (ppt) which is below the threshold of hyper-salinity tolerance (38 – 40 ppt) for local marine organisms (SR 2008a, p. 5.10). Staff's proposed Condition of Certification **Soil&Water-3** would require preparation of a report of water discharge and acquisition of an NPDES permit for operational industrial water discharge. Implementation of this condition would ensure that salinity levels did not exceed the threshold of hyper-salinity tolerance, thereby mitigating potential impacts to local aquatic organisms. Further, implementation of this condition would ensure consistency with LORS pertaining to water quality. Refer to the **Soil and Water Resources** section of this Staff Assessment for additional information regarding water quality.

It is anticipated that the CECP would facilitate the retirement of Encina Power Station Units 1, 2, and 3, which would reduce the volume of seawater currently required for once-through cooling at the existing Encina Power Station. Units 1, 2, and 3 are permitted to use up to 225 million gallons per day of seawater from Agua Hedionda Lagoon, depending upon seasonal and yearly operational needs.

CUMULATIVE IMPACTS AND MITIGATION

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

A project may result in a significant adverse cumulative impact if its effects are cumulatively considerable. There are currently proposed projects near the CECP that may impact local biological resources, especially those in Agua Hedionda Lagoon (e.g., North Coast Interstate 5 HOV/Managed Lanes Project and the Carlsbad Seawater Desalination Plant, CSDP).

Due to ongoing operation of the Encina Power Station, the proposed CECP site within the Encina Power Station property is highly disturbed, is largely devoid of native vegetation, and does not provide suitable habitat for special-status species. Although the CECP is proximate to sensitive species and habitat within Agua Hedionda Lagoon, implementation of proposed conditions of certification and compliance with LORS would avoid or reduce impacts to less than significant, including combined CSDP and CECP operation. Therefore, staff concludes that impacts related to the CECP Project would not contribute significantly to cumulative effects on biological resources in the region.

COMPLIANCE WITH LORS

The proposed project is subject to several LORS including the North County Multiple Habitat Conservation Program and the Habitat Management Plan for Natural Communities in the city of Carlsbad. In general, these plans are protective of special-status species and identified conservation areas (e.g., Agua Hedionda Lagoon). Staff determined that the proposed project would not result in significant impacts to special status species or sensitive habitat. Therefore, the proposed CECP would comply with federal, state, and local LORS pertaining to biological resources.

NOTEWORTHY PUBLIC BENEFITS

The Encina Power Station has an NPDES permit from the San Diego Regional Water Quality Control Board to intake and discharge a maximum of 857 million gallons per day of seawater to use for once-through cooling of Units 1–5 (CEC 2005). The seawater is pumped from Agua Hedionda Lagoon and discharged into the Pacific Ocean. The proposed project would implement dry-cooling technology, and therefore would not need to connect to the existing Encina Power Station seawater once-through cooling system for this purpose.

Further, the CECP would facilitate the retirement of existing Encina Power Station Units 1, 2, and 3. The retirements would occur upon the successful commercial operation of the CECP generating units, which is expected by the summer of 2011 (SR 2008h, p. 2-9). Retirement of Units 1, 2, and 3 could reduce the amount of seawater used in once-through cooling by approximately 225 million gallons per day (CECP 2007a). The reduction in intake volume and the resulting reduction in impingement and entrainment of aquatic organisms from Agua Hedionda Lagoon, as well as the reduction in thermal pollution from discharge water into the Pacific Ocean, is a noteworthy environmental public benefit.

CONCLUSIONS

The proposed CECP is located in an industrial area that is currently occupied by above ground fuel oil storage tanks. Because the proposed project area is highly disturbed due to ongoing operations at the Encina Power Station, there is not suitable habitat for special-status species. The proposed project is located adjacent to Agua Hedionda Lagoon, which is included in the North County Multiple Habitat Conservation Program and the Habitat Management Plan for Natural Communities in the city of Carlsbad, and provides habitat (including critical habitat) for several special-status species. Potential impacts to special-status species, including migratory birds, would be mitigated by implementation of staffs proposed conditions of certification, which recommend minimization of light pollution, installation of bird flight diverters, and nesting bird surveys among other measures.

The proposed project would be air-cooled and would not employ once-through-cooling. However, desalinated seawater would be required for industrial use and dilution purposes. The water used for desalination would come from the discharge flows of existing EPS Units 4 and 5. Regardless of CECP operation, EPS would continue to withdraw a minimum of 4.32 mgd of ocean water for Units 4 and 5. The CECP would use 1.22 mgd of this intake volume for ocean water purification, but this is not in addition to the EPS flows. The proposed CECP would not withdraw water from Agua Hedionda Lagoon for project-specific use and therefore would not result in impingement or entrainment impacts. NMFS, USFWS, and CDFG concur with staff's determination (Chesney 2009; Koski 2009; Paznokas 2009).

Staff concludes that the proposed CECP would not result in any significant unmitigated impacts to biological resources with implementation of the Conditions of Certification and compliance with applicable LORS, as presented in this analysis.

PROPOSED CONDITIONS OF CERTIFICATION

Designated Biologist Selection

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

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

1. bachelor's degree in biological sciences, zoology, botany, ecology, or a closely related field; and
2. three years of experience in field biology or current certification from a nationally recognized biological society, such as The Ecological Society of America or The Wildlife Society; and
3. at least one year of field experience with biological resources found in or near the project area.

In lieu of the above requirements, the resume shall demonstrate to the satisfaction of the CPM, that the proposed or alternate Designated Biologist has the appropriate training and background to implement effectively the applicant-proposed mitigation measures and conditions of certification.

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

If a Designated Biologist needs to be replaced, the specified information of the proposed replacement must be submitted to the CPM at least 10 working days prior to the termination or release of the preceding designated biologist. In an emergency, the project owner shall immediately notify the CPM to discuss the qualifications and approval of a short-term replacement while a permanent Designated Biologist is proposed to the CPM for consideration.

Designated Biologist Duties

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

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

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

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

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

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

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

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

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

9. train the biological monitors as appropriate, and ensure their familiarity with the BRMIMP, Worker Environmental Awareness Program (WEAP) training, and all permits.

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

Biological Monitor Qualifications

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

Biological monitor(s) training by the Designated Biologist shall include familiarity with the conditions of certification, BRMIMP, WEAP, and all permits.

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

Designated Biologist and Biological Monitor Authority

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

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

The Designated Biologist shall:

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

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

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

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

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

Whenever corrective action is taken by the project owner, a determination of success or failure will be made by the CPM within 5 working days after receipt of notice that corrective action is completed, or the project owner will be notified by the CPM that

coordination with other agencies will require additional time before a determination can be made.

Worker Environmental Awareness Program

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

The WEAP must:

1. be developed by or in consultation with the Designated Biologist and consist of an on-site or training center presentation in which supporting written material and electronic media are made available to all participants;
2. discuss the locations and types of sensitive biological resources on the project site and adjacent areas;
3. present the reasons for protecting these resources;
4. present the meaning of various temporary and permanent habitat protection measures;
5. identify whom to contact if there are further comments and questions about the material discussed in the program; and
6. include a training acknowledgment form to be signed by each worker indicating that he/she received training and shall abide by the guidelines.

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

Verification: At least 60 days prior to the start of any project-related ground disturbing activities, the project owner shall provide to the CPM two copies of the proposed WEAP and all supporting written materials and electronic media prepared or reviewed by the Designated Biologist and a resume of the person(s) administering the program.

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

The signed training acknowledgement forms from construction shall be kept on file by the project owner for a period of at least 6 months after the start of commercial operation.

During project operation, signed statements for active project operational personnel shall be kept on file for 6 months following the termination of an individual's employment.

Biological Resources Mitigation Implementation and Monitoring Plan

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

The BRMIMP shall be prepared in consultation with the Designated Biologist and shall identify:

1. all biological resource mitigation, monitoring, and compliance measures proposed and agreed to by the project owner;
2. all applicant-proposed mitigation measures presented in the application for certification;
3. all biological resource conditions of certification identified as necessary to avoid or mitigate impacts;
4. all biological resource mitigation, monitoring and compliance measures required in other state agency terms and conditions, such as those provided in the Regional Water Quality Control Board permits;
5. all biological resource mitigation, monitoring, and compliance measures required in local agency permits, such as site grading and landscaping requirements;
6. all sensitive biological resources to be impacted, avoided, or mitigated by project construction, operation, and closure;
7. all required mitigation measures for each sensitive biological resource;
8. a detailed description of measures that shall be taken to avoid or mitigate temporary disturbances from construction activities;
9. all locations on a map, at an approved scale, of sensitive biological resource areas subject to disturbance and areas requiring temporary protection and avoidance during construction;
10. aerial photographs, at an approved scale, of all areas to be disturbed during project construction activities — one set prior to any site (and related facilities) mobilization disturbance and one set subsequent to completion of project construction. Include planned timing of aerial photography and a description of why times were chosen;
11. duration for each type of monitoring and a description of monitoring methodologies and frequency;
12. performance standards to be used to help decide if/when proposed mitigation is or is not successful;

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

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

15. restoration and revegetation plan; and

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

Verification: The project owner shall provide the specified document at least 60 days prior to start of any project-related ground disturbing activities.

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

The project owner shall notify the CPM no less than 5 working days before implementing any modifications to the approved BRMIMP to obtain CPM approval. Any changes to the approved BRMIMP must also be approved by the CPM in consultation with CDFG, the USFWS, and appropriate agencies to ensure no conflicts exist.

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

Impact Avoidance Mitigation Features

BIO-7 Any time the project owner modifies or finalizes the project design, all feasible measures shall be incorporated that avoid or minimize impacts to the local biological resources. The project owner shall:

1. design, install, and maintain transmission line poles, access roads, pulling sites, and storage and parking areas to avoid identified sensitive resources;

2. design, install, and maintain transmission lines and all electrical components in accordance with the *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006* to reduce the likelihood of electrocutions of large birds;

3. install bird flight diverters on the overhead ground wires of proposed transmission lines (230- and 138-kV) to reduce the likelihood of bird collision with power lines; if overhead ground wires are not installed, bird flight diverters shall be placed on the conductors.

4. eliminate from landscaping plans any List A California exotic pest plants of concern as defined by the California Exotic Pest Plant Council;

5. prescribe a road sealant that is non-toxic to wildlife and plants; and

6. design, install, and maintain facility lighting to prevent side casting of light toward wildlife habitat (i.e., Agua Hedionda Lagoon); obstruction lighting shall be white flashing lights unless specifically prohibited by FAA.

Verification: All mitigation measures and their implementation methods shall be included in the BRMIMP. Implementation of the measures will be reported in the monthly compliance reports by the Designated Biologist. Within 30 days after completion of project construction, the project owner shall provide to the CPM, for review and approval, a written construction termination report identifying how measures have been completed.

Mitigation Management to Avoid Harassment or Harm

BIO-8 The project owner shall implement the following measures to manage its construction site (and related facilities) in a manner to avoid or minimize impacts to local biological resources:

1. install temporary fencing and provide wildlife escape ramps for construction areas that contain steep-walled holes or trenches if outside an approved, permanent exclusionary fence. The temporary fence shall be hardware cloth or similar material that is approved by USFWS and CDFG;

2. ensure that all food-related trash is disposed of in closed containers and removed at least once a week;

3. prohibit feeding of wildlife by staff and subcontractors;

4. prohibit non-security-related firearms or weapons on site;

5. prohibit pets on site;

6. avoid work between March 1 and August 15 to avoid impacts to birds protected under the Migratory Bird Treaty Act.

    A. If this is not feasible, a survey shall be conducted for nesting birds within the project area.

    B. Should an active nest be discovered, the Designated Biologist or biological monitor shall establish an appropriate buffer zone (in which construction activities are not allowed) to avoid disturbance in the vicinity of the nest.

i. Construction activities shall not commence until the Designated Biologist or biological monitor has determined that the nestlings have fledged or that construction activities will not affect adults or newly fledged young; OR

ii. The Designated Biologist or biological monitor shall develop a monitoring plan that permits the activity to continue in the vicinity of the nest while monitoring nesting activities to ensure that nesting birds are not disturbed.

7. report all inadvertent deaths of sensitive species to the biological monitor, who will notify CDFG or USFWS, as appropriate; and
8. minimize use of rodenticides and herbicides in the project area.

Verification: All mitigation measures and their implementation methods shall be included in the BRMIMP. Implementation of the measures shall be reported in the monthly compliance reports by the Designated Biologist. Within 30 days after completion of project construction, the project owner shall provide to the CPM, for review and approval, a written construction termination report identifying how biological resource measures have been completed.

Future Agency Coordination

BIO-9 In the event that EPS Units 4 and 5 (and their pumps that supply discharge water for desalination purposes by the CECP) cease to operate -- and the CECP would require intake of ocean water -- the project owner shall inform the appropriate resource agencies (i.e., NMFS, USFWS, and CDFG), and coordinate regarding the compliance with Clean Water Act Section 316(b), and/or the Endangered Species Act requirements, as necessary.

Verification: Annual reports of the operational status of Units 4 and 5 shall be submitted to the CPM, and planned closure of these units shall be reported to the CPM as soon as possible. No later than 30 days prior to decommissioning of Units 4 and 5, the project owner shall provide copies of pertinent records of conversation, permit applications, associated technical reports, and permits (as applicable) to the CPM to verify that federal and state agency coordination has occurred regarding compliance with Clean Water Act Section 316(b) and/or Endangered Species Act requirements, as necessary.

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APPENDIX 1 RESPONSE TO COMMENTS

Staff received comments on the Biological Resources section of the Preliminary Staff Assessment (PSA) for the proposed Carlsbad Energy Center Project (CECP) from two interveners: the City of Carlsbad (Carlsbad 2009) and Mr. Kerry Siekmann (Siekmann 2009). The applicant also submitted comments (SR 2009). Following provides a summary of these comments and staff's response to each.

1. City of Carlsbad Comment – Impingement and Entrainment of Marine Organisms. Entrainment impacts were analyzed in the PSA; however staff was not able to make a determination regarding the impact's significance. Staff indicated at the PSA workshop that entrainment impacts would be less than significant based on the "credit" associated with retirement of EPS Units 1 through 3.

Response: Retirement of Units 1 through 3 was not the basis for determining that there would be no entrainment impacts from the proposed CECP. The determination was based on the fact that CECP would not draw additional water beyond what is permitted for the existing EPS; rather, it would use a portion of the discharge water from Units 4 and 5 after the water has been used for cooling.

2. City of Carlsbad Comment – Clean Water Act (CWA) Section 316(b) Consistency. CWA Section 316(b) requires avoidance and minimization of impacts from power plants withdrawing over 2 million gallons per day (MGD). The proposed CECP, which would withdraw 4 MGD, would result in impacts that would exceed the regulatory thresholds of the CWA. Saying the proposed CECP is exempt from CWA 316(b) requirements because it would not use ocean water for cooling purposes is contrary to the intent of CWA 316(b), which is to avoid and reduce impacts to marine and aquatic organisms from coastal power plants. Further, the processed seawater would be used for cooling since the CECP would employ evaporative cooling. The proposed CECP is inconsistent with the intent and regulatory requirements of CWA 316(b), "and the PSA makes no effort to address these inconsistencies."

Response: The reference to the CECP being exempt from CWA Section 316(b) requirements because it would not use ocean water for cooling has been removed and the rational for exemption clarified. The CECP is not subject to federal Clean Water Act 316(b) regulations because it would not require additional intake of ocean water beyond what is currently permitted for the existing EPS; rather, discharge water from EPS Units 4 and 5 would be used. Refer to page 4.2-2 of the FSA.

3. City of Carlsbad Comment – Net Reduction of Aquatic Impacts from Retirement of Units 1-3. The conclusion that the proposed CECP would not result in adverse effects to marine organisms appears to be based on the "net reduction" in impingement and entrainment impacts from retirement of Units 1-3. "[T]he analysis fails to recognize that the elimination of existing impacts can be achieved without trading off new impacts on 22.7 million fish larvae per year. Given that feasible alternatives could be implemented to avoid these entrainment impacts entirely, it is not reasonable to rely on a 'reduction' of impacts as a factor in determining the level of significance of new impacts."

Response: Refer to response to City of Carlsbad Comment 1, above. In the Alternatives section of the PSA, staff analyzed a range of alternatives, including those that would not require the use of desalinated ocean water. Because the CECP would not result in impingement and entrainment impacts, selection of an alternative site would not serve to avoid these impacts.

4. City of Carlsbad Comment – Bird Collisions, Flight Path. It is unreasonable and not based in fact to assume that bird flight paths would be typically east-west between the Pacific Ocean and Agua Hedionda Lagoon and not over the EPS. Even if the majority of birds fly east-west between the Pacific Ocean and Agua Hedionda Lagoon, the lagoon is 500 feet from the proposed CECP. This is an inadequate basis upon which to suggest that collision impacts would be avoided.

Response: Staff removed the east-west reference from the FSA and it is not the basis for staff's impact significance determination. Refer to pages 4.2-13 through 4.2-15.

5.City of Carlsbad Comment – Bird Collisions, Cumulative Impacts. The analysis fails to establish a baseline of bird collision impacts associated with the existing EPS. Because the EPS is not being externally altered, the collision impacts associated with EPS would also occur with the proposed CECP. Therefore, bird collision impacts resulting from the CECP should be considered in addition to EPS impacts.

Response: Operation of the existing EPS is considered the baseline for staff's analysis of CECP impacts to biological resources. There are no data available to quantify bird collisions at EPS. The proposed CECP exhaust stacks are significantly shorter than 350 feet (the height above which is considered dangerous to migrating birds), and shorter than the existing built environment (e.g., EPS exhaust stacks), and with implementation of Condition of Certification **VIS-4**, impacts resulting from bird collisions with CECP structures would be less than significant and therefore would not contribute to a cumulatively significant impact when considered with existing avian collision at EPS. Refer to pages 4.2-13 through 4.2-15 of the FSA for additional information on bird collision.

6.City of Carlsbad Comment – Bird Collisions, Condition of Certification BIO-7. The analysis states that Condition of Certification **BIO-7** would reduce collision impacts to less than significant levels. However, this condition requires bird flight diverters on transmission lines, which is unrelated to the impact of bird collisions with CECP structures (buildings).

Response: CLARIFY - Condition of Certification **BIO-7** is intended to mitigate impacts from avian collision with transmission line conductors and over head ground wires. Implementation of Condition of Certification **VIS-4** would minimize bird collision with CECP structures. An expanded analysis of bird collision with CECP structures is presented on pages 4.2-13 through 4.2-15.

7.City of Carlsbad Comment – Bird Collisions, Impact Significance, PSA Recirculation. Bird collisions with buildings are well documented and the CECP may be especially problematic to nocturnal migrant birds. "Due to the proximity of open water

as a bird attractant, the location within a migration corridor, adjacency to native vegetation, and building heights that may extend into the altitude of migrating birds, the CECP could indeed result in significant to migrating or special-status bird species due to an increase in bird strikes." The PSA should be revised and recirculated for public review, "in order to meet the equivalency requirements of CEQA".

Response: An expanded analysis of bird collision with CECP structures is presented on pages 4.2-13 through 4.2-15. However, staff's conclusion that potential impacts would be less-than-significant impact has not changed.

8.City of Carlsbad Comment – Increased Predation by Raptors. The PSA does not analyze the significant indirect impact of increased predation on migratory and special-status birds by raptors, which could result from constructing tall structures (perching opportunities) adjacent to sensitive wetland habitats.

Response: Existing EPS facilities near the proposed CECP that provide opportunities for perching include four 138-kV overheard transmission lines, three 230-kV overhead transmission lines, and several buildings and structures, including three fuel oil tanks currently occupying the proposed CECP site. The proposed CECP transmission lines would generally extend south and away from Agua Hedionda Lagoon. The proposed CECP facilities and transmission structures may provide suitable perching habitat for raptors; however, it is not anticipated that prey mortality rates would increase above current levels or that predator-prey interactions would significantly change thereby affecting local population dynamics.

9.City of Carlsbad Comment – Heating and Air Turbulence. The PSA does not analyze the potential direct or indirect effects to wildlife species from increased air heating or air turbulence created by the CECP.

Response: As described in Appendix TT-1 of the PSA, heated exhaust would be emitted from the HRSG turbine stacks (139 feet tall) and air coolers (22 feet tall). The exhaust temperature would be approximately 363 degrees Fahrenheit immediately above the HRSG turbine stacks; the heat would quickly dissipate above the stack opening. Also, plume velocity from the HRSG turbine stacks would be approximately 67 feet per second (f/s) at the stack opening; the plume velocity would quickly decrease to approximately 26 f/s at 300 feet above ground. The elevated heat and the increased velocity of the CECP plume may temporarily disorient birds that intersect the plume during flight, but it is anticipated that the typical response would be evasion and avoidance of the plume. Avian interaction with increased temperature and velocity within the plume is not anticipated to result in avian mortality or significantly alter migration routes or present a barrier to migration.

As described in the Air Quality section of the FSA, worst-case annual average heat impacts would be approximately 0.012 degrees Fahrenheit increase at any specific location on the ground, which is considered negligible. The maximum 1-hour heat impacts[3] (up to approximately 1.92 degrees Fahrenheit) may occur along hilltops or

[3] The maximum 1-hour heat impact is the maximum temperature increase found to occur at any specific location as averaged over a 1-hour period and modeled with the

ridges to the west-southwest of the project site. This increase in temperature, or other localized temperature increases similar in magnitude caused by the project, would be temporary and infrequent and would not affect wildlife behavior.

10.City of Carlsbad Comment–Night Lighting. There is no analysis to support the conclusion that significant impacts to biological resources from increased lighting would not occur. Artificial lighting at night could illuminate nearby roost and nest sites thereby potentially disrupting breeding patterns and enhancing detection by nocturnal predators. Artificial lighting and glare may also contribute to bird strikes against buildings.

Response: Condition of Certification **VIS-4** and compliance with the Carlsbad Habitat Management Plan would ensure that project lighting would not illuminate the night sky and would be directed away from Agua Hedionda Lagoon. The existing environment is characterized by an elevated ambient level of light from EPS and traffic along interstate 5. Analysis of potential impacts resulting from increased night lighting is presented on page 4.2-16 of the FSA.

Condition of Certification **VIS-4** would require white strobe lighting, which results in far less mortality than steady burning colored and flashing colored lights. Additionally, Condition of Certification **VIS-4** would require lighting be designed so that it does not illuminate the night sky or cause excessive reflected glare. Implementation of this condition would reduce the potential for bird collision with CECP facilities to a less than significant level. Refer to page 4.2-14 for an analysis of lighting and bird collision with CECP facilities.

11.City of Carlsbad Comment–Noteworthy Public Benefits. The public benefit gained by retirement of Units 1 – 3 could be achieved without trading off permanent impacts to 22.7 million fish larva annually, by either locating the facility such that non-ocean water supplies are available, or requiring an alternative design of the facility to avoid the impacts. “Such alternatives were never considered, because the PSA dismisses the CECP’s impacts as insignificant, based on a ‘credit’ assigned to the CECP for discontinuation of existing impacts.”

Response: Refer to responses to City of Carlsbad Comments 1 and 3.

12.Mr. Kerry Seikmann–Heat Impacts. “Has the CEC considered the possible heat impacts to wildlife in the area?”

Response: Refer to response to City of Carlsbad Comment 9.

AERMOD air dispersion model using 3-years (26,304 total hours) of representative coastal surface meteorological data collected from Oceanside. Assumptions used for the heat source modeling were conservative and did not include factors for the merging of the heat plumes that could reduce predicted ground level impacts, did include building and berm downwash assumption that would increase predicted ground level impacts, and used representative and regulatory agency approved meteorological data.

14.Applicant's Comment–Conditions of Certification. Applicant requests revision of Condition of Certification **BIO-8** to provide the Designated Biologist and biological monitor authority to temporarily halt construction while a monitoring plan to avoid potential impacts to migratory birds is developed. Applicant concurs with all other biological resources conditions of certification.

Response: Condition of Certification **BIO-8** (6)(d) allows the Designated Biologist and Biological Monitor to develop and implement a monitoring plan to, among other things, protect nesting birds during project construction and determine under what circumstances project construction would need to be halted. The condition has been modified to provide clarification. Refer to page 4.2-25.

15.Applicant's Comment – Marine Biology, Ocean Water Use. Applicant recommends Staff consider the substantial reduction in ocean water used by EPS. CECP would reduce the specific Units 1-3 maximum cooling water flow by over 98 percent and will reduce the total maximum cooling water flow by over 26 percent. Applicant clarifies that 4.32 MGD will continue regardless of CECP operation, of this 4.32 MGD the CECP will use a maximum of 1.22 MGD for ocean-water purification, but this is not in addition to the flows required for EPS operation.

Response: This clarification is noted and has been incorporated into the FSA. Refer to page 4.2-16.

16.Applicant's Comment–Marine Biology, Brine Discharge. Salinity values of the discharge will not be in violation of the proposed amendments to the Ocean Plan. Salinity concentrations are expected to be 37.8 ppt in the discharge channel, but this only exceeds the strictest proposed standard of 36.5 ppt and does not exceed the more likely standard (10 percent increase over background levels). Salinity levels described in the PEAR are conservative estimates based on 4.32 MDG; dilution is likely to be much greater.

Response: Amendments to the Ocean Plan as proposed in July 2007 (SWRCB 2007) are actively undergoing revisions and may be publically available in late 2009. It is uncertain at this time what the revised standards will be. Implementation of staff's proposed Condition of Certification **Soil&Water-3** would require preparation of a report of water discharge and acquisition of an NPDES permit for operational industrial water discharge, effectively ensuring consistency with LORS pertaining to water quality. It is noted that dilution levels are likely to be greater than those quantified based on 4.32 MGD.

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CULTURAL RESOURCES

Testimony of Dorothy Torres and Beverly Bastian

SUMMARY OF CONCLUSIONS

California Energy Commission staff has determined that the Carlsbad Energy Center Project would not have a significant impact on known significant archaeological resources, historic structures, or ethnographic resources. With the adoption and implementation of the proposed Conditions of Certification, **CUL-1** through **CUL-8**, the Carlsbad Energy Center Project would not have a significant impact on potentially significant archaeological resources that may be discovered during construction.

INTRODUCTION

This cultural resources assessment identifies the potential impacts of the proposed Carlsbad Energy Center Project (CECP) to cultural resources. Cultural resources are defined under state law as buildings, sites, structures, objects, and historic districts. Three kinds of cultural resources are considered in this assessment: prehistoric, historic, and ethnographic.

Prehistoric archaeological resources are those materials relating to prehistoric human occupation and use of an area. These resources may include sites and deposits, structures, artifacts, rock art, trails, and other traces of Native American human behavior. In California, the prehistoric period began over 11,500 years ago and extended through the eighteenth century until 1769, the time when the first Spaniards settled in what is now California.

Historic period resources are those materials, archaeological and architectural, usually associated with Euro-American exploration and settlement of an area and the beginning of a written historical record. They may include archaeological deposits, sites, buildings and structures, travel routes, artifacts, or other evidence of human activity. Under federal and state requirements, historical cultural resources must be more than 50 years old to be considered of potential historical importance. A resource less than 50 years of age may be historically important if the resource is of exceptional significance.

Ethnographic resources are those materials important to the heritage of a particular ethnic or cultural group, such as African Americans, Mexican Americans, or Native Americans, or European, Asian, or Latino immigrants and their descendants. They may include traditional resource-collecting areas, ceremonial sites, topographic features, cemeteries, shrines, or ethnic neighborhoods and structures.

For the proposed CECP, staff provides an overview of the environmental setting and cultural history of the project area, an inventory of the cultural resources identified in the project vicinity, a consideration of the significance of those cultural resources, and an analysis of the effects of possible project impacts on those cultural resources, using significance criteria from the California Environmental Quality Act (CEQA). Where impacts to significant cultural resources, both known and not yet discovered, cannot be avoided, measures to mitigate the adverse effects on or loss of the resources are

proposed. The primary concerns are to ensure that all potential impacts to cultural resources are identified and that conditions are imposed on the project that ensure that any significant impacts are reduced to a less– than– significant level.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Projects licensed by the California Energy Commission (Energy Commission) are reviewed to ensure compliance with all applicable laws, ordinances, regulations, and standards (LORS). For this project, in which there is no federal involvement with respect to cultural resources,[1] the applicable laws are primarily state laws, in particular, CEQA. Although the Energy Commission has pre-emptive authority over local laws, it typically ensures compliance with local laws, ordinances, regulations, standards, plans, and policies.

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

Applicable Law	Description
State	
Public Resources Code, section 21083.2	The lead agency may require reasonable steps to preserve a unique archaeological resource in place. Otherwise, the project applicant is required to fund mitigation measures to the extent prescribed in this section. This section also allows a lead agency to make provisions for archaeological resources unexpectedly encountered during construction, which may require the project applicant to fund mitigation and delay construction in the area of the find (CEQA).
California Code of Regulations, Title 14, section 15064.5, subsections (d), (e), and (f)	Subsection (d) allows the project applicant to develop an agreement with Native Americans on a plan for the disposition of remains from known Native American burials impacted by the project. Subsection (e) requires the landowner [possibly the project applicant] to rebury Native American remains elsewhere on the property if other disposition cannot be negotiated within 24 hours of accidental discovery and required construction stoppage. Subsection (f) directs the lead agency to make provisions for historical or unique archaeological resources that are accidentally discovered during construction, which may require the project applicant to fund mitigation and delay construction in the area of the find (CEQA Guidelines).

[1] Cultural resources are indirectly protected under provisions of the federal Antiquities Act of 1906 (Title 16, United States Code, section 431 et seq.) and subsequent related legislation, policies, and enacting responsibilities, e.g., federal agency regulations and guidelines for implementation of the Antiquities Act.

California Code of Regulations, Title 14, section 15126.4(b)	This section describes options for the lead agency and for the project applicant to arrive at appropriate, reasonable, enforceable mitigation measures for minimizing significant adverse impacts from a project. It prescribes the manner of maintenance, repair, stabilization, restoration, conservation, or reconstruction as mitigation of a project's impact on a historical resource; discusses documentation as a mitigation measure; and advises mitigation through avoidance of damaging effects on any historical resource of an archaeological nature, preferably by preservation in place, or by data recovery through excavation if avoidance or preservation in place is not feasible. Data recovery must be conducted in accordance with an adopted data recovery plan (CEQA Guidelines).
Public Resources Code 5024.1	The California Register of Historical Resources (CRHR) is established and includes: properties determined eligible for the National Register of Historic Places (NRHP) under four criteria (A. events; B. important persons; C. distinctive construction; and D. data); State Historic Landmark No. 770 and subsequent numbered landmarks; points of historical interest recommended for listing by the State Historical Resources Commission; and historical resources, historic districts, and landmarks designated or listed by a city or county under a local ordinance. CRHR eligibility criteria are: (1) events, (2) important persons, (3) distinctive construction, and (4) data.
Public Resources Code 5020.1(h)	*Historic district* means a definable unified geographic entity that possesses a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development.
California Health and Safety Code, Section 7050.5	This code makes it a misdemeanor to disturb or remove human remains found outside a cemetery. This code also requires a project owner to halt construction if human remains are discovered and to contact the county coroner.
Local	
City of Carlsbad, General Plan 2006	The city of Carlsbad General Plan includes a policy to "Protect and conserve natural resources, fragile ecological areas, unique natural assets and historically significant features of the community."

SETTING

REGIONAL SETTING

The project would be located on a coastal plain at the edge of the Peninsular Ranges physiographic province of Southern California. The region is within the geomorphic province of the Peninsular Ranges, which extend into Baja California and are bounded on the east by the Colorado Desert. The project area has experienced a marine regression over 54 million years resulting in a thick sequence of marine and non-marine sedimentary rocks on the seaside terrain. The specific project area is located on a

Pleistocene marine terrace immediately adjacent to Agua Hedionda Lagoon (CECP 2007a, p. 5.3-5).

The CECP project area is located in northern San Diego County in the city of Carlsbad. The project area sits approximately 50 feet above mean sea level and has been heavily disturbed by the construction and operation of the existing power plant, and areas that have not been developed have been graded and landscaped. In addition, fill covers the area at depths from 3 to 9 feet (CH2MHill 2007a, p. 15).

PROJECT, SITE, AND VICINITY DESCRIPTION

The proposed CECP site would be located within the boundaries of the Encina Power Station (EPS) located in the central portion of the city of Carlsbad, adjacent to the Pacific Ocean west of I-5. Carlsbad Boulevard is located west of the project site and the Agua Hedionda Lagoon is located immediately to the north of the site. The existing railroad line, adjacent to the site on the west is used by Coaster, Amtrack, and freight operator Burlington Northern and Sante Fe (2007a, p. 5.12-13). The predominant land uses in the vicinity are industrial, with residential and commercial uses located nearby (CECP 2007a, p. 1-5).

The CECP project would be located on approximately 23 acres of the existing 95-acre EPS. About three acres at the project site would be available during construction for parking and approximately seven acres would be available for construction equipment/material laydown (CECP 2007a, p. 1-5). The proposed project is located in the East Tank Farm, which is the northeastern portion of the EPS property and is presently occupied by existing fuel oil tanks 5, 6, and 7. Prior to construction, the tanks would be removed and soil would be remediated. (CH2MHIl2008a, p. 10-11). Although the East Tank Farm includes tanks 4, 5, 6, and 7, only tanks 5, 6, and 7 would be removed to build the CECP (SR 2008e, p. 2-6). Natural gas has been the primary fuel for EPS since 1984 and tank 4 would remain in service because it provides backup fuel for EPS Units 4 and 5 (SR 2008e, p. 2-6).

The fuel oil tanks were built in the late 1960s and early 1970s to hold fuel oil for the EPS. The tanks are 35 feet high, sit primarily on asphalt, and are enclosed by deep containment berms approximately 25 feet high (CECP 2007a, Appendix 5.3B, p. 17; SR 2008e, p. 2-6). The Cannon Substation is located south of the tanks and was built between 1976 and 1984. The tanks and Cannon Substation are less than 45 years of age and do not appear to be exceptional.

The CECP would demolish tanks 5, 6, and 7. They are surrounded by concrete - coated berms and the footprint of each tank is surrounded by a six-inch layer of gravel. Conveyance piping to the tanks is primarily above ground, but is directed through the berms (SR 2008e, p. 2-7). Several of the proposed removal and remediation activites identified below have the potential to affect unidentified cultural resources.

- Tanks 5, 6, and 7 would be removed as would associated conveyance piping and other appurtenances.

- The oil-impregnated cushion under tanks 5, 6 and 7 would be removed as well as any associated impacted soil.

- The berms that separate tanks 5, 6 and 7 would be removed and one level impound basin would be created.

Cabrillo Power I LLC has submitted a voluntary remediation application to the Department of Environmental Health (DEH). The license issued by the Energy Commission would authorize the tank demolition, but DEH would retain jurisdiction for approval and implementation of the work plan for soil remediation. Prior to beginning soil remediation, a work plan governing the physical removal of the associated piping, foundations, and structures would be submitted to both the DEH and Energy Commission for review (SR 2008q, p. 2-5).

Water conveyance systems proposed at CECP also have potential to impact previously unidentified archaeological resources. The Carlsbad Energy Center LLC has requested that the Energy Commission license two proposed sources of reclaimed water. The originally proposed, reclaimed water system would include a pipeline route and water supply obtained from city of Carlsbad's Recycling Facility including the discharge of industrial wastewater into the city's existing sanitary/industrial sewer. The originally proposed reclaimed water line that would serve CEPC would extend 3,700 feet from the City of Carlsbad Recycling Facility on Avenida Encinas to a tie-in at the CEPC site. Additionally, 1,100 feet of clay pipe would be necessary on the CEPC site to transport the reclaimed water (CECP 2007a, p. 5.15-9).

The second proposed reclaimed water system would be composed of an ocean-water purification system including an existing intake system and industrial wastewater discharge through the existing EPS ocean water discharge system (SR 2008e, p. 1-1). (CECP 2007a, p. 2-2).

Potable water would be supplied by the City of Carlsbad. After pretreatment to reduce biological and physical contaminants, waste water would either be discharged into the City's sewer system (CECP 2007a, p. 5.15-10), or the wastewater would be contained within mobile units at the CECP site. It would then be transported to EPS for disposal into the existing sanitary sewer system that is connected to the Encina Wastewater Authority wastewater treatment plant. An alternate plan for wastewater disposal would be to hire a licensed domestic waste hauler to pump the wastewater from the self contained on-site mobile storage units (SR 2008e, p. 5-47).

A new San Diego Gas and Electric (SDG&E) 230-kV switchyard would be constructed on SDG&E property east of the railroad tracks, west of I-5 and south of the Cannon Substation. (SR 2008e, p. 2-1; SR 2008e, Figure 2.1-1). The new SDG&E substation would ultimately be licensed by the California Public Utilities Commission

Several additional linear facilities would serve the new CECP. Unit 6 would use approximately 2,059 feet of proposed 138kV overhead transmission line interconnection that would connect to the existing Encina Power Station 138 kV switchyard within the boundaries of the existing EPS. The transmission interconnection that serves Unit 7

would include 230 kV line approximately 1,800 feet long including approximately 1,000 feet to be installed underground (SR 2008e, p.3-1). Natural gas would be provided from the existing Southern California Gas Company transmission pipeline immediately adjacent to the CECP site on the west side, parallel to the existing rail line, via a 1,100-foot long interconnection pipeline (CECP 2007a, p.1-3).

PREHISTORIC SETTING

Regional Climatic and Environmental History

The proposed CECP is located along the coast of the Pacific Ocean in northern San Diego County. Generally speaking, the shores of the county are separated from the mountains by low hills and terraces. The vegetation of this region consists primarily of chaparral (Moratto 1984, p. 116). The landscape along the coast is comprised of bays, lagoons, and sandy beaches ending in rocky points. Within and around these bodies of water are mollusks, fish, and waterfowl. The climate of San Diego County is categorized as Mediterranean, which is characterized by relatively hot, dry summers and mild, semiarid winters, with the greatest precipitation occurring in the winter (Felton 1965). Due to the abundance of resources along the coast of San Diego County, prehistoric human populations tended to congregate near its shores (Moratto 1984, p. 117).

Human Occupation in San Diego County

The chronological sequences for California prehistory have been varied and sometimes confusing and are typically regional in nature. For the purposes of this assessment, the chronological sequence for the Southern Bight provided by Byrd and Raab (2007) is employed. The Southern Bight encompasses much of San Diego, Orange, and Santa Barbara counties, as well as western Riverside County and the Channel Islands (Byrd and Raab 2007, p. 215). The sequence in Byrd and Raab (2007, p. 217) is broken down into the Early Holocene (9,600 cal[2] B.C. to 5,600 cal B.C.), Middle Holocene (5,600 cal B.C. to 1,650 cal B.C.), and Late Holocene (1,650 cal B.C. to A.D. cal 1,769). It should be noted that the time frame of the Early Holocene as outlined by Byrd and Raab (2007) also subsumes what has traditionally been regarded as the late (or terminal) Pleistocene, sometimes referred to as the Paleoindian period. To avoid confusion, the designation of “cal B.C.” in Byrd and Raab (2007) is converted to “B.P.” (before present, or years ago) in the following discussion.

Early Holocene (~11,600 to 7,600 B.P.)

Models of California prehistory have traditionally viewed the first inhabitants as Paleoindian big-game hunters who traveled across North America during the terminal phase of the last Ice Age (e.g., Fagan 2003; Moratto 1984; Wallace 1978). Evidence for such an early occupation of southern California is lacking, however, particularly along the coastal areas. There continues to be debate regarding the origins of California’s initial coastal populations, some archaeologists claim that early populations came from the interior of western North America and others argue for a coastal route originating from northeast Asia (e.g., Byrd and Raab 2007; Chatters 2001). The characteristic artifact of this time period is the fluted projectile point form known as the Clovis point.

[2] The abbreviation “cal” stands for calibrated radiocarbon date.

In the desert regions of southern California during this time, cultures responded to the diminishing lacustrine (lake) environments induced by climate change by exploiting a wider array of plants and animals and by moving to more favorable areas, such as the southern California coast (Byrd and Raab 2007, pp. 217–218; also see Gallegos 1991). Similar developments appear to have taken place in San Diego County, such as that seen at the C. W. Harris site, the type site for the San Dieguito Complex (Warren 1968, 1984). Marker artifacts from this complex include leaf-shaped and large-stemmed projectile points (such as Silver Lake and Lake Mojave types), scrapers, engraving tools, crescents, and various other stone tools (Moratto 1984, pp. 97–98).

The San Dieguito Complex is comprised of interior and coastal expressions distributed throughout much of southern California (e.g., Moratto 1984; Wallace 1978; Warren 1967). Sites of this complex have been purported to date between about 11,000 and 8,000 B.P., although few have been securely dated, and most are made up of isolated finds or lithic scatters. Moratto (1984, pp.108–109), classified the coastal San Dieguito Complex as belonging to a Paleo-Coastal Tradition characterized by an absence of milling equipment and a generalized subsistence economy (Erlandson 1994, pp. 44–45).

Subsequent to initial settlement, coastal groups began to focus on marine foods (e.g., shellfish and fish), nuts, and grasses. This later adaptation has been referred to as the Archaic, also known as the La Jolla Complex along coastal San Diego and the Pauma Complex at inland San Diego County sites (e.g., Gallegos 1992; Moratto 1984; True 1958, 1980). Settlements along the San Diego coast during this time consisted of relatively large and semisedentary populations residing near bays and estuaries (see Byrd and Raab 2007, pp. 218–219). Artifacts from these two complexes are similar and include a variety of milling tools, cobble tools, Pinto-like projectile points, and perforated stones (Moratto 1984, p. 147).

Middle Holocene (7,600 to 3,650 B.P.)

The Middle Holocene has been viewed as a time of cultural transition, which is thought to have been largely influenced by environmental factors. Cultural adaptation during this time appears to have been focused on small plant seeds, marine shellfish, and medium to small game. In addition, kelp-bed and nearshore rocky-reef fishing was common (Byrd and Raab 2007, p. 220; Master and Gallegos 1997, pp. 11–12). Lagoon-based resources were important as well, but populations also traversed the river valleys to obtain a variety of inland and coastal resources (e.g., Gallegos 2002; Masters and Gallegos 1997). It has been argued that boats must have been used to fish among the kelp beds, although the only evidence for the use of watercraft is the presence of cobble mortars within the kelp beds, which would have required the use of boats to transport them (Masters and Gallegos 1997, p. 20).

Numerous important Middle Holocene sites along the San Diego coastline have been documented in inland and littoral (ocean coast or river bank) settings (e.g., Byrd and Reddy 2002). Many areas demonstrate occupational continuity from the Middle to the Late Holocene, such as San Diego Bay, Mission Bay, Sorrento Valley, San Elijo Lagoon, Las Flores Creek, and San Mateo Creek (Byrd and Raab 2007, p. 220). Archaeological assemblages from Middle Holocene sites of San Diego have contained

doughnut stones, discoidals, choppers, Elko projectile points and knives, hammerstones, scrapers, cores, worked bone, and a variety of beads (Masters and Gallegos 1997, p. 12).

Within the Middle Holocene was a time known as the Millingstone Horizon, so named because of the abundance of milling implements (especially manos and metates) and the absence of other types of artifacts. Many radiocarbon dates from Millingstone Horizon archaeological components suggest a time span between about 8,000 and 2,000 B.P., although most sites date between about 7,000 and 5,000 B.P., particularly along the coast. There has been some suggestion that the Millingstone Horizon is more ancient on the coast, but that has yet to be verified. In some areas, the Millingstone Horizon appears to have persisted late in time, including San Diego County (Warren 1964, 1968).

Late Holocene (3,650 B.P. to A.D. 1769)

During the Late Holocene, smaller shellfish became the subsistence focus, and settlement patterns suggest widespread shifts in land use. A key aspect of that shift was the development of relatively large residential camps associated with numerous satellite sites concentrated on specialized tasks. Site types during this time included major residential bases, short-term residential camps, and limited activity sites (Byrd and Raab 2007, pp. 223–224). The change in land use patterns over the last 500 years has been viewed as “evidence of a long-term trend toward hunter-gatherer intensification” (Byrd and Reddy 1999, p. 33).

Late Holocene cultural adaptations included maritime activities, residential sedentism, and large-scale trade networks. Greater variation is evident in sociopolitical complexity all along the coast during this time, such as that of the Kumeyaay of southern San Diego County (Byrd and Raab 2007, pp. 225–226). Moreover, archaeological evidence from sites along the coastal regions of Los Angeles, Orange, and San Diego counties during the Late Holocene have demonstrated evidence for a diffusion of elements (such as pottery and cremations), as well as movement of linguistic groups. These changes may have been a result of the migration of interior Shoshonean groups to the coast post-1,500 B.P. (Erlandson 1994, p. 43).

Ethnographic Setting

The location of Agua Hedionda Lagoon and the project area appears to have been a location of fluid boundaries with the Agua Hedionda Lagoon and San Luis Rey Creek functioning as the approximate southern boundary of the Lusieño and the northern boundary of the Ipai. The Ipai are the northern most group of the Kumeyaay who were Hokan speakers. The territorial boundaries of the Takic speaking Luiseño and Hokan speaking Kumeyaay appear to have met at Agua Hedionda Lagoon (Bean and Shipek 1978, p. 551).

The term Luiseño was first applied to the Indian people living at the San Luis Rey Mission during the mid 1800s. The Luiseño language is part of the Cupan group of Takic speakers which belongs to the widespread Uto-Aztecan family (Bean and Shipek 1978, p. 550).

Territory of the Luiseño included an area bounded by Agua Hedionda on the south to near Aliso Creek on the northwest. The boundary to the northeast extends to Santiago Peak and then south to the east and south of Palomar Mountain. From the south of Palomar Mountain the boundary extended west to Agua Hedionda Creek (Bean and Shipek 1978, p. 551).

The Luiseño moved between hills and seashore to exploit seasonal resources (Morotto 1984, p. 119). Acorns were the most important food source gathered by the Luiseño, and they may have located villages close to water to facilitate the practice leaching acorns. Other important seeds included, "…manzanita, sunflower, sage, chia, lemonade berry, wild rose, holly-leaf cherry, prickly pear, lamb's-quarters and pine nuts" (Bean and Shipek 1978, p. 552). The Luiseño used fire at least every third year as a crop-management technique to ensure annual return from some grasses, greens, yucca, and basket grasses. They appear to have utilized food resources located within one day's travel from their village (Bean and Shipek 1978, p.551).

The Spanish referred to the native peoples that were associated with the presidio and mission of San Diego de Alcalá as Diegueño. This term was subsequently replaced with Kumeyaay, which has two divisions: Ipai, which denotes the northern Kumeyaay; and Tipai, which denotes the southern Kumeyaay (Luomala 1978, p. 592; also see Kroeber 1976, p. 710). The Ipai division of the Kumeyaay is likely to have been the specific group within the project area.

Kumeyaay is part of the Yuman language family of the Hokan stock. Based on early historical accounts and mission records, the Kumeyaay population in 1769 was estimated to have been between about 10,000 and 25,000 scattered among perhaps 85 villages (Kroeber 1976; Shipek 1993). The estimate provided by Shipek (1993, p. 386) of 23,000 to 26,000 (in 1769) translates to roughly 6 people per square mile north of the border.

The northern boundary of historic northern Kumeyaay (Ipai) territory is approximately the location of San Luis Rey River and San Felipe Creek to the north. According to Spanish accounts, there was a fluidity of boundaries in the San Luis Rey River and San Felipe Creek areas particularly near the Agua Hedionda Lagoon, which is a short distance from the mouth of the San Luis Rey River (Luomala 1978, p. 593).

Some of the botanical resources important to the prehistoric Kumeyaay included chamise, acorns, agave, yucca, elderberry, wild lilac, and a variety of grasses and seeds (Luomala 1978, pp. 593–594). Major faunal resources for the Kumeyaay included rabbits and hares, deer, fish, mollusks, and shellfish, among others (Luomala 1978, p.p. 600–601). The Kumeyaay often managed their resources by burning in order to return nutrients to the soil, prevent wild fires, destroy plant diseases and insects, and eliminate parasites (such as mistletoe). After burning an area, plant seeds were broadcast over the ashes to enhance the food crop of the following season (Shipek 1993, p. 382). Due to the wide array of wild resources in Kumeyaay territory, agriculture was never practiced. Cremation was a common method of disposal of the dead among the Kumeyaay, after which the ashes were retrieved, placed in a pottery jar, and then buried or hidden under rocks. The clothing of the deceased was retained for the clothes-burning ceremony (Kroeber 1976, p. 716).

The material culture of the Kumeyaay included bedrock mortars to grind various resources (such as seeds) and various forms of pottery and basketry. For their pottery, the Kumeyaay mixed reddish clay was mixed with finely crushed rocks, which it was then coiled, shaped with a stone and wooden paddle, and fired. Cooking pots and water jars were some of the common forms of pottery. Basketry was of a type seen in other parts of southern California and included carrying nets and sacks. Tule balsas (boats) were used in the San Diego Bay (Kroeber 1976, pp. 722–723).

Historic Setting

Although there was contact with Spanish explorers as early as 1542, it is generally accepted that the historic period for San Diego County began in 1769, with the introduction of the Spanish mission known as San Diego de Alcalá, which was originally located on a hill overlooking San Diego Bay. In 1798, Mission San Luis Rey was established several miles north of Agua Hedionda. This mission became the largest of the 21 missions in California, extending over 20 square miles and containing 2,000 Indian residents (CECP 2007a, p. 5.3-9). The establishment of the mission system was the beginning of the Spanish period (1769 to 1822) and the forced acculturation of native peoples in this area. A number of family ranchos were established during this period, although there are few remnants of these early settlements. It is also possible that elements of Spanish period sites and structures were incorporated into later building efforts (Luomala 1978). Ultimately, however, the entry of Spanish missionaries into the coastal region resulted in large-scale destruction of native lifeways.

The Mexican period (1822 to 1848) followed the Spanish period as Mexico gained its independence from Spain (Castillo 1978). It was during this time that land began to be granted to private citizens and the missions became secularized. A number of ranchos between the coast and the mountains of San Diego County included vast landholdings upon which cattle and sheep were grazed. Natural valleys and slopes were used as open range for livestock well into the subsequent American period. Political responsibility for the region was transferred to the United States with the signing of the Treaty of Guadalupe Hidalgo on February 2, 1848 (Castillo 1978, pp. 104–107). Despite these changes, the economic and demographic makeup of the San Diego area remained virtually unchanged until sometime after California became a state on September 9, 1850.

During the subsequent American period, which began in 1848, a growing number of farms appeared along with the cattle and sheep ranches (Castillo 1978). As a result, a rural community pattern emerged that continued until about 1930. This pattern consisted of communities made up of population aggregates that lived within well-defined geographic boundaries. The population lived on farmsteads, tied together by a common school district, church, post office, and country store. These farmsteads and dispersed farming communities gave way to horse ranches, dairies, and nurseries, which in turn were replaced by the establishment of the roadside service complex, which was linked by state and federal roadways.
The community of Carlsbad was named for the popular 19th century Karlsbad Spa in Europe. The first mention of Carlsbad in historical documents was in 1769, when a party

of Spanish explorers, led by Don Gaspar de Portolà, arrived in Alta California to claim the territory for the King of Spain. The Carlsbad depot was built in 1887 by the Arizona Eastern Railway. The depot also served as a telegraph office, post office, Wells Fargo Express office, and general store. In 1905, it was purchased by the Atchison, Topeka and Santa Fe Railroad, when it became a shipping point for locally grown fruits, vegetables, and flowers. Closed in 1960, the building was deeded to the city. It now serves as the Tourist Information Center to provide information and assistance to the many tourists who visit Carlsbad (CECP 2007a, p. 5.3-9).

Inventory of Cultural Resources

Methods: Records Search, Background Research, and Native American Contacts

In July 2007, the CECP requested that staff of the California Historical Resources Information System (CHRIS) South Coastal Information Center (SCIC) conduct a file search for the CECP using a definition of a one-mile radius around the project site and associated laydown areas and at least a quarter-mile radius around the linear facilities. According to the data available in the CHRIS files, 61 previous cultural resource surveys have been conducted within the project area. In addition, there have been 35 previously recorded resources within one mile of the project area (CECP 2007a, pp. 5.3-9 to 5.3-12).

Two of the previously recorded 35 cultural resources identified within one mile of the project site were historic, built environment resources. The other 33 of the previously recorded cultural resources were prehistoric sites or isolates. None of these resources fall within the project footprint, except site CA-SDI-6751 and it is likely that CA-SDI-6751 has been previously destroyed by grading activity. Sites 6831 and 16885 are located close to the proposed CECP site. Other previously recorded archaeological resources are located well outside the CECP project boundaries, and it does not appear that the project would have an effect on them (CECP 2007a, 5.3-13—5.3-14).

JRP Historical Consulting (JRP) conducted a literature search at several libraries and contacted five historical societies, the City of Carlsbad Planning Department, and the San Diego County's Local Register of Historical Resources. JRP reviewed historic resources listed by Ordinance 9493, San Diego County Administrative Code section 396.7 were reviewed by JRP to determine the location of any historic resources listed by local ordinance that might be impacted by the CECP (CECP 2007a, Appendix 5.3B). Two historic resources within the city of Carlsbad were listed by County ordinance (CECP 2007a, Confidential Filing).

Historic resources more than 45 years old within one mile of the project boundaries were identified during the CHRIS search or the additional research conducted by JRP. The Historic Property Data File maintained by San Diego County listed the Carlsbad Santa Fe Depot and a residence at 519 Chinquapin Avenue. The Carlsbad Santa Fe Depot at 400 Carlsbad Village Drive is listed on the National Register of Historic Places (NRHP) and is located approximately one mile north of the project site (CECP 2007a, Appendix 5.3B).The residence at 519 Chinquapin Avenue is listed by the Historic Property Data File for San Diego County. It is located approximately one block from proposed project boundaries. The residence was evaluated through the federal Section

106 process and was determined not eligible for the NRHP. The residence has not been evaluated for local listing or for listing on the California Register of Historical Resources (CRHR) (CECP 2007a Confidential Filing).

On June 19, 2007, the applicant submitted a request to the Native American Heritage Commission (NAHC) to conduct a Sacred Lands file search for locations of heritage importance or religious significance in the project area. The NAHC responded on June 21, 2007, with a list of Native Americans with heritage concerns in the vicinity of the project. CECP sent letters to Native American groups and individuals on June 22, 2007, asking for information regarding Native American concerns in the proposed project area. As of August 30, 2007, CECP had received no responses (CECP 2007a, p. 5.3-17).

The NAHC records search of the Sacred Lands files did not indicate the presence of Native American heritage sites or places of religious significance in the immediate project area. The records search conducted at the CHRIS for the CECP also failed to indicate the presence of Native American traditional cultural properties (CECP 2007a, 5.3-17).

Staff also requested a list of Native Americans in the proposed project area from the NAHC and sent letters to Native American groups and individuals on December 12, 2007, asking for information regarding Native American concerns in the proposed project area.

The San Luis Rey Band of Mission Indians responded to staff's inquiry, with a letter dated February 1, 2008. The Band expressed concern that unique and irreplaceable resources would be affected by the project. They provided a list of procedures that they feel would protect the resources including Native American monitoring during all ground disturbance (Romo 2008 p. 1-3).

Methods: Field Survey

On July 10, 2007, archaeologist Clint Helton of CH2M HIll conducted a cultural resources survey on behalf of the proposed CECP of portions of the site that were accessible (not covered by structures) using 10-meter parallel transects. This survey encompassed the CECP site, the laydown areas, and the off-site reclaimed water line alignment. The CECP would be located entirely within the existing Encina Power Station property, which was constructed in the early1950s. Previous geotechnical evaluations within the Encina Power Station boundaries, but not within the actual project location, verified the presence of fill to a depth of 3 to 9 feet (CECP 2007a, p. 5.3-14 and CH2MHIl 2007a, p. 15).

Mr. Helton surveyed up to a 200-foot buffer around the project area, stopping at the ATSF/BNSF railroad right-of-way. In addition, a 50-foot buffer on the east side of the railroad following the reclaimed water line alignment south to Cannon Road was surveyed. Ground visibility during the survey was good and the area had been heavily graveled and graded. No prehistoric resources were observed as a result of the survey (CECP 2007a, Confidential Report, p. 3).

On October 1, 2008, archaeologist Gloriella Cardenas of CH2MHill conducted a pedestrian survey of the proposed 230 kV switchyard site and 230 kV transmission interconnection route. The survey area included a 200 foot buffer around the proposed switchyard and transmission interconnection route. The proposed switchyard site would be located within an existing SDG&E parcel of land that includes the existing Cannon Substation. The proposed site has been previously graded and some areas have been leveled and other have been filled and the proposed transmission interconnection route has also been previously disturbed (SR 2008q, Technical Memorandum, p. 1).

JRP conducted an architectural field survey to assess the potential for historic architectural resources at the proposed project location. JRP examined the Encina Power Station, including the CECP site and adjacent parcels no less than one parcel from the plant boundaries (CECP 2007a, p. 5.3-15). The architectural study area considered the location of tanks 5, 6, and 7 where the proposed CECP project would be constructed after tank removal, the Cannon Substation, and a segment of the former Atchison, Topeka and Santa Fe Railway's "Surfline," now owned by North San Diego County Transit District (CECP 2007a, p. 5.3-15).

The results of the architectural survey indicated that the study area is primarily industrial, but that a modern hotel, restaurant, and gas station complex is located immediately to the south. In addition, agricultural fields are located east of the freeway, and a modern residential area is located south of Cannon Road, outside the study area (CECP 2007, p. 5.3-15).

Results: Prehistoric and Historic Archaeological Resources Identified and Evaluated for Historical Significance

The archival research as well as archaeological field surveys failed to locate or reestablish the presence of any significant archaeological sites or areas of heritage concern or areas of religious significance within the CECP project boundaries or survey area. Three archaeological sites are located near the CECP site, the presence of one site that would fall within the project footprint, could not be reconfirmed. All others fall outside the project footprint. In summary, there are 35 previously recorded cultural resources within one mile of the project. All but two of these previously recorded resources are prehistoric sites or isolates (CECP 2007a, p. 5.3-13).

Nevertheless, while significant archaeological and historical sites were not discovered during the field surveys for the CECP, since numerous archaeological sites were previously recorded nearby, it is possible that subsurface construction could encounter buried archaeological deposits. As such, the CECP proposes measures to mitigate any potential adverse impacts that could occur due to any inadvertent discoveries of buried cultural resources. For example, the CECP has proposed environmental sensitivity training for workers and monitoring for disturbances in native soil.

Results: Historic Structures Identified and Evaluated for Historical Significance

The applicant identified three historic structures within the project area from the records search and the field survey. The structure identified and recorded via the field survey is the Atchison, Topeka and Santa Fe Railway's Surfline. It is a length of rail line that runs

through the Encina Power Station west of the CECP. This rail line is part of the former Atchison, Topeka and Santa Fe Railway's Surfline, now owned by North San Diego County Transit District. The track was originally built in 1882, but realigned in 1906 and is now used as a commuter and freight line. JRP evaluated this segment of the rail line on behalf of CECP. According to CEPC, this resource does not appear to meet the criteria for listing in the NRHP, CRHR, or the San Diego County Register of Historical Resources as it lacks integrity of design, setting, materials, workmanship, feeling, and association for the potential period of significance of 1882. Moreover, continued development along the route has impacted the integrity of the line; as such, little remains of the 1882 track except the location (CECP 2007a, Appendix 5.3B, p. 19).

The Carlsbad Sante Fe Depot was built in 1887 by the Arizona Eastern Railway, burned and was rebuilt in 1907, and is listed on the National Register of Historic Places (NRHP). The Depot is located at 400 Elm Avenue (now 400 Carlsbad Village Drive) and was constructed in the Gothic Revival Style of wood, weatherboard, and shingles. The Depot now serves as a visitor's center (Carlsbad 2008), (Santa Fe 2008).

Results: Ethnographic Resources Identified and Evaluated for Historical Significance

As noted above, CEPC contacted the NAHC by letter on June 19, 2007, to request information about traditional cultural properties or sacred lands in and around the project area. The NAHC responded on June 21, 2007, indicating that there were no such properties within the project area. The records search conducted at the CHRIS also did not indicate the presence of Native American traditional cultural properties (CECP 2007a, p. 5.3-17).

On June 22, 2007, CECP sent letters (with a map of the project area) to 12 Native American individuals or groups that the NAHC had identified as having concerns about heritage resources or areas of religious significance in San Diego County. CECP had not received any responses as of July 20, 2007. Staff also requested from the NAHC a list of Native Americans in the proposed project area. Staff sent letters to Native American groups and individuals on December 12, 2007, asking for information regarding Native American concerns in the proposed project area. One response was received on June 20, 2008. Although no specific areas of heritage or religious significance have been identified, the San Luis Rey Band of Mission Indians in their response of February 1, 2008, has expressed concern regarding the sensitivity of the project location. The band has requested that all ground disturbance be monitored and has stated that they plan to ensure that the requirements of CEQA and Senate Bill 18 (Burton, Chapter 905, Statutes of 2004) are rigorously applied.

The law cited above and generally referred to as SB18, states that Cities and Counties are required by statute to consult with Native American tribes as part of the General Plan Amendment process in accordance with General Plan Guidelines. Senate Bill 18, (Chapter 905, Statutes 2004) effective January 1, 2005, requires local governments to consult with tribes prior to making certain planning decisions, and to provide notice to tribes at certain key points in the planning process. These consultation and notice requirements apply to adoption and amendment of general plans and specific plans. The Governor's Office of Planning and Research has prepared "Tribal Consultation

Guidelines," dated November 14, 2005, as a supplement to General Plan Guidelines. The Tribal Consultation Guidelines are available online at [http://www.opr.ca.gov/SB182004.html].

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

Various laws apply to the evaluation and treatment of cultural resources. CEQA requires the Energy Commission to evaluate resources by determining whether they meet several sets of specified criteria. These evaluations then influence the analysis of potential impacts to the resources and the mitigation that may be required to ameliorate any such impacts.

The CEQA Guidelines provide a definition of a historical resource as a "resource listed in, or determined to be eligible by the State Historical Resources Commission, for listing in the CRHR," or "a resource listed in a local register of historical resources or identified as significant in a historical resource survey meeting the requirements of Section 5024.1 (g) of the Public Resources Code," or "any object, building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California, provided the agency's determination is supported by substantial evidence in light of the whole record" (California Code of Regulations, Title 14, § 15064.5 [a]). Historical resources that are automatically listed in the CRHR include California historical resources listed in or formally determined as eligible for the National Register of Historic Places (NRHP) and California Registered Historical Landmarks from No. 770 onward (Public Resources Code, § 5024.1[d]).

Under the CEQA Guidelines, a resource is generally considered to be historically significant if it meets the criteria for listing in the CRHR. These criteria are essentially the same as the eligibility criteria for the NRHP. In addition to being at least 50 years old,[3] a resource must meet at least one of the following four criteria: is associated with events that have made a significant contribution to the broad patterns of our history (Criterion 1); or, is associated with the lives of persons significant in our past (Criterion 2); or, that embodies the distinctive characteristics of a type, period, or method of construction, or represents the work of a master, or possesses high artistic values (Criterion 3); or, that has yielded, or may be likely to yield, information important to history or prehistory (Criterion 4) (Public Resources Code § 5024.1). In addition, historical resources must also possess integrity of location, design, setting, materials, workmanship, feeling, and association (California Code of Regulations, Title 14, § 4852[c]).

Even if a resource is not listed or determined to be eligible for listing in the CRHR, CEQA allows the lead agency to make a determination as to whether the resource is a historical resource as defined in Public Resources Code sections 5020.1(j) or 5024.1.

[3] The Office of Historic Preservation's *Instructions for Recording Historical Resources* (1995) endorses recording and evaluating resources more than 45 years of age to accommodate a five-year lag in the planning process.

Whether a proposed project would cause a substantial adverse change in the significance of historical resources is the issue that staff analyzes to determine if the project may have a significant effect on the environment.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Direct impacts to cultural resources are those associated with project development, construction, and coexistence. Construction usually entails surface and subsurface disturbance of the ground, and direct impacts to archaeological resources may result from the immediate disturbance of the deposits, whether from vegetation removal, vehicle travel over the surface, earth-moving activities, excavation, or demolition of overlying structures. Construction can have direct impacts on historic standing structures when those structures must be removed to make way for new structures or when the vibrations of construction impair the stability of historic structures nearby. New structures can have direct impacts on historic structures when the new structures are stylistically incompatible with their neighbors and the setting, and when the new structures produce something harmful to the materials or structural integrity of the historic structures, such as emissions or vibrations.

Generally speaking, indirect impacts to archaeological resources are those that may result from increased erosion due to site clearance and preparation, or from inadvertent damage or outright vandalism to exposed resource components due to improved accessibility. Similarly, historic structures can suffer indirect impacts when project construction creates improved accessibility, and vandalism and/or greater weather exposure become possible.

Ground disturbance, including tank removal and soil remediation, accompanying construction at the proposed plant site and along the associated linear facilities has the potential to directly impact archaeological resources, unidentified at this time. The potential direct, physical impacts of the proposed construction on unknown archaeological resources are commensurate with the extent of ground disturbance entailed in the particular mode of construction. This varies with each component of the proposed project. Placing the proposed plant into this particular setting could have a direct impact on the integrity of association, setting, and feeling of nearby standing historic structures.

Construction Impacts and Mitigation

Direct Impacts on Previously Unknown Archaeological Resources and Proposed Mitigation

Staff agrees with CECP that, the presence of archaeological resources within the proposed project footprint has not been reconfirmed by archaeological surveys. Consequently, no project-related construction impacts from the CECP to known archaeological resources have been identified, and no mitigation would be required for known archaeological resources.

Because the proposed project development and construction generally would require subsurface disturbance in the project area, which is likely to have been utilized during prehistoric and historic times, staff must consider the possibility that the proposed CECP has the potential to adversely affect as-yet unknown archaeological resources if excavation exceeds the depth of the fill, which varies from 3 to 9 feet in various project locations.

Removal of fuel oil tanks 5, 6, and 7 would include the use of mechanical equipment including cranes, small excavators, bobcats, and front-end loaders. The fuel oil tanks are located in an area that was originally over-excavated and covered with artificial fill. Soil remediation would occur to a depth of approximately one foot (CH2MHill 2008a, p. 11). The AFC states on page 5.3-5 that the location of the tanks was excavated down to bedrock. Cultural resources reports, completed for work within other areas of the project boundaries and provided under confidential cover, appear to disagree and discuss the potential for discovery of archaeological material if native soil is encountered under the tanks (CECP 2007a, Confidential Filing, Appendix 5.3C, Part 1). Although the area has been over-excavated and compacted and has had fill applied over the surface and since measurements of the level of fill in the tank farm area vary, the potential exists for heavy equipment to impact archaeological deposits, if the tank removal or soil remediation extends into native soil. Staff has requested and CECP has agreed in Data Response 2, to provide additional information regarding geotechnical boring and boring cores (CH2MHill 2008a, p.10).

The proposed site of the SDG&E switchyard would be graded to a depth of 1 to 2 feet, and if necessary, soil would be removed and fill soil would be added. Ground disturbance for the 230kV interconnection, extending from proposed Unit 7 to the proposed SDG&E switchyard, would include excavation for power ducts that would be 10 to 12 feet deep and 3 to 4 feet wide (SR2008q, Data Responses, Set 3A p.2).

As noted above, it is possible that prehistoric and historic archaeological deposits could be encountered during construction. If any newly found resources are eligible for the CRHR, the direct impacts from construction could materially impair the resources. Appropriate mitigation measures, such as avoidance or assessment and data recovery, must be implemented to reduce that impact to less than significant. In recognition of this possibility, CEQA directs a lead agency to make provisions for archaeological resources unexpectedly encountered during construction (Public Resources Code, section 21083.2; California Code of Regulations, Title 14, sections 15064.5[f] and 15126.4[b]).

Many of the CECP's proposed treatment procedures for newly discovered archaeological resources have been incorporated into staff's proposed measures for identifying, evaluating, and possibly mitigating impacts to previously unknown archaeological resources discovered during construction (see "Proposed Conditions of Certification" **CUL-1** through **CUL-8** below).

CECP has recommended that a Cultural Resources Specialist be available to oversee cultural resources activities if native soil is identified. Staff proposes having an archaeologist monitor all construction activities entailing ground disturbance, including tank removal and soil remediation, that may extend into native soil, and, in addition, that a Native American join the archaeologist in monitoring construction activities where any

prehistoric cultural resources have been discovered. Staff's cultural resources conditions of certification have provisions for limiting or discontinuing monitoring if circumstances change.

CECP has also proposed a construction worker sensitivity training program to ensure implementation of procedures to follow in the event that cultural resources are discovered during construction. Additional mitigation measures proposed by CECP include procedures to mitigate an inadvertent discovery, site recordation and evaluation, and a report of findings at the conclusion of the project (CECP 2007a, pp. 5.3-20 to 5.3-21).

Staff recommends monitoring in locations where native soil may be encountered at the project site and full-time monitoring during ground disturbance, including tank removal and soil remediation. Staff asserts that providing archaeological monitoring is warranted for locations where ground disturbance, including tank removal and soil remediation, may extend into native soil because the area has a long history of human utilization, including both prehistoric and historic period occupations. The past ecology of the area would have made it attractive to Native Americans, and the geology would have contributed to the burial of prehistoric deposits. Staff has requested that CECP ensure that a qualified archaeologist examine the cores of any geotechnical borings to determine whether any cultural material can be identified. If geotechnical borings are conducted in the future, CECP has agree that boring cores would be examined by a qualified archaeologist and a report of the results provided to staff. This information may allow staff and CECP to refine the proposed monitoring program.

Staff also contends that at a minimum a modified Cultural Resources Monitoring and Mitigation Plan is essential to have the necessary theoretical framework ready to address an unexpected discovery without causing undue delay to the project.

CECP proposes to mitigate any impacts from the inadvertent discovery of Native American human remains by following state law (CECP 2007a, p. 5.3-21). Staff agrees with this recommendation.

Staff has added Condition of Certification **CUL-8** to allow the CECP flexibility when it chooses borrow or disposal sites to obtain fill soil or to dispose of remediated or unnecessary soil. Cultural resources surveys are only necessary, if CECP chooses to use a private borrow or disposal location. Commercial sites have already had appropriate cultural resources work conducted so there is no need to write a condition that applies to use of commercial sites.

Direct Impacts on Historic Structures and Proposed Mitigation

Historical Buildings

The historical Carlsbad Santa Fe Depot located at 400 Carlsbad Village Drive (Previously 400 Elm Drive) is listed on the NRHP. It is located almost one mile from the proposed project location with numerous modern structures between the Historic Depot and the proposed project. Another address that exceeds 50 years of age appears to be a private residence located at 519 Chinquapin Avenue. It has been listed by San Diego

County as not eligible for the NRHP, but not evaluated for eligibility for either the CRHR or local listing. Although this building is within one block of the proposed project, there is considerable modern development located between the building and the proposed project (CECP 2007, Confidential Filing, Appendix 5.3C, Part 1).

Historical Railroads

The Atchison, Topeka and Santa Fe Railway's "Surfline," (built by the closely affiliated California Southern Railroad) borders the project on the west side. The proposed project would not demolish or connect to the railroad. The most recent track replacement occurred in 1989 and 1990 and the segment has been previously realigned. Numerous modern buildings and structures have already affected the setting of the railroad. Therefore, there would not be any physical alteration of the railroad or an impact to the setting of the railroad. Since there is considerable modern development in this location and the railway segment in the project area has been considerably altered through time, there would be no impact to the "Surfline" by the construction of the CECP project. In summary, no impact to the integrity of setting, the integrity of association, or the integrity of feeling of any historic structures in the area surrounding the proposed CECP would result from the proposed project.

Direct Impacts on Ethnographic Resources and Proposed Mitigation

No ethnographic resources, either previously recorded or newly disclosed in the communications with Native Americans initiated by CECP or by the Energy Commission for the proposed project, were identified in the vicinity of the project.

Indirect Impacts

Neither the applicant nor staff identified any indirect impacts to cultural resources in the impact area of the proposed project; thus, no mitigation of indirect CECP impacts would be required for any class of cultural resources.

Operation Impacts and Mitigation

During operation of the proposed power plant, if a leak should develop in the gas or water pipelines supplying the plant, repair of the buried utility could require the excavation of a large hole. Such repairs could impact previously unknown subsurface archaeological resources in areas unaffected by the original trench excavation. The conditions of certification proposed for mitigating impacts to previously unknown archaeological resources during ground disturbance, including tank removal and soil remediation, construction of the plant and linear facilities would also serve to mitigate impacts from repairs occurring during plant operation.

Cumulative Impacts and Mitigation

A cumulative impact refers to a proposed project's incremental effect together with other closely related past, present, and reasonably foreseeable future projects whose impacts may compound or increase the incremental effect of the proposed project (Public Resources Code § 21083; California Code of Regulations, Title 14, §§ 15064[h], 15065[c], 15130, and 15355). The construction of other projects in the same vicinity as the proposed project could affect unknown subsurface archaeological deposits (both prehistoric and historic).

With the assistance of the city of Carlsbad, CECP provided a list and description of proposed projects that appear to be primarily located within 0.5 mile of its own proposed project (CECP 2007a, p. 5.6-36). Most of these eight projects would include a considerable amount of ground disturbance. Proponents for future projects in the CECP area can mitigate impacts to as-yet-undiscovered subsurface archaeological deposits to less than significant by implementing mitigation measures requiring construction monitoring, evaluation of resources discovered during monitoring, and avoidance or data recovery for resources evaluated as significant (eligible for the CRHR or NRHP). Staff's proposed conditions of certification would ensure that the proposed project's incremental effect would not be cumulatively considerable.

COMPLIANCE WITH APPLICABLE LORS

If the conditions of certification, below, are properly implemented, the proposed CECP would result in a less-than-significant impact on newly found cultural resources or on any known resources that may be impacted in a previously unanticipated manner. The project would, therefore, be in compliance with CEQA and the other applicable state and local laws, ordinances, regulations, and standards.

Staff's conditions of certification require specific actions not just to promote, but to effect historic preservation and mitigate impacts to all cultural resources to ensure CEQA compliance. Consequently, if the proposed CECP implements these conditions, its actions would be consistent with the cultural resources preservation policies of San Diego County.

APPLICANT AND PUBLIC COMMENTS

There were no comments received from the Applicant or the public regarding the Cultural Resources Preliminary Staff Assessment.

CONCLUSIONS AND RECOMMENDATIONS

Staff has determined that the CECP would not have a significant impact on known significant archaeological resources, historic structures, or ethnographic resources. With the adoption and implementation of the proposed Conditions of Certification **CUL-1** through **CUL-8,** the CECP would not have a significant impact on potentially significant archaeological resources that may be discovered during construction.
Staff recommends that the Energy Commission adopt the following proposed cultural resources Conditions of Certification **CUL-1** through **CUL-8**. These conditions are intended to facilitate the identification and assessment of previously unknown archaeological resources encountered during construction and to mitigate any significant project impacts on any newly found resources assessed as significant and on any known resources that may be affected by the project in an unanticipated manner. To accomplish this, the conditions provide for:

- the hiring of a Cultural Resources Specialist, Cultural Resources Monitors, and Cultural Resources Technical Specialists;
- the archaeological and Native American (if needed) monitoring of ground-disturbing activities;
- the recovery of significant data from discovered archaeological deposits;
- the writing of a technical archaeological report on monitoring activities and findings;
- the curation of recovered artifacts and associated notes, records, and reports; and
- cultural resources surveys, if CECP chooses to use a private soil borrow or disposal site rather than a commercial one.

When properly implemented, staff believes that these conditions of certification would mitigate any impacts to unknown significant archaeological resources newly discovered in the project impact areas to a less than significant level.

PROPOSED CONDITIONS OF CERTIFICATION

CUL-1 Prior to the start of ground disturbance,[4] including tank removal and soil remediation, the project owner shall obtain the services of a Cultural Resources Specialist (CRS) and one or more alternates, if alternates are needed. The CRS shall manage all monitoring, mitigation, curation, and reporting activities required in accordance with the Conditions of Certification (Conditions). The CRS may elect to obtain the services of Cultural Resources Monitors (CRMs) and other technical specialists, if needed, to assist in monitoring, mitigation, and curation activities. The project owner shall ensure that the CRS makes recommendations regarding the eligibility for listing in the California Register of Historical Resources (CRHR) of any cultural resources that are newly discovered or that may be affected in an unanticipated manner (discovery). No ground disturbance, including tank removal and soil remediation, shall occur prior to CPM approval of the CRS, unless specifically approved by the CPM. Approval of a CRS may be denied or revoked for non-compliance on this project.

CULTURAL RESOURCES SPECIALIST

The resumes for the CRS and alternate(s) shall include information demonstrating to the satisfaction of the CPM that their training and backgrounds conform to the U.S. Secretary of Interior's Professional Qualifications Standards, as published in the Code of Federal Regulations, 36 CFR Part 61. In addition, the CRS shall have the following qualifications:

1. The CRS's qualifications shall be appropriate to the needs of the project and shall include a background in anthropology, archaeology, history, architectural history, or a related field; and

[4] "Ground disturbance" includes "preconstruction site mobilization"; "construction ground disturbance"; and "construction grading, boring and trenching," as defined in the General Conditions for this project.

2. At least three years of archaeological or historic, as appropriate, resources mitigation and field experience in California.

3. At least one year of experience in a decision-making capacity on cultural resources projects in California and the appropriate training and experience to knowledgably make recommendations regarding the significance of cultural resources.

The resumes of the CRS and alternate CRS shall include the names and telephone numbers of contacts familiar with the work of the CRS/alternate CRS on referenced projects and demonstrate to the satisfaction of the CPM that the CRS has the appropriate education and experience to accomplish the cultural resource tasks that must be addressed during ground disturbance, including tank removal and soil remediation.

CULTURAL RESOURCES MONITORS

CRMs shall have the following qualifications:

1. a BS or BA degree in anthropology, archaeology, historical archaeology or a related field and one year's experience monitoring in California; or

2. an AS or AA degree in anthropology, archaeology, historical archaeology, or a related field, and four years experience monitoring in California; or

3. enrollment in upper division classes pursuing a degree in the fields of anthropology, archaeology, historical archaeology, or a related field, and two years of monitoring experience in California.

4. CRMs assigned to monitor during tank removal and soil remediation shall hold an appropriate hazardous waste operations training certificate(s).

CULTURAL RESOURCES TECHNICAL SPECIALISTS

The resume(s) of any additional technical specialists, e.g., historical archaeologist, historian, architectural historian, and/or physical anthropologist, shall be submitted to the CPM for approval.

Verification:

1. At least 45 days prior to the start of ground disturbance, including tank removal and soil remediation, the project owner shall submit the resume for the CRS, and alternate(s) if desired, to the CPM for review and approval.

2. At least 10 days prior to a termination or release of the CRS, or within 10 days after the resignation of a CRS, the project owner shall submit the resume of the proposed new CRS to the CPM for review and approval. At the same time, the project owner shall also provide to the approved new CRS the AFC and all cultural documents, field notes, photographs, and other cultural materials generated by the project.

3. At least 20 days prior to ground disturbance, including tank removal and soil remediation, 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. CRMs possessing current hazardous waste operations certificates shall be identified. If additional CRMs are obtained during the project, the CRS shall provide additional letters to the CPM identifying the CRMs and attesting to the qualifications of the CRMs, at least five days prior to the CRMs beginning on-site duties.

4. At least 10 days prior to beginning tasks, the resume(s) of any additional technical specialists shall be provided to the CPM for review and approval.

5. At least 10 days prior to the start of ground disturbance, including tank removal and soil remediation, the project owner shall confirm in writing to the CPM that the approved CRS will be available for on-site work and is prepared to implement the Cultural Resources Conditions.

CUL-2 Prior to the start of ground disturbance, including tank removal and soil remediation, if the CRS has not previously worked on the project, the project owner shall provide the CRS with copies of the Application for Certification (AFC), data responses, and confidential cultural resources reports for the project. The project owner shall also provide the CRS and the CPM with maps and drawings showing the footprint of the power plant, all linear facilities, access roads and laydown areas. Maps shall include the appropriate U.S. Geological Survey quadrangles and a map at an appropriate scale (e.g., 1:2000 or 1 inch = 200 feet') for plotting cultural features or materials. If the CRS requests enlargements or strip maps for linear facility routes, the project owner shall provide copies to the CRS and CPM. The CPM shall review submittals and, in consultation with the CRS, approve those that are appropriate for use in cultural resources planning activities.

No ground disturbance, including tank removal and soil remediation, shall occur prior to CPM approval of maps and drawings, unless specifically approved by the CPM.

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

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

The project owner shall notify the CRS and CPM of any changes to the scheduling of the construction phases.

Verification:

1. At least 40 days prior to the start of ground disturbance, including tank removal and soil remediation, the project owner shall provide the AFC, data responses, and confidential cultural resources documents to the CRS, if needed, and the subject maps and drawings to the CRS and CPM. The CPM will review submittals in consultation with the CRS and approve maps and drawings suitable for cultural resources planning activities.

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

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

4. On a weekly basis during ground disturbance, including tank removal and soil remediation, a current schedule of anticipated project activity shall be provided to the CRS and CPM by letter, email, or fax.

5. Within 5 days of identifying changes, the project owner shall provide written notice of any changes to scheduling of construction phase.

CUL-3 Prior to the start of ground disturbance, including tank removal and soil remediation, 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 CRMMP shall be provided in the Archaeological Resource Management Report (ARMR) format, and, per ARMR guidelines, the author's name shall appear on the title page of the CRMMP. The CRMMP shall identify general and specific measures to minimize potential impacts to sensitive cultural resources. Implementation of the CRMMP shall be the responsibility of the CRS and the project owner. Copies of the CRMMP shall reside with the CRS, alternate CRS, each monitor, and the project owner's on-site construction manager. No ground disturbance, including tank removal and soil remediation, shall occur prior to CPM approval of the CRMMP, unless specifically approved by the CPM.

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

1. a proposed general research design that includes a discussion of archaeological research questions and testable hypotheses specifically applicable to the project area, and a discussion of artifact collection, retention/disposal, and curation policies as related to the research questions formulated in the research design. A prescriptive treatment plan may be included in the CRMMP for limited resource types. A refined research design will be prepared for any resource where data recovery is required.
2. the following statement included in the Introduction: "Any discussion, summary, or paraphrasing of the Conditions in this CRMMP is intended as general guidance and as an aid to the user in understanding the Conditions and their implementation. The Conditions, as written in the Commission Decision, shall supersede any

summarization, description, or interpretation of the Conditions in the CRMMP. The Cultural Resources Conditions of Certification from the Commission Decision are contained in Appendix A."

3. identification of the person(s) expected to perform each of the tasks, his or her responsibilities, and the reporting relationships between project construction management and the mitigation and monitoring team.

4. a description of the manner in which Native American observers or monitors will be included, the procedures to be used to select them, and their role and responsibilities.

5. a statement that all cultural resources encountered shall be recorded on a Department of Parks and Recreation (DPR) form 523 and mapped and photographed. In addition, all archaeological materials retained as a result of the archaeological investigations (survey, testing, data recovery) shall be curated in accordance with the California State Historical Resources Commission's *Guidelines for the Curation of Archaeological Collections*, into a retrievable storage collection in a public repository or museum.

6. a statement that the project owner will pay all curation fees and a copy of an agreement with, or other written commitment from, a curation facility to accept artifacts from this project. Any agreements concerning curation will be retained and available for audit for the life of the project.

7. a statement that the CRS has access to equipment and supplies necessary for site mapping, photography, and recovery of any cultural resources materials that are encountered during construction and cannot be treated prescriptively.

8. a description of the contents and format of the Cultural Resources Report (CRR), which shall be prepared according to ARMR guidelines.

Verification:

1. At least 30 days prior to the start of ground disturbance, including tank removal and soil remediation, the project owner shall submit the subject CRMMP to the CPM for review and approval. Ground disturbance, including tank removal and soil remediation, may not commence until the CRMMP is approved, unless specifically approved by the CPM.

2. At least 30 days prior to the start of ground disturbance, including tank removal and soil remediation, a letter shall be provided to the CPM indicating that the project owner agrees to pay curation fees for any materials collected as a result of the archaeological investigations (survey, testing, data recovery).

CUL-4 The project owner shall submit the Cultural Resources Report (CRR) to the CPM for approval. The CRR shall be written by or under the direction of the CRS and shall be provided in the ARMR format. The CRR shall report on all field activities including dates, times and locations, findings, samplings, and analyses. All survey reports, Department of Parks and Recreation (DPR) 523

forms, and additional research reports not previously submitted to the California Historical Resources Information System (CHRIS) and the State Historic Preservation Officer (SHPO) shall be included as an appendix to the CRR.

If the project owner requests a suspension of construction activities, then a draft CRR that covers all cultural resources activities associated with the project shall be prepared by the CRS and submitted to the CPM for review and approval on the same day as the suspension/extension request. The draft CRR shall be retained at the project site in a secure facility until construction resumes or the project is withdrawn. If the project is withdrawn, then a final CRR shall be submitted to the CPM for review and approval at the same time as the withdrawal request.

Verification:

1. Within 90 days after completion of ground disturbance (including landscaping), the project owner shall submit the CRR to the CPM for review and approval. If any reports have previously been sent to the CHRIS, then receipt letters from the CHRIS or other verification of receipt shall be included in an appendix.

2. Within 10 days after CPM approval, the project owner shall provide documentation to the CPM confirming that copies of the CRR have been provided to the SHPO, the CHRIS, and the curating institution, if archaeological materials were collected.

3. Within 30 days after requesting a suspension of construction activities, the project owner shall submit a draft CRR to the CPM for review and approval.

CUL-5 Prior to and for the duration of ground disturbance, including tank removal and soil remediation, the project owner shall provide Worker Environmental Awareness Program (WEAP) training to all new workers within their first week of employment. The training shall be prepared by the CRS, may be conducted by any member of the archaeological team, and may be presented in the form of a video. The CRS shall be available (by telephone or in person) to answer questions posed by employees. The training may be discontinued when ground disturbance, including tank removal and soil remediation, is completed or suspended, but shall 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. instruction that the CRS, alternate CRS, and CRMs have the authority to halt construction in the area of a discovery to an extent sufficient to ensure that the resource is protected from further impacts, as determined by the CRS;
4. instruction that employees are to halt work on their own in the vicinity of a potential cultural resources discovery and shall contact their supervisor and the CRS or CRM, and that redirection of work would be determined by the construction supervisor and the CRS;

5. an informational brochure that identifies reporting procedures in the event of a discovery;
6. an acknowledgement form signed by each worker indicating that he/she has received the training; and
7. a sticker that shall be placed on hard hats indicating that environmental training has been completed.

No ground disturbance, including tank removal and soil remediation, shall occur prior to implementation of the WEAP program, unless specifically approved by the CPM.

Verification:

1. At least 30 days prior to the beginning of ground disturbance, including tank removal and soil remediation, the CRS shall provide the training program draft text and graphics and the informational brochure to the CPM for review and approval, and the CPM will provide to the project owner a WEAP Training Acknowledgement form for each WEAP-trained worker to sign.
2. On a monthly basis, the project owner shall provide in the Monthly Compliance Report (MCR) the WEAP Training Acknowledgement forms of persons who have completed the training in the prior month and a running total of all persons who have completed training to date.

CUL-6 The project owner shall ensure that the CRS, alternate CRS, or CRMs shall monitor ground disturbance, including tank removal and soil remediation, full time at the project site and linear facilities, and ground disturbance full time at laydown areas or other ancillary areas, to ensure there are no impacts to undiscovered resources and to ensure that known resources are not impacted in an unanticipated manner (discovery). Specifically, the CRS, alternate CRS, or CRMs shall monitor the ground disturbance, including tank removal and soil remediation, that reaches to within 3 feet of native soil below the fill and all ground disturbance, including tank removal and soil remediation, in native soil. Whether or not archaeological monitoring is being conducted at project locations, twice daily, in the morning and afternoon, an archaeological monitor shall examine locations where machinery is disturbing fill soil to determine whether native soils might be disturbed. If disturbance is within 3 feet of native soil, full-time monitoring shall commence.

Full-time archaeological monitoring for this project shall be the archaeological monitoring of all earth-moving activities on the project site and laydown areas, including tank removal and soil remediation, for as long as the activities are ongoing. Full-time archaeological monitoring shall require at least one monitor per excavation area where machines may disturb native soils. If an excavation area is too large for one monitor to effectively observe the soil removal, one or more additional monitors shall be retained to observe the area.

If future geotechnical core borings are conducted for the project, they shall be monitored and the boring cores examined by a geoarchaeologist or qualified archaeologist for the presence of cultural material. If cultural material is identified, that information shall be

reported to the CPM within 24 hours. Whether or not cultural material is identified, the results of the core examinations shall be provided in a report to the CPM.

In the event that the CRS determines that the current level of monitoring is not appropriate in certain locations, a letter or e-mail detailing the justification for changing the level of monitoring shall be provided to the CPM for review and approval prior to any change in the level of monitoring.

The research design in the CRMMP shall govern the collection, treatment, retention/disposal, and curation of any archaeological materials encountered.

On forms provided by the CPM, CRMs shall keep a daily log of any monitoring and other cultural resources activities and any instances of non-compliance with the Conditions and/or applicable LORS. From these logs, the CRS shall compile a monthly monitoring summary report to be included in the Monthly Compliance Report (MCR). If there are no monitoring activities, the summary report shall specify why monitoring has been suspended.

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.

A Native American monitor shall be obtained to monitor ground disturbance, including tank removal and soil remediation, in areas where excavations may extend into native soil. Informational lists of concerned Native Americans and guidelines for monitoring shall be obtained from the Native American Heritage Commission. Preference in selecting a monitor shall be given to Native Americans with traditional ties to the area that shall be monitored. If efforts to obtain the services of a qualified Native American monitor are unsuccessful, the project owner shall immediately inform the CPM. The CPM will either identify potential monitors or will allow ground disturbance, including tank removal and soil remediation to proceed without a Native American monitor.

Verification:

1. At least 30 days prior to the start of ground disturbance, including tank removal and soil remediation, the CPM will provide to the CRS an electronic copy of a form to be used as a daily monitoring log. While monitoring is ongoing, the project owner shall include in each MCR a copy of the monthly summary report of cultural resources-related monitoring prepared by the CRS.
2. Daily, the CRS shall provide a statement that "no cultural resources more than 50 years of age were discovered" to the CPM as an e-mail, or in some other form acceptable to the CPM. The statement shall also include information based on the twice daily observations of soils by the archaeological monitor and indicate the likelyhood of disturbing native soils. If the CRS concludes that daily reporting is no longer necessary, a letter or e-mail providing a detailed justification for the decision to reduce or end daily reporting shall be provided to the CPM for review and approval at least 24 hours prior to reducing or ending daily reporting. At least 24 hours prior to implementing a proposed change in monitoring level, documentation justifying the change shall be submitted to the CPM for review and approval.
3. At least 24 hours prior to implementing a proposed change in monitoring level, documentation justifying the change shall be submitted to the CPM for review and approval.
4. If geotechnical core borings are conducted and cultural material is identified by a geoarchaeologist or archaeologist, the CPM shall be notified within 24 hours. Within 30 days after the examination of the core borings is completed, the CRS shall provide a copy of the results of the core examinations in a report to the CPM.

CUL-7 The project owner shall grant authority to halt construction to the CRS, alternate CRS, and the CRMs in the event of a discovery. Redirection of ground disturbance, including tank removal and soil remediation, shall be accomplished under the direction of the construction supervisor in consultation with the CRS.

In the event cultural resources more than 50 years of age or considered exceptionally significant are found, or impacts to such resources can be anticipated, construction shall be halted or redirected in the immediate vicinity of the Discovery sufficient to ensure that the resource is protected from further impacts. The halting or redirection of construction shall remain in effect until the CRS has visited the Discovery, and all of the following have occurred:

1. the CRS has notified the project owner, and the CPM has been notified within 24 hours of the discovery, or by Monday morning if the cultural resources discovery occurs between 8:00 a.m. on Friday and 8:00 a.m. on Sunday morning, including a description of the discovery (or changes in character or attributes), the action taken (i.e. work stoppage or redirection), a recommendation of eligibility, and recommendations for mitigation of any cultural resources discoveries, whether or not a determination of significance has been made.
2. the CRS has completed field notes, measurements, and photography for a DPR 523 primary form. The "Description" entry of the 523 form shall include a

recommendation on the significance of the find. The project owner shall submit completed forms to the CPM.

3. The CRS, the project owner, and the CPM have conferred, and the CPM has concurred with the recommended eligibility of the discovery and approved the CRS's proposed data recovery, if any, including the curation of the artifacts, or other appropriate mitigation; and any necessary data recovery and mitigation have been completed.

Verification:

1. At least 30 days prior to the start of ground disturbance, including tank removal and soil remediation, the project owner shall provide the CPM and CRS with a letter confirming that the CRS, alternate CRS, and CRMs have the authority to halt construction activities in the vicinity of a cultural resources discovery, and that the project owner shall ensure that the CRS notifies the CPM within 24 hours of a discovery, or by Monday morning if the cultural resources discovery occurs between 8:00 a.m. on Friday and 8:00 a.m. on Sunday morning.
2. Completed DPR form 523s shall be submitted to the CPM for review and approval no later than 24 hours following the notification of the CPM, or 48 hours following the completion of data recordation/recovery, whichever is more appropriate for the subject cultural resource, as determined by the CRS.

CUL- 8 If fill soils must be acquired from a non-commercial borrow site or disposed of to a non-commercial disposal site, unless less-than-five-year-old surveys of these sites for archaeological resources are documented to and approved by the CPM, the CRS shall survey the borrow and/or disposal site(s) for cultural resources and record on DPR 523 forms any that are identified. When the survey is completed, the CRS shall convey the results and recommendations for further action to the project owner and the CPM, who will determine what, if any, further action is required. If the CPM determines that significant archaeological resources that cannot be avoided are present at the borrow site, all these conditions of certification shall apply. The CRS shall report on the methods and results of these surveys in the CRR.

Verification:

As soon as the project owner knows that a non-commercial borrow site and/or disposal site will be used, he/she shall notify the CRS and CPM and provide documentation of previous archaeological survey, if any, dating within the past five years, for CPM approval.

In the absence of documentation of recent archaeological survey, **at least 30 days prior** to any soil borrow or disposal activities on the non-commercial borrow and/or disposal sites, the CRS shall survey the site/s for archaeological resources. The CRS shall notify the project owner and the CPM of the results of the cultural resources survey, with recommendations, if any, for further action.

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APPENDIX 1 – PSA COMMENTS

The San Diego County Archaeological Society, Inc. filed Preliminary Staff Assessment (PSA) comments on December 28, 2008 (SDCAS 2008). The letter indicated that, "Cultural resources mitigation measures CUL-1 through CUL-8 are comprehensive and appropriate. Our only suggestion would be to require an archaeological monitor to be present during any additional geotechnical test borings, the results of which could help guide the later monitoring program.

> RESPONSE: This comment is appreciated and considered by staff. Please see Page 4.3-28, paragraph two, of this analysis:
>
> "Full-time archaeological monitoring for this project shall be the archaeological monitoring of all earth-moving activities on the project site and laydown areas, including tank removal and soil remediation, for as long as the activities are ongoing. Full-time archaeological monitoring shall require at least one monitor per excavation area where machines may disturb native soils. If an excavation area is too large for one monitor to effectively observe the soil removal, one or more additional monitors shall be retained to observe the area."

HAZARDOUS MATERIALS MANAGEMENT

Testimony of Alvin J. Greenberg, Ph.D. and Rick Tyler

SUMMARY OF CONCLUSIONS

Staff's evaluation of the proposed Carlsbad Energy Center Project (CECP), 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., Carlsbad Energy Center LLC (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 San Diego County Department of Environmental Health, Hazardous Materials Division (SD DEH HMD) and Energy Commission staff. In addition, staff's proposed conditions of certification require that both the SD DEH HMD and staff review and approve the risk management plan prior to delivery of any hazardous materials to the CECP project site. Other proposed conditions of certification address the issue of the transportation, storage, and use of aqueous ammonia and site security.

INTRODUCTION

The purpose of this hazardous materials management analysis is to determine if the proposed CECP 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 CECP project in quantities exceeding the reportable amounts defined in the California Health and Safety Code, section 25532 (j) (CECP 2007a, Table 5.5-2). 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 CECP project. No acutely toxic hazardous materials will be used on site during construction, and 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 follow Best Management Practices (BMPs) to minimize environmental effects (CECP 2007a, Section 5.5.6.1).

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 CECP would connect to an existing natural gas pipeline that would require the installation of about 1,100 feet of new piping on-site (CECP 2007a, Section 4.0). The CECP 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.

Applicable Law	Description
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 515	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 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.

The Certified Unified Program Agency (CUPA) with the responsibility to review Risk Management Plans (RMPs) and Hazardous Materials Business Plans (HMBPs) is the San Diego County Department of Environmental Health, Hazardous Materials Division (SD DEH HMD). 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 CCR Title 24 and 2001 California Building Code (CECP 2007a, Section 2.3.1.1.1).

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 (5.1) of the Application for Certification (AFC) (CECP 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 a temperature of 108°F are appropriate for conducting the off-site consequence analysis (CECP 2007a, Section 5.5.4.3).

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 topography of the site is essentially flat (about 29 feet above sea level) with the pacific ocean lying to the west and hills rising to the north, east, and south of the project site.

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 in the project vicinity are listed and shown in **APPENDIX 5.5A** and **APPENDIX 5.9A** (CECP 2007a). The nearest sensitive receptors are two schools located north of the project site and an elder care facility located northeast of the project site, both about 0.8 miles away. All sensitive receptors within three miles of the project site are depicted in figures 5.9A-1 through -5b (CECP 2007a, Appendix 5.9A). The nearest residence is approximately 0.44 miles northeast of the site, and additional residences are located about 0.49 miles and 0.51 miles from the site to the northwest and southwest, respectively (CECP 2007a, Section 5.9.3).

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 (CECP 2007a, Section 5.5 and SR 2008h, Section 5.5). 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 Tables 4.12-1A through 4.12-3A of the Project Enhancement and Refinement (SR 2008h, Appendix 5.5E) 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 measures also included engineering controls such as

catchment basins and methods to keep vapors from spreading and administrative controls such as training emergency response crews.

- Step 5: Staff analyzed the theoretical impacts on the public of a worst-case spill of hazardous materials, 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

In conducting the analysis, staff determined in Steps 1 and 2 that some hazardous materials, although present at the proposed facility, pose a minimal potential for off-site impacts since they will be stored in a solid form or in smaller quantities, have low mobility, or have low levels of toxicity. These hazardous materials, which were eliminated from further consideration, are briefly discussed below.

During the construction phase of the project, the only hazardous materials proposed for use are paint, paint thinner, cleaners, solvents, sealants, gasoline, diesel fuel, motor oil, hydraulic fluid, lubricants, and welding flux. Any impact of spills or other releases of these materials will be limited to the site because of the small quantities involved, their infrequent use (and therefore reduced chances of release), and/or the temporary containment berms used by contractors. Petroleum hydrocarbon-based motor fuels, mineral oil, lube oil, and diesel fuel are all very low volatility and represent limited off-site hazards even in larger quantities.

During operations, hazardous chemicals such as cleaning agents, lube oil, mineral insulating oil, and other various chemicals (see **HAZARDOUS MATERIALS APPENDIX B** for a list of all chemicals proposed to be used and stored at CECP) would be used and stored in relatively small amounts and represent limited off-site hazards because of their small quantities, low volatility, and/or low toxicity.

The CECP proposes to use an ion exchange system for ocean water purification that would require two storage trailers parked continuously on site with up to 55,000 pounds of ion exchange resin in each. The ion exchange resins consist of cross-linked forms of sulfonic acid and ammonium hydroxide, which are listed as health hazards under SARA Title III. The applicant estimated that the resin trailers would have to be replaced every 150 to 225 days, which would be done without draining the resin at the project site so that the resin would remain inside the trailers at all times (SR 2008h, Section 5.5.3.1). Staff determined that the ion exchange resin proposed to be used and stored on-site would not present an off-site hazard.

After removing from consideration those chemicals that pose no risk of off-site impact in Steps 1 and 2, staff continued with Steps 3, 4, and 5 to review the remaining hazardous

materials: natural gas and aqueous ammonia. However, the project will be limited to using, storing, and transporting only those hazardous materials listed in Appendix B of the PSA 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 of mostly methane, but also contains ethane, propane, nitrogen, butane, isobutene, and isopentane. It is colorless, odorless, tasteless and lighter than air. Natural gas can cause asphyxiation when methane is 90% in concentration. Methane is flammable when mixed in air at concentrations of 5-14%, 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 confined conditions (as demonstrated by the recent natural gas detonation in Belgium in July 2004).

While natural gas will be used in significant quantities, it will not be stored on site. It will be delivered by the Southern California Gas Company via a new 1,100-foot 18-inch gas pipeline connecting the existing gas pipeline that serves Encina Power Station to a new gas metering station that would be constructed as part of the CECP. The new gas pipeline will run east along the railroad tracks within the boundaries of the proposed CECP site (CECP 2007a, Section 4.0). 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.

The natural gas pipeline will be designed for Class 3 service and will meet California Public Utilities Commission General Order 112 standards, and 49 CFR 192 standards for pipelines located in populated areas (CECP 2007a, Sections 4.4 and 5.5.4.4). 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 existing LORS are sufficient to ensure minimal risks of pipeline failure. Additionally, the gas pipeline that would be constructed for this project would be located entirely on-site, which greatly reduces the risks of impacts to the public from a rupture or failure.

Aqueous Ammonia

Aqueous ammonia will be used to control the emission of oxides of nitrogen (NO_x) from the combustion of natural gas at the CECP. The accidental release of aqueous ammonia without proper mitigation can result in significant down-wind concentrations of ammonia gas. CECP would have 19-percent aqueous ammonia solution in two stationary above-ground storage tanks. Each tank would have an approximate capacity of 10,000 gallon and would be filled to a maximum of 8,500 gallons (CECP 2007a, Section 5.5.4.2).

Based on staff's analysis described above, aqueous ammonia is the only hazardous material that may pose the risk of off-site impact. The use of aqueous ammonia can result in the formation and release of toxic gases in the event of a spill even without interaction with other chemicals. 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 bench mark exposure levels of ammonia gas occurring offsite. These include:

1. the lowest concentration posing a risk of lethality, 2,000 ppm;

2. the 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 US 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 (considered by staff to be a level of significance).

If the potential exposure associated with a potential release exceeds 75 ppm at any public receptor, staff will assume that the potential release poses a risk of significant impact. However, staff will also assess the probability of occurrence of the release and/or the nature of the potentially exposed population in determining whether the likelihood and extent of potential exposure are sufficient to support a finding of potentially significant impact. A detailed discussion of the exposure criteria considered by staff, as well as their applicability to different populations and exposure-specific conditions, is provided in **HAZARDOUS MATERIALS APPENDIX A**.

Section 5.5.4.3 and **APPENDIX 5.5B** of the AFC (CECP 2007a) describe the modeling parameters used for the worst-case 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 one of the two storage tanks. Ammonia emissions from the potential release scenario were calculated following methods provided in the RMP off-site consequence analysis guidance, US EPA, April 1999. The maximum temperature recorded in the area in the past three years (108°F), a wind speed of 1.5 meters per second, and atmospheric stability class F were used for emission and dispersion calculations. Potential off-site ammonia concentrations were estimated using the SLAB numerical dispersion model. Results from the OCA were tabulated showing the distance from the source release point to the four benchmarks of ammonia concentration.

Hazardous Materials Management Table 2 shows the applicant's modeled distance to the four benchmark criteria concentrations at an elevation of 5.25 feet above ground level (the height of an average human).

Hazardous Materials Management Table 2
Distance to EPA/CalARP and CEC Toxic Endpoints

Distance in Feet to 2,000 ppm	Distance in Feet to IDLH (300 ppm)	Distance in Feet to AIHA's ERPG-2 (150 ppm)	Distance in Feet to CEC level (75 ppm)
64.8	105.6	118.6	134.1

Source: Table 5.5-6 of CECP 2007a

At the nearest point, the proposed facility boundary would be located about 165 feet from the ammonia storage area. The results of the applicant's modeling show that concentrations exceeding CEC's level of significance of 75 ppm would not occur at any off-site location. Staff conducted its own independent analysis and found that while the applicant used proper meteorological input factors as required by the Cal-ARP and U.S. EPA RMP programs, these default values were not site specific and thus overestimated the airborne concentration of ammonia that would be reached under more realistic modeling. The fact that the project sits below grade in a "bowl" surrounded by an 18 to 25-foot high berm greatly restricts air flow around the aqueous ammonia storage tank and secondary containment area. Restricted and lower speed air flows will result in much lower rates of evaporation from a covered containment are but with two 4.5 square foot drainage grates. Also, staff believes that a more realistic temperature of spilled aqueous ammonia should be used when determining a reasonable potential for off-site impacts and resultant mitigation. In this case, staff used 74.4 deg F which was the highest mean temperature recorded at Oceanside Marina based on monthly normal temperature from 1971-2000. Staff also used both SCREEN3 and HARP with two different air speeds (1.5 m/sec and 0.1 m/sec and with the berm in place in the HARP model. Staff found that with using SCREEN3 (which does not consider the location of the berm) and the lower wind speed, the maximum airborne concentration near the secondary containment would be 14 ppm. Using HARP (which does consider the impact of the berm in preventing dispersion and thus increasing the concentration within the "bowl") with the lower wind speed, staff found that the maximum concentration of ammonia near the containment area would be 26 ppm. In both cases, the predicted airborne concentration on I-5 would be much lower (6 ppm and 7 ppm, respectively). Staff believes that both models are more realistic than the applicant's and that both results are well below the level of significance such that workers and the off-site public –

including drivers on I-5 – would not experience adverse effects should a spill occur at the site.

The future expansion of I-5 would eliminate part of the current earth berm and thus the expansion plans by Caltrans has changed this analysis. Accordingly, the applicant proposed to move one of the aqueous ammonia storage tanks formerly to be located on the eastern side of the site (the side nearest I-5) to the western side of the site so that both tanks would be located on the same side (SR 2008h, Revised Figure 2.2-1). Staff agrees with this modification and believes it strengthens both safety and security as the aqueous ammonia storage tanks will not be vulnerable to either an accident involving a vehicle leaving I-5 or to an attacking from I-5. The tanks will not be viewable from I-5.

Additionally, the tanks will not be viewable or have direct line-of-site from off-site areas to the west of the site such as the rail corridor or a proposed public "Coastal Rail Trail" due to the below-grade nature of the site and the proposal of the applicant to place a new berm for the major part of the west side of the site, just east of the perimeter fence east of the rail corridor. The need for this berm and for the proposed "Coastal Rail Trail" to be located west of the rail corridor is discussed below under **Site Security**.

The above-mentioned staff modeling shows that the predicted airborne concentration that the public would experience if using the public hiking trail (located either east or west of the rail corridor at the time of an accidental release would be around 7 ppm, a level very much less than staff's *minimum threshold criteria for potentially significant impacts on public health* of 75 ppm.

Furthermore, 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 CECP project include:

- 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 plus the volume of water associated with 20 minutes of fire suppression;
- physical separation of stored chemicals in isolated containment areas with a non-combustible partition in order to prevent accidental mixing of incompatible materials, which could result in the evolution and release of toxic gases or fumes;
- installation of a fire protection system for hazardous materials storage areas;
- construction of bermed containment areas surrounding each of the aqueous ammonia storage tanks capable of holding the entire tank volume plus the water associated with a 24-hour period of a 25-year storm;

- construction of a sloped ammonia unloading pad that drains into the storage tank's secondary containment structure; and
- process protective systems including continuous tank level monitors, 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 (CECP 2007a, Section 5.5.6). 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).

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. Emergency procedures will be established which include evacuation, spill cleanup, hazard prevention, and emergency response.

The first responders to a hazardous materials incident would be Stations #1 and #4 of the Carlsbad Fire Department (CFD). A full hazardous materials response would be provided by the San Diego City and County Department of Environmental Health, Hazardous Materials Incident Response Team (DEH-HIRT). The DEH-HIRT is capable of handling any hazardous materials-related incident at the proposed facility and would have a minimal response time of one hour (CFD 2008). Staff finds that the DEH-HIRT teams are capable of responding to a hazardous materials emergency call from CECP.

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 I-5 to Cannon Road to Avenida Encinas to the project site (SR 2008a, Data Response Set 2). There are no schools, parks, or residences along the proposed route.

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 (I-5). 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 5.12 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 applicant estimated that routine operation of the proposed CECP would require one or two ammonia deliveries per month, with up to five tanker truck deliveries of aqueous ammonia per month during peak operation periods, each delivering about 6,500 gallons (CECP 2007a, Section 5.5.4.2). Each delivery will travel approximately 0.2 miles from I-5 along Cannon Road and about 0.6 miles along Avenida Encinas to the facility.

This would result in a maximum of 2.4 miles of delivery tanker truck travel in the project area per month during peak operation (with a full load) and an average of approximately 29 miles of delivery tanker truck travel per year (assuming three deliveries per month). 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 via Cannon Rd. and Carlsbad Blvd. Results show a risk of 0.15 in 1,000,000 for one trip from I-5 and a total annual risk of 5.4 in 1,000,000 for 36 deliveries. This risk was calculated using accident rates on various types of roads (in this case, urban multilane undivided, multilane divided, and two-lane) 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 proposed Condition of Certification **HAZ-6** would require the use of only the specified and approved route to the site.

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 California's Loma Prieta earthquake of 1989, its 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. Staff 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. Staff also 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. 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 2001 California Building Code for Seismic Zone 4 (CECP 2007a, Section 2.3.1.1.1). 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 and will include a description of perimeter security measures and procedures for evacuating, notifying authorities of a security breach, monitoring fire alarms, conducting site personnel background checks, site access, and a security plan and background checks for hazardous materials drivers. Perimeter security measures utilized for this facility may include security guards, security alarms, breach detectors, motion detectors, and video or camera systems (CECP 2007a, Section 5.5.6.5.2).

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 CECP 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 in the Federal Register (Interim Final Rule 6 CFR Part 27). Staff determined that this project would fall into the category of medium vulnerability due to the urban setting and close proximity to sensitive receptors. 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. The perimeter fencing should include slats or other methods to reduce and restrict the visibility of the site from

off-site locations. The sight will have a major interstate highway along its eastern fenceline, and a rail line and possible public hiking trail along its western fenceline. 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.

Another site security issue involves the proposed routes for a Coastal Rail Trail. Staff is very concerned about the safety and security of the CECP should the project be certified and built, and should the Coastal Rail Trail be built. Staff will avoid discussing the obvious safety and public health issues of placing a trail for use by hikers, bikers, and runners along a rail corridor that goes through a heavily industrialized area, thus resulting in among other things, a trail-user's exposure to intermittent high concentrations of Diesel Particulate Matter from passing trains. Instead, staff believes placing the Coastal Rail Trail on the eastern side of the railroad ROW -- an option under consideration -- raises several security, safety, and fire access problems. Staff discusses the security and safety concerns in this section of the FSA and refers the reader to the **Worker Safety and Fire Protection** section for discussion of the fire access issues.

As seen in **Appendix D photo 063**, the current rail corridor is single-track and sunken below existing grade as it goes by the power plant site. Staff understands that one option for the LOSSAN Rail Corridor would have two tracks within this area and sink the new side-by-side tracks a bit further below grade. This will add to the safety by reducing the chances that a derailment will jump the "depression" and result in railcars going through the CECP western fence and onto the power plant site. The most current plot-plans for the CECP site (Appendix D, Figure 1) also include a berm just east of the present dirt road that is east of the western fenceline. This berm will add to the safety and security of the below-grade power plant infrastructure.

A review of **Appendix D photos 059 and 060** shows the dirt road east of the rail corridor is very wide, runs the length of the CECP project site, and starts on the south end of the site (the SW corner of the site) where an access gate is located. This access gate and dirt road will serve as the construction entrance for heavy equipment and for access to the north side of the site for this heavy equipment. The applicant proposes to pave this road or at least make a sturdier route with gravel. After construction, the gate at the SW corner would serve as an emergency vehicle access point that would be required by a proposed Condition of Certification in the **Worker Safety and Fire Protection** section of this FSA.

Staff has serious security and safety concerns about a Rail Trail on the east side of the tracks. Since NRG must place a security fence with CCTV and breach detectors along the power plant's entire perimeter, it would be problematical of them to move that security fence further east of the rail line and closer to power plant critical energy infrastructure. The project owner would have to prevent line-of site viewing from the public, and a trail at that location would not allow the project owner to place the same sized berm proposed as a means to protect the safety and security of the power plant infrastructure as well as workers located down in the below-grade power plant site. Furthermore, staff is informed that the City has a sewer under this road now and maintains a sewer easement. There is a proposal to place a larger sewer main under this road and it will be far easier to access the sewer that main if no Rail Trail is placed on top of it.

Finally, as shown in **photos 057 and 058**, there appears to be adequate space for a Rail Trail on the western side of the railroad ROW. In staff's opinion, this would be highly preferable as it would not pose safety, security, or emergency response access problems for the CECP site. It would also afford public access to the desalinization facility by enabling safer and easier access to the public using the rail trail by obviating the need to cross the rail tracks to get to the facility.

Staff therefore proposed Condition of Certification **HAZ-9** which would require the project owner to maintain the security of the power plant site and prohibit the placement of a public access rail trail east of the rail corridor.

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 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.

Table 5.5-7 of the AFC provides a list of nearby facilities that store or use hazardous materials (CECP 2007a). None of the existing or planned projects in the vicinity of the proposed CECP store or use hazardous materials that may have a potential cumulative impact except for the existing Encina Power Plant which stores 19% ammonia. Since both the applicant's and the staff's modeling of an accidental release show that ammonia concentrations exceeding 75 ppm would not occur off-site, cumulative impacts from ammonia releases from these two facilities are not expected to occur.

The applicant will develop and implement a hazardous materials handling program for CECP 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 CECP 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

Please refer to Appendix C for responses to comments.

COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Staff concludes that construction and operation of the CECP 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 San Diego County Department of Environmental Health, Hazardous Materials Division 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 *high integrity* 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 San Diego County Department of Environmental Health, Hazardous Materials Division (HMD) and the CPM for review. After receiving comments from the San Diego County DEH HMD 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 San Diego County DEH HMD and the Carlsbad Fire Department 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 and the Carlsbad Fire Department 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.

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 The project owner shall direct all vendors delivering any hazardous material to the site to use only the route approved by the CPM (I-5 to Cannon Road to Avenida Encinas to the project site). The project owner shall obtain approval of the CPM if an alternate route is desired.

Verification: At least sixty (60) days prior to receipt of any hazardous materials on site, the project owner shall submit copies of the required transportation route limitation direction to the CPM for review and approval.

HAZ-7 Prior to commencing construction, a site-specific Construction Site Security Plan for the construction phase shall be prepared and made available to the CPM for review and approval. The Construction Security Plan shall include the following:

1. perimeter security consisting of fencing enclosing the construction area;
2. security guards;
3. site access control consisting of a check-in procedure or tag system for construction personnel and visitors;
4. written standard procedures for employees, contractors and vendors when encountering suspicious objects or packages on site or off site;

5. protocol for contacting law enforcement and the CPM in the event of suspicious activity or emergency; and
6. evacuation procedures.

Verification: At least thirty (30) days prior to commencing construction, the project owner shall notify the CPM that a site-specific Construction Security Plan is available for review and approval.

HAZ-8 The project owner shall 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 eight feet high and topped with barbed wire or the equivalent (and with slats or other methods to restrict visibility if a fence is selected;

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;

   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;

6. site access controls for employees, contractors, vendors, and visitors;

7. 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;

8. closed circuit TV (CCTV) monitoring system, recordable, and viewable in the power plant control room and security station (if separate from the control room) with cameras able to pan, tilt, and zoom, have low-light capability, and are able to view 100% of the perimeter fence, the ammonia storage tank, the outside entrance to the control room, and the front gate; and

9. additional measures to ensure adequate perimeter security consisting of either:

   A. security guard(s) present 24 hours per day, 7 days per week; **or**

   B. power plant personnel on site 24 hours per day, 7 days per week, and perimeter breach detectors **or** on-site motion detectors.

The project owner shall fully implement the security plans and obtain CPM approval of any substantive modifications to 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.

HAZ-9 If the project owner dedicates an easement for the Coastal Rail Trail, it shall be located within the boundaries of the overall Encina Power Station Precise Development Plan area in a location mutually agreed upon with the City of Carlsbad and located west of the north/south AT&SF/North County Transit District Rail Corridor. In no event shall the project owner grant or dedicate an easement for the Coastal Rail Trail east of the Rail Corridor on the CECP site.

Verification: Not later than 10 days after drafting an agreement, the project owner shall submit to the CPM for review and approval the instrument of easement dedication showing that the location mutually agreed upon with the City of Carlsbad is west of the north/south AT&SF/North County Transit District Rail Corridor.

SAMPLE CERTIFICATION (Attachment A)

Affidavit of Compliance for Project Owners

I,

_____

(Name of person signing affidavit)(Title)

do hereby certify that background investigations to ascertain the accuracy of the identity and employment history of all employees of

_____

(Company name)

for employment at

_____

(Project name and location)

have been conducted as required by the California Energy Commission Decision for the above-named project.

_____

(Signature of officer or agent)

Dated this _____ day of _____, 20 _____.

THIS AFFIDAVIT OF COMPLIANCE SHALL BE APPENDED TO THE PROJECT SECURITY PLAN AND SHALL BE RETAINED AT ALL TIMES AT THE PROJECT SITE FOR REVIEW BY THE CALIFORNIA ENERGY COMMISSION COMPLIANCE PROJECT MANAGER.

SAMPLE CERTIFICATION (Attachment B)

Affidavit of Compliance for Contractors

I,

_____

(Name of person signing affidavit)(Title)

do hereby certify that background investigations to ascertain the accuracy of the identity and employment history of all employees of

_____

(Company name)

for contract work at

_____

(Project name and location)

have been conducted as required by the California Energy Commission Decision for the above-named project.

_____

(Signature of officer or agent)

Dated this _____ day of _____, 20 _____.

THIS AFFIDAVIT OF COMPLIANCE SHALL BE APPENDED TO THE PROJECT SECURITY PLAN AND SHALL BE RETAINED AT ALL TIMES AT THE PROJECT SITE FOR REVIEW BY THE CALIFORNIA ENERGY COMMISSION COMPLIANCE PROJECT MANAGER.

SAMPLE CERTIFICATION (Attachment C)

Affidavit of Compliance for Hazardous Materials Transport Vendors

I,

_____

(Name of person signing affidavit)(Title)

do hereby certify that the below-named company has prepared and implemented security plans in conformity with 49 CFR 172.880 and has conducted employee background investigations in conformity with 49 CFR 172, subparts A and B,

_____

(Company name)

for hazardous materials delivery to

_____

(Project name and location)

as required by the California Energy Commission Decision for the above-named project.

_____

(Signature of officer or agent)

Dated this _____ day of _____, 20 _____.

THIS AFFIDAVIT OF COMPLIANCE SHALL BE APPENDED TO THE PROJECT SECURITY PLAN AND SHALL BE RETAINED AT ALL TIMES AT THE PROJECT SITE FOR REVIEW BY THE CALIFORNIA ENERGY COMMISSION COMPLIANCE PROJECT MANAGER.

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HAZARDOUS MATERIALS
APPENDIX A

Basis for Staff's Use of 75 Parts Per Million Ammonia Exposure Criteria

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]	NIOSH	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

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WHO. 1986. World Health Organization, Environmental Health Criteria 54, Ammonia, WHO, Geneva, Switzerland.

ABBREVIATIONS - 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

HAZARDOUS MATERIALS
APPENDIX B

Hazardous Materials Proposed for Use at the CECP

Hazardous Materials Appendix B
Hazardous Materials Proposed for Use at the CECP

Material	CAS No.	Application	Hazardous Characteristics	Maximum Quantity On Site	CERCLA SARA RQ[a]
Acetylene	47-86-2	Welding gas	Health: hazardous if inhaled Physical: combustible, flammable	300 pounds	NA
Aqueous Ammonia 19% Solution	7664-41-7	NO_X emissions control	Health: irritation to permanent damage from inhalation, ingestion, and skin contact Physical: reactive, vapor is combustible	10,200 gallons	100 pounds
Cleaning Chemicals/ Detergents	None	Periodic cleaning of combustion turbine	Health: various Physical: various	Up to 25 gallons or 100 pounds per chemical	NA
Hydraulic Oil	None	In combustion turbine and turbine control valve actuators	Health: hazardous if ingested Physical: may be flammable/combustible	150 gallons	42 gallons
Ion Exchange Resin	None	Demineralization of boiler feedwater	Health: immediate health hazard	110,000 pounds	NA
Lubrication Oil	None	Lubricate rotating equipment	Health: hazardous if ingested Physical: may be flammable/combustible	400 gallons	42 gallons
Mineral Insulating Oil	8012-95-1	Transformers/switchyard	Health: hazardous if ingested Physical: may be flammable/combustible	550 gallons	42 gallons
Oxygen	7782-44-7	Welding gas	Health: skin irritant Physical: flammable	300 pounds	NA
Paint	Various	Touchup of painted surfaces	Health: various Physical: various	Up to 25 gallons or 100 pounds per type	NA
Propane	74-98-6	Torch gas	Health: causes frostbites Physical: flammable, oxidizing	100 pounds	NA
Sulfure Hexaflouride/ USEPA Protocol Gases	2551-62-4	Calibration gases	Health: hazardous if inhaled Physical: flammable	400 pounds	NA

Source: CECP 2007a Tables 5.5-1 through 5.5-3, and SR 2008h Tables 4.12-1A through 4.12-3A.
a. Reportable quantities for a pure chemical, per the Comprehensive Environmental Response, Compensation, and Liability Act.

Hazardous Materials Appendix C

RESPONSE TO COMMENTS

POWER OF VISION Comments

POV2009a – Power of Vision/Julie Backer (tn: 49934). Comments on Preliminary Staff Assessment ("Safety" Comments). 1/30/2009

Comment: Storage and transportation of aqueous ammonia is less than .5 miles from residents.

Staff Response: Both the applicant and staff have independently assessed the risk of an accidental hazardous materials release causing harm to the public. Staff has determined that the risk is **less than significant** and that numerous administrative and engineering controls that reduce the chances of an accidental release or that would contain a spill should an accident occur would contribute to the overall safety of this power plant if licensed by the Commission and built by the applicant.

Comment: Transportation route for aqueous ammonia directly passes a hotel.

Staff Response: Staff is aware of this fact and has assessed the potential impact of a transportation accident resulting in a release of aqueous ammonia. As described in the section on **Transportation of Hazardous Materials,** staff has used four different approaches in its assessment and proposed two Conditions of Certification to ensure that the risk to the public, including hotel guests and staff, are less than significant.

Comment: The internal workings of CECP are visible to I-5motorists and possible terrorist activities.

Staff Response: Staff is aware of this issue and has addressed site security in a lengthy assessment in the section on **Site Security** above. The nature of the "below-grade" site, the presence of a raised berm and vegetation between the eastern fenceline and I-5, and the proposal to place another berm on the west side of the site all contribute to shielding the power plant site from view. Staff's recommended prohibition on locating the proposed "Coastal Rail Trail" east of the rail corridor will also add to facility security.

Comment: The internal workings of CECP are visible to railway tracks and possible terrorist activities

Staff Response: Please refer to staff's response, above.

NORTH COUNTY TRANSIT DISTRICT Comments

NCTD2009a – North County Transit District/Ed Singer. (tn: 49679). NCTD Comment Letter. 1/9/2009

Comment: NCTD staff is concerned about any activity adjacent to, within, above or below the railroad property, tracks, signaling and other equipment. We are concerned with demolition and construction access to the site, the quality of soils beneath the old tanks, use of existing tunnels for utility purposes, proposed new excavations and borings beneath our tracks, queuing traffic in the vicinity or across Cannon Road railroad crossing, use of cranes and extent of their booms, import and ***export of noxious chemicals via rail***, and any increase to and proper drainage of storm water.

Staff Response: Staff will address the concern about "***exporting of noxious chemicals via rail***" in this section and refer the reader to responses to comments on other matters in the **Waste Management** section of this FSA. Staff is unaware that any hazardous materials will be delivered to or taken from the proposed CECP via rail. All hazardous materials will be delivered via truck or tank truck.

Hazardous Materials Appendix D

IMAGE PHOTOS ON THE FOLLOWING PAGES

HAZARDOUS MATERIAL MANAGEMENT - FIGURE 1

Carlsbad Energy Center Project - Photo 057

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

SOURCE: Dr. Alvin Greenberg, June, 2009

HAZARDOUS MATERIAL MANAGEMENT - FIGURE 2

Carlsbad Energy Center Project - Photo 058

SOURCE: Dr. Alvin Greenberg, June, 2009

HAZARDOUS MATERIAL MANAGEMENT - FIGURE 3

Carlsbad Energy Center Project - Photo 059

SOURCE: Dr. Alvin Greenberg, June, 2009

HAZARDOUS MATERIAL MANAGEMENT - FIGURE 4

Carlsbad Energy Center Project - Photo 060

SOURCE: Dr. Alvin Greenberg, June, 2009

HAZARDOUS MATERIAL MANAGEMENT - FIGURE 5

Carlsbad Energy Center Project - Photo 063

SOURCE: Dr. Alvin Greenberg, June, 2009

LAND USE

Testimony of Negar Vahidi

SUMMARY OF CONCLUSIONS

Energy Commission Staff concludes that the proposed Carlsbad Energy Center Project (CECP or "proposed project"), would be consistent with the applicable laws, ordinances, regulations, and standards (LORS) pertaining to State and local land use planning and would not generate a significant impact under the California Environmental Quality Act (CEQA) guidelines with respect to CEQA Appendix G issues, "Land Use and Planning" and "Agriculture Resources." With implementation of Condition of Certification **LAND-**1, the proposed project would be consistent with applicable sections of the Warren-Alquist Act regarding public use. In addition, the proposed CECP would not be incompatible with existing on-site or nearby uses, as it is consistent with the general character of these existing permitted uses.

INTRODUCTION

The land use analysis of the Carlsbad Energy Center Project Application for Certification (AFC) focuses on the project's consistency with land use plans, ordinances, regulations, and policies, and the project's compatibility with existing and planned land uses. In general, a power plant and its related facilities could be incompatible with surrounding land uses if they cause unmitigated impacts in the areas of noise, dust, public health, traffic, and visual resources. These individual resource areas are discussed in detail in separate sections of this document. A power plant also may create a significant land use impact if it converts prime or unique farmland or farmland of statewide importance to non-agricultural uses.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

LAND USE Table 1 provides a general description of land use LORS applicable to the proposed project. The city of Carlsbad is the only local agency with land use LORS applicable to the proposed project. The project's consistency with these LORS is discussed in **LAND USE Table 2**.

LAND USE Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable LORS	Description
Federal	None
State	
California Coastal Commission Public Resources Code § 25500 et seq. California Coastal	The Coastal Act establishes a comprehensive approach to govern land use planning along the entire California coast. The Coastal Act also sets forth general policies (Public Resources Code §30200 et seq.) that govern the Coastal Commission's review of permit applications and local plans. In the case of energy facilities, Section 30600 of the Coastal Act states: (a) Except as provided in subdivision (e), and in addition to obtaining any other permit required by law from any local

Applicable LORS	Description
Act of 1976, Public Resources Code §3000, et seq. §25529 of the Warren-Alquist Act	government or from any state, regional, or local agency, any person, as defined in Section 21066, wishing to perform or undertake any development in the coastal zone, other than a facility subject to Section 25500, shall obtain a coastal development permit. Section 25500 specifically identifies the Energy Commission's exclusive power to certify sites for power generation facilities 50 MW or greater and related facilities anywhere in the state.
Subdivision Map Act (Public Resources Code Section 66410-66499.58)	This section of the California Public Resources Code provides procedures and requirements regulating land division (subdivisions) and parcel legality. Regulation and control of the design and improvement of subdivisions have been vested in the legislative bodies of local agencies.
Local[1]	
Carlsbad General Plan	The City of Carlsbad General Plan establishes an overall multi-part vision for the entire city. Implementation of the city's overall vision is accomplished by the various General Plan elements and various policies, programs, and procedures. The city's last comprehensive amendment to its General Plan was in 1994. Currently, the city is in the beginning stages of the next comprehensive General Plan update.
Carlsbad Zoning Ordinance, Chapter 21.36	The Zoning Ordinance serves as the legal mechanism for implementation of the General Plan. Chapter 21.36 of the city's Zoning Ordinance addresses the Public Utilities ("P-U") Zone and was adopted in 1971. This section of the Zoning Ordinance implements the "Public Utility" land use designation of the city's General Plan. In 1975, the city amended the P-U Zone to require a precise development plan for public utility uses.
Encina Specific Plan (SP 144)	SP 144 includes 680 acres of land that encompass the entire Encina Power Station (EPS) site and the adjacent beach, all water areas of the Agua Hedionda Lagoon, and most properties on either side of Interstate 5 between Cannon Road and the lagoon. At the time of the specific plan's adoption in 1971, all of these lands were owned by San Diego Gas and Electric. Following its adoption, SP 144 was amended several times to permit the development and expansion of the EPS. In 2006, the Carlsbad City Council approved SP 144(H), which permitted the development of the City of Carlsbad Seawater Desalination Plant Project. SP 144(H) is the most current version of the specific plan guiding development at the EPS site.
Encina Power Station (EPS) Precise Development Plan (PDP 00-02)	The adopted precise development plan for the EPS follows Section 21.36.050 of Carlsbad's Zoning Ordinance. PDP 00-02 divides the EPS into planning areas with general development standards for each. It elaborates on parking requirements and provides basic aesthetic and landscaping requirements. The PDP also contains an inventory of existing uses and facilities at the power station and provides general review and approval criteria for any future improvements.
Carlsbad Local	In May 1982, the Carlsbad City Council adopted the Agua Hedionda

[1] COC 2008e.

Applicable LORS	Description
Coastal Program/Agua Hedionda Land Use Plan	Land Use Plan (AHLUP), which is the segment of the City's Local Coastal Program that applies to the Agua Hedionda Lagoon area and all of the SP 144 area. While the AHLULP is a certified segment of the City's Local Coastal Program (LCP), the city does not have the authority to issue coastal development permits within the AHLUP area. However, the city does review projects in the coastal zone for consistency with the requirements of the LCP, but requires project proponent/developers to apply to the California Coastal Commission to obtain a coastal development permit for their projects. The AHLUP contains eight different sections, which contain policies affecting the EPS site. This plan has not had any substantial revisions since its adoption 25 years ago.
South Carlsbad Coastal Redevelopment Project Area Plan	In September 1997, the city began to identify options for an action to eliminate or reduce the environmental impacts of the existing EPS and to achieve more compatible land uses along its coastline. The city no longer considered the industrial land uses represented by the EPS to be the best used of coastal property. As a result, the city formed the South Carlsbad Coastal Redevelopment Area and the associated redevelopment plan. The underlying intent of the redevelopment plan was to convert the industrial land west of the railroad tracks to another land use that would provide a greater benefit to the community and would eliminate the possibility of an intensification of industrial uses at the EPS site. The plan's intent is to encourage the redevelopment of the EPS site and decommissioning of the existing power plant.
North County Multiple Habitat Conservation Plan (MHCP) and the Carlsbad Habitat Management Plan (HMP) for Natural Communities[2]	The North County Multiple Habitat Conservation Plan (MHCP) has been prepared for a portion of San Diego County including the cities of Carlsbad, Encinitas, Escondido, Oceanside, San Marcos, Solana Beach, and Vista. The MHCP is a long-term conservation program that addresses existing biological resources, proposed urban growth, habitat losses, and direct, indirect, and cumulative effects on sensitive species throughout the San Diego region. The MHCP is a multi-jurisdictional planning effort and each city is tasked with developing a sub-area plan in order to set policies and regulatory mechanisms to carry out the goals outlined in the regional MHCP. The Habitat Management Plan (HMP) for Natural Communities in the City of Carlsbad, which serves as the city's sub-area plan and received its final approval in November, 2004, proposes a comprehensive, citywide program to preserve the diversity of habitat and protect sensitive biological resources while allowing for additional development consistent with the City's General Plan and its Growth Management Plan. The HMP also identifies existing and proposed conservation areas.

[2] The **Biological Resources** section addresses consistency with the MHCP and HMP.

SETTING

PROPOSED PROJECT

For a detailed description of the proposed project components and associated facilities, see the **Project Description** section. The environmental setting for the proposed project as it relates to land use is described below.

Power Plant Site

The proposed CECP site is within the existing Encina Power Station (EPS), which is located in the City of Carlsbad adjacent to the southern edge of the Agua Hedionda Lagoon. The total land acreage of the existing EPS is approximately 95 acres, not including the Agua Hedionda Lagoon acreage owned by Cabrillo Power I LLC (Cabrillo). The EPS is bounded by San Diego Gas and Electric (SDG&E) property to the south, Interstate 5 (I-5) to the east, Carlsbad Boulevard to the west, and Agua Hedionda Lagoon to the north. The north/south AT&SF/North County Transit District (NCTD) Rail Corridor bisects the EPS. The EPS consists of an approximately 65-acre parcel containing the existing generating equipment (Assessor Parcel Number [APN] 210-01-43), and an approximately 30-acre parcel east of the railroad tracks containing the east tank farm (large above ground fuel oil storage tanks), which upon removal, the CECP would be constructed (APN 210-01-41). The CECP would be sited on a 23-acre portion of the 30-acre parcel located east of the rail corridor and west of I-5.

The EPS has been in operation as a power generation station since 1954, with no significant changes in the land use of the site since its origination. Over the years, several operational and infrastructure changes have occurred, including the addition of the 400-foot high stack to disperse air emissions, the addition and expansion of buildings, and other site improvements. In 1999, Cabrillo acquired EPS from SDG&E and now owns the power plant, surrounding lagoon areas, related facilities and above ground fuel oil storage tanks (including recessed level EPS Tanks 5, 6, and 7, which would be removed as part of the project to accommodate the CECP).

The CECP would be located north of the intersection of Carlsbad Boulevard and Cannon Road. The primary operations access to the site would be from Carlsbad Boulevard, through the existing EPS, and using the existing railroad crossing between APN 210-01-43 and APN 210-01-41.

During construction, up to 3 acres of the existing EPS west of the railroad tracks will be used for construction worker parking, and up to seven acres on the EPS would be used for onsite construction equipment/material laydown. No offsite construction worker parking or construction equipment/material laydown are anticipated to be required for the construction of the CECP.

Other Project-Related Features and Facilities

With the exception of short, onsite interconnections, no offsite transmission or gas supply lines are required for the project. Other features/facilities that would be developed as part of the proposed project are listed below.

- Ocean-water purification system and industrial wastewater discharge: An ocean-water purification system (reverse osmosis) is proposed as an alternative source of industrial water for CECP, in addition to the potential use of reclaimed water. An alternative discharge industrial wastewater path through the existing EPS ocean-water discharge system is offered, in addition to the plan to discharge CECP industrial wastewater through the city's existing system. The ocean water purification system and industrial water discharge would be located within the EPS boundaries.
- Tank Demolition and Remediation: Demolition of EPS fuel oil tanks 5, 6, and 7 (i.e., EPS Tanks 5, 6, and 7 which, along w/ EPS Tank 4, comprise the "east tank farm");
- Retirement of existing EPS units: As part of the CECP, existing EPS steam boiler Units 1, 2, and 3 would be retired upon the successful commercial operation of the new CECP generating units, and the use of seawater for cooling water for these three units would cease;
- New SDG&E Switchyard: Construction of a new SDG&E 230-kV switchyard which would be located at the Cannon Substation -- SDG&E's switchyard property south of the CECP site -- parcel APN 210-010-42. The 230-kV electrical interconnection from CECP to the new SDG&E 230-kV switchyard would be via an above/underground cable; and
- Natural Gas Interconnection Pipeline: Natural Gas would be provided from the existing Southern California Gas Company (SoCalGas) transmission pipeline (Line TL 2009, "Rainbow line"), which is located immediately adjacent to the CECP site, on the west side parallel to the existing rail line via a 1,100 foot long interconnection pipeline.

Agricultural Land

The Farm Land Mapping and Monitoring Program (FMMP) of the California Department of Conservation (DOC) provide statistics on conversion of farmland to non-agricultural uses for San Diego County where the CECP is located. According to the FMMP "Important Farmlands" maps, the proposed project site and all associated facilities are located on land defined as "Urban and Built-up Land" (see **Land Use Figure 1).** Urban and Built-up Land is defined by the DOC as: "land occupied by structures with a building density of at least one unit to 1.5 acres, or approximately six structures to a 10-acre parcel. This land is used for residential, industrial, commercial, construction, institutional, public administration, railroad and other transportation yards, cemeteries, airports, golf courses, sanitary landfills, sewage treatment, water control structures, and other developed purposes."

There are lands designated as Prime, Unique, and of Statewide Importance within the one-mile buffer of the CECP site (see **Land Use Figure 1**). These lands are all located east of the I-5 transportation corridor.

The proposed project and related facilities are not subject to an Agricultural Land Conservation (Williamson Act) contract. In addition, the proposed project and related facilities are located on land that is considered nonagricultural land by the DOC.

SURROUNDING AREA

For purposes of describing the existing land uses in the nearby area, existing uses at the EPS site that surround the proposed CECP, and uses surrounding the EPS are described below.

Land uses surrounding the proposed CECP site (within the EPS) consist of:

- industrial facilities associated with the EPS to the west, south, and southwest;
- AT&SF/North County Transit District (NCTD) Rail Corridor to the west;
- Middle Agua Hedionda Lagoon to the north[3]; and
- I-5 transportation corridor directly to the east. I-5 is an Eligible State Scenic Highway, and is considered a Community Scenic Corridor by the City of Carlsbad[4].

Land uses surrounding the EPS include:

- Middle and Outer Agua Hedionda Lagoon to the north and northeast, respectively;
- Carlsbad Boulevard directly to the west, which is considered a Community Scenic Corridor pursuant to the Carlsbad General Plan[4];
- Carlsbad State Beach located west of Carlsbad Boulevard;
- Single-family residences to southwest, located west of Carlsbad Boulevard;
- The I-5 transportation corridor to the east;
- The Carlsbad Aqua Farm located adjacent to the Outer Lagoon's southern shore;
- Hubbs Sea World Research Institute and fish hatchery, located on the north side of the Outer Lagoon;
- Car Country Park, located on Paseo Del Norte, to the south and adjacent to the west side of I-5. This small greenbelt is privately owned and operated;
- Cannon Boulevard to the south; and
- Single-family residences on the south side of Cannon Boulevard (Terramar Assn.).

In addition to the land uses described above, the following land uses occur within one mile of the proposed project site:

- **Recreational Facilities:** There are five City parks or facilities, one State Beach, and one private park within approximately one mile of the CECP site. Magnolia Athletic Field is located on Highland Drive, north of the CECP site. Cannon Park is located on Carlsbad Boulevard and Cannon Road, south and west of the CECP site. This park features basketball courts, picnic tables, barbeque, toy lot play area, and a softball back stop. Chase Field and Brierly Field are both located north of the CECP

[3] The Agua Hedionda Lagoon is a regionally significant biological resource. As a result of the location of the proposed project in close proximity to this sensitive resource, the CECP site would be required to comply with the North County Multiple Habitat Conservation Plan (MHCP) and the Habitat Management Plan for Natural Communities in the City of Carlsbad (HMP). The **Biological Resources** section provides and analysis of the proposed project's consistency with the MHCP and HMP.

[4] The **Visual Resources** section provides information on scenic resources.

site, just west of I- 5 and adjacent to Chestnut Avenue. Holiday Park is also north of the CECP site and located off Chestnut Avenue, but is adjacent to the east side of I-5.

- **Educational Facilities:** There are sixteen (16) schools located within the Carlsbad Unified School District, which serve the city of Carlsbad. Valley Middle School, Jefferson Elementary School, Magnolia Elementary School (which also houses Carlsbad Seaside Academy, a public home school program), Pine Elementary School, and Carlsbad Village Academy (an alternative public high school) – are all located within one mile of the CECP site. Additionally, there is one private religious school (Saint Patrick's) north of the CECP site on Tamarack Avenue and one private for-profit alternative High School (La Palma High School) also north of the CECP site on Harding Street within the one-mile buffer.
- **Religious Facilities:** There are five churches located within one mile of the CECP site. Included are First Baptist Church of Carlsbad, Saint Patrick's Catholic Church, the North Coast Christian Fellowship, Carlsbad Community Church, and the Carlsbad Religious Science Church, all located north of the CECP site.

GENERAL PLAN LAND USE AND ZONING DESIGNATIONS

Land Use Figure 2 (General Plan Land Use Map) and **Land Use Figure 3** (Zoning Map) illustrate the land use and zoning designations of the proposed power plant site. In addition, these figures illustrate the land use and zoning designations of lands within the one-mile buffer of the proposed power plant site. The land use and zoning designations of the areas surrounding the proposed project do not directly apply to the proposed project, but are presented to help illustrate the affected local agencies' existing and planned pattern of land use development in the project area.

Project Site

The proposed CECP site has a City of Carlsbad General Plan Land Use designation of Public Utility ("U"), and is zoned Public Utility ("PU"). The "PU" zoning designation implements the corresponding General Plan "U" designation. The "U" General Plan designation allows for the generation of electrical energy, treatment of waste water, and operating facilities, or other primary utility functions designed to serve all or a substantial portion of the community. The "PU" Zone allows for the generation and transmission of electrical energy, use and storage of fuel oils, and energy transmission facilities, all of which are existing uses at the EPS. The "PU" Zone also specifies that the issuance of any building permits or entitlements cannot occur until a Precise Development Plan (PDP) has been approved by the City of Carlsbad for the property.

Within One-Mile Radius of the Project Site

Information regarding the general plan land use and zoning designations surrounding the site is not directly applicable to the proposed project, but is presented to illustrate the local agencies' planned pattern of land use development in the project area.

General Plan land use designations within the project vicinity include Open Space, Public Utilities, and Travel/Recreation Commercial. General plan land use designations adjacent to the CECP site and within a one-mile radius of the site include Elementary School, Junior High School, Planned Industrial, Open Space, Public Utilities, Regional

Commercial, Local Shopping Center, Travel/Recreation Commercial, Office and Related Commercial, Village, Low-Medium Density, Medium Density, Medium-High Density, and High Density.

Zoning designations (City of Carlsbad Municipal Code, Chapter 21.36) within the project Vicinity includes Residential Agricultural, Public Utility, and Open Space. Zoning designations adjacent to the CECP site and within a one-mile radius of the site include Residential Agricultural, One-Family Residential, Two-Family Residential, Multiple-Family Residential, Residential Density-Multiple, Residential Professional, Tourist Commercial, Public Utility, Village Redevelopment, Planned Community, Open Space, Neighborhood Commercial Zone, and General Commercial Zone.

Land Use Figures 2 and 3 illustrate the city's General Plan Land Use and Zoning designations, respectively. AFC Land Use **Tables 5.6-3 and 5.6-4** describe the uses allowed by the general plan and zoning designations within a one-mile radius of the proposed CECP site.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Energy Commission staff has analyzed the information provided in the AFC and has acquired information from other sources, including the local jurisdiction, to determine consistency of the proposed project with applicable land use LORS and the proposed project's potential to have significant adverse land use-related impacts.

METHOD AND THRESHOLDS FOR DETERMINING SIGNIFICANCE

Significance criteria used in this document are based on the CEQA Guidelines (CCR 2006) and performance standards or thresholds identified by Energy Commission staff, based on applicable LORS and utilized by other governmental regulatory agencies. An impact may be considered significant if the proposed project results in:

- Conversion of Farmland

    1. Conversion of 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.

    2. Conflict with existing zoning for agricultural use or a Williamson Act contract.

    3. Other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural uses.

- Physical disruption or division of an established community.
- Conflict with any applicable habitat conservation plan or natural community conservation plan.
- 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, redevelopment plan, or zoning ordinance.

- 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: they create unmitigated noise, dust, or a public health or safety hazard or nuisance; result in adverse traffic or visual impacts; or preclude, interfere with, or unduly restrict existing or future uses. Please see other sections of this document, as noted, for a detailed discussion of any additional potential project impacts and recommended mitigation and conditions of certification.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Conversion of Farmland

According to the FMMP, the proposed project, including its associated linear facilities, are all located on lands designated as "Urban and Built-Up Land." In addition, none of the lands affected by the proposed project are zoned for agricultural uses. Given the FMMP designations for lands affected by the proposed project, the proposed project would not convert any Farmland (i.e., with FMMP designations of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance) to non-agricultural use. Neither the construction nor operational activities of the proposed project would result in any impacts to existing agricultural operations or foreseeable future agricultural use. In addition, the project site is not located in an area that is under a Williamson Act contract. Therefore, the proposed project would not result in the conversion of Farmland to non-agricultural use, or conflict with existing agricultural zoning or Williamson Act contracts. The project would have no impact with respect to farmland conversion.

Physical Disruption or Division of an Existing Community

The proposed CECP and its related features/facilities would be located within the boundaries of an existing power plant that has been in its current location since the mid 1950s. The proposed power plant and associated SDG&E Cannon Substation switchyard would be located between two major transportation corridors (i.e., the NCTD Rail Corridor and I-5). In addition, the proposed project is located on lands designated and zoned for public utility uses, including electrical generating facilities. The power plant would be located entirely on private property, on existing parcels that contain uses and facilities related to the activities at the existing EPS. Access to the proposed project (including the construction laydown/worker parking area) would be through existing rights-of-way, including Cannon Road and Carlsbad Boulevard, and roadways internal to the EPS. Therefore, no existing roadways or pathways would be blocked or removed from service due to the proposed CECP. In addition, no off-site facilities would be constructed as a result of the proposed project.

The proposed project would not disrupt or divide an established community, nor would it conflict with the established industrial and power generation-related uses located immediately adjacent to it at the EPS. The proposed project primarily involves the development of energy infrastructure in an area designated for public utilities and

energy-related uses. Therefore, no significant impacts associated with division of an established community would occur as a result of the proposed project.

Conflict with Any Applicable Habitat or Natural Community Conservation Plan

The **Biological Resources** section provides a detailed discussion of LORS applicable to wildlife and plants, including the proposed project's consistency with the North County Multiple Habitat Conservation Plan (MHCP) and the Carlsbad Habitat Management Plan (HMP) for Natural Communities. As discussed in the **Biological Resources** section, the proposed project is subject to the MHCP and HMP in the City of Carlsbad. In general, these plans are protective of special-status species and identified conservation areas (e.g., Agua Hedionda Lagoon). Biological Resources staff has determined that the proposed project would not result in significant impacts to special-status species or sensitive habitat. Therefore, the proposed CECP would comply with the MHCP and HMP.

Conflict with Any Applicable Land Use Plan, Policy, or Regulation

As required by California Code of Regulations, Title 20, Section 1744, Energy Commission staff evaluates the information provided by the project owner in the AFC (and any amendments), project design and operational components, and siting 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 (PRC 2005). This includes all applicable federal, state, and local laws, ordinances, regulations, and standards, including those adopted by the California Coastal Commission and city of Carlsbad. 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.

As part of the licensing process, the Energy Commission must determine whether a proposed facility complies with all applicable state, regional, and local LORS (Public Resources Code section 25523[d][1]). The Energy Commission must either find that a project conforms to all applicable LORS or make specific findings that a project's approval is justified even where the project is not in conformity with all applicable LORS (Public Resources Code section 25525).

The discussion of the proposed project's consistency with applicable LORS is presented below**.**

California Coastal Commission

The project must demonstrate consistency with the Coastal Act policies, which constitute the standards used by the California Coastal Commission (Coastal Commission) in its coastal development permit decisions.

California Coastal Act

The Coastal Act establishes a comprehensive approach to govern land use planning along the entire California coast. The Coastal Act also sets forth general policies (Public

Resources Code §30200 et seq.) that govern the Coastal Commission's review of permit applications and local plans. In the case of energy facilities, Section 30600 of the Coastal Act states: (a) Except as provided in subdivision (e), and in addition to obtaining any other permit required by law from any local government or from any state, regional, or local agency, any person, as defined in Section 21066, wishing to perform or undertake any development in the coastal zone, other than a facility subject to Section 25500, shall obtain a coastal development permit. Section 25500 specifically identifies the Energy Commission's exclusive power to certify sites for power generation facilities 50 MW or greater and related facilities anywhere in the state.

The project site is located within the Coastal Zone in the city of Carlsbad. Although the city of Carlsbad has a certified Local Coastal Program (LCP), the proposed CECP site (and the entire Agua Hedionda Land Use Plan area) is within the retained jurisdiction of the Coastal Commission. The Coastal Commission retains jurisdiction of tidelands trust and other public trust lands such as historical coastal wetlands within areas that would otherwise fall under the jurisdiction of the LCP. The Coastal Commission is responsible for issuing Coastal Development Permits (CDPs) in its retained jurisdiction, based on an evaluation of the project's conformity with the policies of the California Coastal Act of 1976. The policies of the City of Carlsbad's LCP, general plan, and zoning ordinance, however, are used by the Coastal Commission as guidance (Luster 2006). Because the Energy Commission has jurisdiction over power plants and all related facilities (Public Resources Code, Section 25500), the Energy Commission issues a license in lieu of any state or local permit and must make findings concerning whether the proposed project conforms with state and local laws, ordinances, regulations and standards, including land use plans and zoning. To that end, the city of Carlsbad's applicable LORS (see below), including the city's LCP, general plan and zoning ordinance and the Coastal Commission's policies are used as guidance by the Energy Commission for LORS determination.

California Coastal Act Consistency Determination

Energy Commission staff received a letter from the Coastal Commission (docketed on October 16, 2007) stating that due to its staff's substantial workload and limited resources, the Coastal Commission will be unable to participate in the Application for Certification (AFC) reviews currently before the Energy Commission. As a result, the Coastal Commission will not be developing the report as it normally would for the CECP siting case pursuant to Coastal Act Section 30413(d).

The Coastal Commission further noted that the CECP (as well as other power plants located in the coastal zone) is proposing to end the environmentally destructive use of seawater for once-through cooling and instead employ dry cooling technology, which the Coastal Commission has strongly supported during past power plant reviews. The move away from once-through cooling reduces the Coastal Commission's concerns about the type and scale of impacts associated with these proposed projects and about the ability of these projects to conform to Coastal Act provisions. As such, the Coastal Commission's letter encourages the Energy Commission to incorporate some aspects of Coastal Act conformity into our review.

In light of the Coastal Commission's letter, staff has determined that the project would be consistent with the land use related policies of the Coastal Act based on staff's

review of the project and the applicable Coastal Act policies. Staff's analysis with each applicable requirement is discussed below. Please refer to the **Biological Resources, Hazardous Materials Management, Visual Resources, Soils and Water,** and **Cultural Resources** sections of this document for a complete discussion of the project's compliance within these areas, to the degree they apply to Coastal Act provisions.

Coastal-Dependent Developments

The Coastal Act §30255 states: Coastal-dependent developments shall have priority over other developments on or near the shore line. Except as provided elsewhere in this division, coastal-dependent developments shall not be sited in a wetland. When appropriate, coastal related developments should be accommodated within reasonable proximity to the coastal-dependent uses they support.

The proposed CECP would be a 558 MW gross combined-cycle generating facility located at the existing EPS, which is considered a coastal-dependent facility by the Coastal Commission. The existing EPS is a "coastal dependent use" pursuant to the Coastal Act, inasmuch as it uses once-through cooling technology. Coastal dependent uses are encouraged to expand "within existing sites and shall be permitted reasonable long-term growth where consistent with this division" (Public Resources Code, Section 30260). Even though the existing EPS steam boiler Units 1, 2, and 3 would be retired upon successful commercial operation of the new CECP generating units, the other existing EPS Units 4 and 5 would continue operating. Therefore, the EPS would continue to be a coastal dependent facility. Thus, the addition of the proposed project (i.e., CECP generating units 6 and 7) is an expansion of a coastal dependent use that is consistent with provisions of the Coastal Act. In addition, at this point, it appears that the most feasible source of water for the new CECP facility would be the proposed ocean-water purification system, which would make the CECP a coastal-dependent use.

The site is zoned Public Utility (allows for the generation and transmission of electrical energy) by the city of Carlsbad. The CECP would be located on the same property as the existing EPS power plant, and all of its associated infrastructure would be on-site at the existing EPS. The Coastal Act §30101 defines "Coastal-dependent development or use" as any development or use which requires a site on, or adjacent to, the sea to be able to function at all. While the CECP would not use ocean water for once-through cooling and on this basis may not be considered coastal dependent, locating the CECP at the site of the existing EPS (which is a coastal dependent use) and the proposed ocean-water purification system would make the project a coastal-dependent facility. Locating the CECP and its associated facilities/features on-site at the EPS allows the CECP to utilize the plant's infrastructure, thereby avoiding offsite construction of linear facilities or other infrastructure. Constructing the CECP on this site would avoid the need to develop in areas of the city of Carlsbad unaccustomed or unsuited to this type of industrial development. In addition, by shutting down existing EPS Units 1, 2, and 3, the proposed CECP would enhance the marine environment by reducing the use of once-through cooling seawater.

The region needs additional electric generation and constructing the CECP on the existing EPS site prevents the need for development of this type of industrial facility in another area of the Coastal Zone or elsewhere outside the Coastal Zone. The EPS has

been an established industrial site since the early1950s. The existence of two major transportation corridors (i.e., the NCTD Rail Corridor and I-5) on either side of the proposed CECP site indicates that the parcel would remain as an industrial site, because the future siting of land use types other than industrial between these heavily-traveled transportation corridors would likely be incompatible. It should be noted that Caltrans has plans for widening the I-5 corridor adjacent to the east boundary of the EPS, there is a potential for the existing single railroad track through the EPS to be double-tracked (see description under the **CUMULATIVE IMPACTS AND MITIGATION** section), and the city of Carlsbad has plans for placing the Vista/Carlsbad Interceptor Sewer and Agua Hedionda Lift station projects along and within the west boundary of the CECP, immediately adjacent to the NCTD Rail Corridor (COC 2008j). All of these foreseeable land uses are public utilities and compatible with the types of existing development at the EPS site and the proposed CECP. Therefore, the proposed CECP also would be a suitable use for this site.

Coastal-Dependent Industrial Facilities

The Coastal Act §30260 states: Coastal-dependent industrial facilities shall be encouraged to locate or expand within existing sites and shall be permitted reasonable long-term growth where consistent with this division. However, where new or expanded coastal-dependent industrial facilities cannot feasibly be accommodated consistent with other policies of this division, they may nonetheless be permitted in accordance with this section and Sections 30261 and 30262 if (1) alternative locations are more environmentally damaging; (2) to do otherwise would adversely affect the public welfare; and (3) adverse environmental affects are mitigated to the maximum extent feasible.

The proposed CECP would be sited within the boundary of the existing EPS site. Therefore, the CECP is consistent with the Coastal Act policy that prefers onsite expansion of existing power plants to development of new power plants in undeveloped areas of the Coastal Zone. The EPS property is zoned for public utility use and has been previously developed in its entirety for industrial uses. Construction of the CECP on the site of an existing industrial property with access to existing power infrastructure, and with limited adjacent sensitive uses, has greater relative merit to development of a power plant at an alternative site. Therefore, staff concludes that the CECP is consistent with Section 30260 of the Coastal Act. In addition, it is worth noting that for several coastal power plant repower licensing cases[5], the Energy Commission found such sites to be coastal dependant and in conformity with the Coastal Act because they were located on the same site as an existing industrial facility. The **Alternatives** section provides a discussion of the alternatives screening process and alternative sites analyzed.

Environmentally Sensitive Habitat Areas

The Coastal Act §30240 (b) states: Development in areas adjacent to environmentally sensitive habitat areas and parks and recreation areas shall be sited and designed to

[5] Specifically, El Segundo Power Plant Project, Morro Bay Modernization and Replacement Power Plant Project, Moss Landing Power Plant Project, and Humboldt Bay Repowering Project.

prevent impacts which would significantly degrade those areas, and shall be compatible with the continuance of those habitat and recreation areas.

The Agua Hedionda lagoon is adjacent to the CECP site, and there are several recreational resources within one mile of the CECP site. The **Biological Resources** section of this document provides a detailed analysis of how the CECP would comply with this section of the Coastal Act. The **Visual Resources** section of this document addresses the CECP's visual impacts on surrounding land uses (including recreational resources), and how the proposed CECP would comply with this section of the Coastal Act.

From a land use perspective, construction and operation of the CECP would not significantly impact environmentally sensitive habitat areas and parks, including the Agua Hedionda Lagoon and the recreational facilities surrounding the EPS site, because the CECP would be entirely within the fenced perimeter of the EPS, which is an existing power plant facility.

Public Access Policies

The Coastal Act §30211 states: Development shall not interfere with the public's right of access to the sea where acquired through the use or legislative authorization, including, but not limited to, the use of dry sand and rocky coastal beaches to the first line of terrestrial vegetation.

The Coastal Act §30212 (a) states: Public access from the nearest public roadway to the shoreline and along the coast shall be provided in new development projects except where (1) it is inconsistent with public safety, military security needs, or the protection of fragile coastal resources; (2) adequate access exists nearby; or (3) agriculture would be adversely affected. Dedicated accessway shall not be required to be opened to public use until a public agency or private association agrees to accept responsibility for maintenance and liability of the accessway.

Coastal Rail Trail Project

The California Coastal Rail Trail (CRT) is intended to provide a multi-modal (i.e. walking/day hiking, in-line skating, road bicycling, running etc) transportation route that is separated from the roadway and will run adjacent to the active tracks of the Los Angeles– San Diego rail corridor used by Amtrak, Metrolink, and Coaster commuter trains. According to the city of Carlsbad, the CRT was envisioned to run 44 miles within existing railroad right-of-way from Oceanside to the train depot in downtown San Diego (COC 2008k). Sections of the CRT have been completed in Carlsbad. However, the North County Transit District (NCTD) has now clarified that it will not support a trail in its right-of-way, possibly due to liability and plans to install an additional track (NCTD 2009a) . Consideration and funding of the trail began in the early 1990s. The City of Carlsbad, acting as the lead for cities in which the trail would be located, approved the trail project in 2001. The CRT has an approximate overall section of 18 feet to 21 feet and a paved trail width of 12 feet with shoulders on either side. The trail also has street lights and is bordered by fencing. In the City of Carlsbad, the goal is to locate the trail separate from the roadway. However, in some cases the trail has been built as an on-street, Class II bikepath. The trail was envisioned by the city of Carlsbad on the east

side of the railroad tracks for several reasons: 1) train stations are on the east side in Carlsbad; 2) the trail is intended to share the Agua Hedionda Lagoon bridge with the Vista Carlsbad Interceptor Sewer Project, which is located on the east side; and 3) the trail alignment was selected to avoid environmental impacts. According to the city, the west side railroad tracks in some areas of Carlsbad would have environmental impacts (COC 2008j; COC 2008k).

Originally, the CRT was planned within the NCTD Rail Corridor through the EPS property. Upon understanding that the trail would need to be located out of the NCTD right-of-way, the City of Carlsbad had discussions with the applicant regarding alternative CRT alignments through and along the EPS property. Alignments considered include: one currently being discussed along the west side of I-5; and an alignment on the opposite, west side of the proposed CECP, still on the applicant's property, east of the railroad tracks, and within a sewer easement the city has on the EPS property. According to the city of Carlsbad, the applicant has not looked favorably on the western alignment because of security concerns that would occur where the CRT would intersect the existing gated crossing that provides access across the railroad tracks and to the EPS property on the west side of the railroad (COC 2008k). The city of Carlsbad, in conditioning the Precise Development Plan (PDP) approval for the EPS, required the applicant to dedicate an easement for the CRT in a location within the boundaries of the PDP that is mutually acceptable to the City and Cabrillo Power or its successor in interest. The reader is referred to the discussion below (under the Warren-Alquist Act) for additional analysis of this issue as it relates to the proposed CECP's compliance with public access and use issues.

The CECP would be located entirely within the fenced perimeter of the existing EPS. Construction and operation of the CECP would not impede or deter public access in the Coastal Zone, including use of the existing constructed portions of the CRT within the city. Further, the proposed project would not require additional rights-of-way for related transmission or linear facilities that could impede or deter public access in the Coastal Zone.

State Agencies

The **Warren-Alquist Act (Pub. Resources Code § 25500 et seq.)**, discusses the Energy Commission's statutory requirement for a public use area for facilities proposed in the Coastal Zone.

Pursuant to Public Resources Code §30413(b) of the Coastal Act, the Coastal Commission shall "designate those specific locations within the Coastal Zone where the location of a facility, as defined in § 25110, would prevent the achievement of the objectives of this division; provided, however, that specific locations that are presently used for such facilities and reasonable expansion thereof shall not be so designated." The proposed CECP would be located entirely within the EPS. The Coastal Commission has not designated the existing EPS power generation facility site as a site that is inappropriate for the facility or for reasonable expansion. The proposed CECP represents modernization of existing EPS infrastructure. As stated above, the CECP is consistent with the Coastal Act provision that prefers onsite expansion of existing power plants to development of new power plants in undeveloped areas of the Coastal Zone.

Warren-Alquist Act (Pub. Resources Code § 25500 et seq.)

Pursuant to § 25529 of the Warren-Alquist Act, the Energy Commission shall require the establishment of an area for public use as a condition of certification of a facility proposed in the Coastal Zone as follows:

"When a facility is proposed to be located in the Coastal Zone or any other area with recreational, scenic, or historic value, the [Energy] Commission shall require, as a condition of certification of any facility contained in the application, that an area be established for public use, as determined by the Commission. Lands within such area shall be acquired and maintained by the applicant and shall be available for public access and use, subject to restrictions required for security and public safety. The applicant may dedicate such public use zone to any local agency agreeing to operate or maintain it for the benefit of the public. If no local agency agrees to operate or maintain the public use zone for the benefit of the public, the applicant may dedicate such zone to the state. The [Energy] Commission shall also require that any facility to be located along the coast or shoreline of any major body of water be set back from the shoreline to permit reasonable public use and to protect scenic and aesthetic values."

On March 26, 2008, staff conducted a field review of potential public use areas. Staff met with representatives from the City of Carlsbad and the applicant to determine where opportunities for public use exist and how to best provide such an area within the community. In addition, as discussed above, staff has obtained detailed information about the city's plans regarding the CRT (COC 2008k).

Selection Criteria

In its review of the potential projects discussed with the city of Carlsbad and the applicant, staff used the following criteria as guidance for selecting an appropriate public use area:

- Would the project provide a specific and tangible benefit to the community?
- Are the project plans developed?
- Is the project environmental review and permitting underway or completed?
- Would the project cause a public nuisance?
- Would the project be properly operated and maintained?
- Can the project component that would be funded by the applicant be developed regardless of where and when additional funding is obtained?
- Would the project funding mechanisms allow the applicant to make a one-time contribution?

In addition to placement of the CRT within the EPS site, the city of Carlsbad provided information on CRT alignments that could avoid the EPS site entirely. The CRT could connect to Carlsbad Boulevard, the street that runs north-south along the front of the EPS and Agua Hedionda Lagoon (COC 2008k). A Carlsbad Boulevard alignment could avoid crossing the power plant property and would require the trail to be located on the west side of the railroad tracks. However, such an alignment would not fulfill the CRT

vision of providing a route along the railroad (COC 2008k). Further, existing constraints caused by the beach and lagoon, a wide boardwalk, and two bridges, would make it difficult to comply with the CRT goal of locating a path apart from a roadway.

Based on the above criteria, staff has determined that implementation of **LAND-1** would best meet the needs of the community, as well as the statutory requirement for a public use area. **LAND-1** would require the applicant to dedicate an easement for the CRT in a location within the boundaries of the EPS PDP area that is mutually agreed upon by the city, but located west of the NCTD Rail Corridor. Based on further site reconnaissance conducted in June 2009, staff analyzing plant security issues observed that there is adequate space for the CRT on the western side of the NCTD rail corridor through the EPS. Locating the CRT west of the rail corridor would be preferable to staff as it would not pose safety, security, or emergency response access problems for the CECP site. It would also afford public access to the city's seawater desalination facility. Staff understands that the city would be providing public "educational tours" of the desalination project. Therefore, placement of the CRT west of the rail corridor would allow for safe and easy access in that the public would not have to cross the tracks to get to the city's desalination facility. The **Hazardous Materials Management** section provides a discussion of site security issues.

Other Considerations

In addition to the Warren Alquist requirement for public use areas, the Agua Hediona Land Use Plan (AHLUP), which is the applicable portion of the city's LCP, designates the proposed CECP site and the surrounding EPS as "Utilities" (U). The AHLUP (in accordance with Coastal Act Policy 30212), states that "[p]ublic access from the nearest public roadway to the shoreline and along the coast shall be provided in new development projects…" (COC 1982, page 48). The proposed project would not be considered a new project, because it would be located entirely within the existing EPS boundaries and includes decommissioning of older EPS units and replacement with newer technology in power generation. Staff notes that if the Energy Commission approves the CECP, the applicant would either dedicate an easement for the CRT or provide funding for such an easement as a requirement of licensing (see Condition of Certification **LAND-1**) facilitating the completion of the CRT within the City of Carlsbad for public use and enjoyment. In addition, the ongoing use of the CECP site, while predominantly industrial, would not preclude the public's use and enjoyment of adjacent coastal lands, as is currently the case with the EPS and surrounding coastal lands.

Based on the above criteria and input received from the City of Carlsbad Planning Department, staff has determined that the dedication of an easement for the CRT within the EPS PDP area, or the funding of the purchase/acquisition of an easement in an appropriate location within the city of Carlsbad, would be the best option for meeting the statutory requirement for a public use area. As a multi-modal transportation route, the completion of the CRT would improve both local and regional access and allow for the connectivity of south and north San Diego County cities with a continuous recreational trail. Staff recommends the implementation of Condition of Certification **LAND-1** to ensure compliance with the Warren-Alquist Act (Pub. Resources Code § 25500 et seq.) requirements regarding public use.

City of Carlsbad

When determining LORS compliance, staff is permitted to rely on a local agency's assessment of whether a proposed project is consistent with that agency's zoning and general plan. On past projects, staff has requested that the affected local agency provide a discussion of the findings and conditions that the agency would make when determining whether a proposed project would comply with that agency's LORS, were they the permitting authority. Any conditions recommended by an agency are considered by Energy Commission staff for inclusion in the proposed conditions of certification for the project.

As part of staff's analysis of local LORS compliance, and specifically to determine the views of the city of Carlsbad on the project's consistency with their General Plans and zoning codes, staff sent a solicitation letter to the city of Carlsbad on March 20, 2008. The letter was sent to the city's planning department detailing the LORS compliance issues associated with the proposed project. Staff requested that the city provide the conditions and/or variances that they would attach to the proposed project, were they the permitting agency if not for the exclusive siting authority of the Energy Commission.

On May 1, 2008, the city of Carlsbad responded to staff's letter by providing specific and detailed information regarding land use LORS, the city's position on the proposed project, and the LORS that the city interprets as being directly applicable to the proposed project (COC 2008e). The city indicated that, "Carlsbad does not support the CECP" (COC 2008e). According to the city, "[t]he EPS property is predominantly surrounded by residences and open space. Its central location and proximity to the beach and lagoon, significant open space, and major transportation corridors make it a potential key gateway location and a connector between the ocean and existing and future visitor-serving and recreational uses." **LAND USE Table 2** provides a summary of the city's analysis of the proposed project with applicable LORS. In addition, **LAND USE Table 2** includes staff's determination of the applicability of the city's LORS and the associated city analysis with the proposed project. Based on the LORS consistency analysis conducted by staff, the proposed project is consistent with applicable land use LORS (see **LAND USE Table 2b**).

LAND USE Table 2a and **Table 2b** provide the consistency of the proposed CECP with the applicable land use LORS adopted by federal, State, and local agencies, as identified in **LAND USE Table 1**. **LAND USE Table 2** is presented in two parts. **LAND USE Table 2a** presents information on applicable State LORS and staff's analysis of the proposed project's consistency with those LORS. Because the city of Carlsbad provided detailed input in response to staff's request regarding the city's interpretation of their applicable LORS, **LAND USE Table 2b** provides both the city's analysis of the proposed project's consistency with city LORS, and staff's conclusion regarding the proposed CECP's compliance. Staff has summarized the City's analysis and consistency conclusions for inclusion in the table. For the complete wording by the city, please refer to the city's May, 2008 letter (COC 2008e). In general, staff has determined that the proposed CECP proposal would comply with applicable land use LORS.

LAND USE Table 2a
Project Compliance with Applicable Federal and State Land Use LORS

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
Federal	None		
State			
California Coastal Commission Public Resources Code § 25500 et seq. California Coastal Act of 1976, Public Resources Code §3000, et seq. §25529 of the Warren-Alquist Act	Detailed descriptions of these code sections and their applicability to the proposed project are provided above in the text narrative under the section entitled **Conflict with Any Applicable Land Use Plan, Policy, or Regulation.**	YES (with implementation of Condition of Certification **LAND-1**)	Detailed analysis of these code sections and the proposed project's compliance are provided above in the text narrative under the section entitled **Conflict with Any Applicable Land Use Plan, Policy, or Regulation.** In summary, staff has determined that the project would be consistent with the land use related policies of the Coastal Act based on staff's review of the project and the applicable Coastal Act policies. Staff has determined that implementation of **LAND-1** would best meet the needs of the community, as well as the statutory requirement for a public use area. **LAND-1** would require the applicant to dedicate an easement for the CRT in a location within the boundaries of the EPS PDP area. Staff notes that if the Energy Commission approves the CECP, the applicant would either dedicate an easement for the CRT or provide funding for such an easement as a requirement of licensing (see Condition of Certification **LAND-1**) facilitating the completion of the CRT within the City of Carlsbad for public use and enjoyment. In addition, the ongoing use of the CECP site, while predominantly industrial, would not preclude the public's use or public access to adjacent coastal lands.
Subdivision Map Act (Pub. Resources Code Section 66410-66499.58)	The Subdivision Map Act provides procedures and requirements regulating land divisions and the determination of parcel legality. Regulation and control of the design and improvement of subdivisions by the Map Act have been vested in the legislative bodies of local government. Section 66412.1 of the Subdivision Map Act exempts a project from state subdivision requirements provided that the project demonstrates compliance with local ordinances regulating design and improvements.	YES	As described in the CECP AFC Supplement A and as shown by the Certificate of Compliance issued by the city of Carlsbad, the CECP site is part of the 95-acre Encina Power Station parcel. The Encina Power Station parcel consists of an approximately 65-acre parcel (designated by the San Diego County Assessor as Assessor Parcel Number [APN] 210-01-43), which contains the existing generating equipment and a 31.08-acre parcel east of the railroad tracks (designated by the San Diego County Assessor as APN 210-01-41) containing the fuel tanks that are being removed and upon which CECP would be constructed (CH2MHILL 2007e). The Encina Power Station parcel is owned by Cabrillo Power I LLC, an indirectly

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
			wholly owned subsidiary of NRG Energy, Inc. Carlsbad Energy Center LLC is also an indirectly wholly owned subsidiary of NRG Energy, Inc. At this time, it is the intent of Carlsbad Energy Center LLC to lease APN 210-010-41 from Cabrillo Power LLC for purposes of constructing the CECP. APN 210-010-41 will be a leasehold parcel only. The Certificate of Compliance recorded with San Diego County Recorder's Office on October 30, 2001 (see AFC Supplement Attachment LU-1A) reflects an adjustment to Parcel 4, as shown on Exhibit B, which was identified in 2001 as portions of APNs 210-010-39 and 210-010-40. The portion of Parcel 4 that is located northeast of the railroad tracks is APN 210-010-41. Given this information, the proposed project would be in compliance with the Subdivision Map Act.

LAND USE Table 2b
Project Compliance with Adopted Applicable City of Carlsbad Land Use LORS

Applicable LORS	Description of Applicable LORS[6]	City of Carlsbad Compliance Requirements[7]/Consistency Determination by city of Carlsbad	Energy Commission Staff Conclusion
Carlsbad General Plan	The General Plan Land Use Element designates the entire Encina Power Station (EPS), which includes the CECP site, for Public Utilities ("U"). The General Plan describes the Public Utilities designation as follows: *This category of land use designates areas, both existing and proposed, either being used or which may be considered for use for public or quasi-public functions.* *Primary functions include such things as the generation of electrical energy, treatment of waste water, public agency maintenance storage and operating facilities, or other primary utility functions designed to serve all or a substantial portion of the community. Sites identified with a "U" designation indicate that the City is studying, or may in the future evaluate the location of, a utility facility which could be located within a one kilometer radius of the designations on a site for such a facility. Specific siting for such facilities shall be accomplished only by a change of zone, and an approved Precise Development Plan adopted by ordinance and approved only after fully noticed public hearings.*	The existing power plant [EPS] is consistent with the General Plan Public Utility designation. According to the city, the same statement cannot be made for the CECP. The constant city policy for nearly 20 years has been, with few exceptions, to comprehensively update the Encina Specific Plan 144 before any development occurs. This specific plan encompasses the EPS. Based on Redevelopment Agency goals as expressed in the South Carlsbad Coastal Redevelopment Plan, its comprehensive update would likely replace part or all of the Public Utility designation on the EPS with a designation(s) deemed more appropriate. The update may also result in requirements for open space, recreation, and public uses that would affect the current and proposed power plants. Therefore, until the comprehensive update is processed, a determination of General Plan consistency for the CECP cannot be made. The General Plan, in and of itself, would not require NRG to submit any land use permits. However, implementation of the General Plan's goals, objectives, and policies, would be accomplished by the permits required by the Zoning Ordinance, Local Coastal Program, and other implementing ordinances and policies. Through these permits, the city would need to demonstrate written compliance with the provisions of the General Plan through detailed findings.	The city's General Plan Public Utilities ("U") designation of the proposed project site expressly allows for the development of electrical generating facilities. The proposed project site is also zoned for Public Utilities ("PU"), which implements the "U" land use designation (see below for a discussion of zoning). As noted by the city, the General Plan would not require the applicant to submit any land use permits (COC 2008e). **Consistency:** Based on the fact that the "U" designation lists electrical generation as an allowable land use, and the fact that the proposed project would be sited at an existing power plant facility (i.e., the EPS), staff concludes that the proposed CECP is consistent with the City of Carlsbad General Plan.

[6] COC 2008e
[7] Ibid.

Applicable LORS	Description of Applicable LORS[6]	City of Carlsbad Compliance Requirements[7]/Consistency Determination by city of Carlsbad	Energy Commission Staff Conclusion
Carlsbad Zoning Ordinance, Chapter 21.36	The Public Utilities ("P-U") Zone, Chapter 21.36 of the Zoning Ordinance, has been applied to the EPS and other public utility properties in Carlsbad. It implements the Public Utility land use designation of the General Plan. In 1975, the city amended the P-U Zone to require a precise development plan for public utility uses. As stated in Section 21.36.030 of the Carlsbad Municipal Code, "no building permit or other entitlement for any use in the P-U zone shall be issued until a precise development plan has been approved for the property." In 2000, the first precise development plan for the EPS was submitted; the city approved the precise development plan, PDP 00-02, as part of the Carlsbad Seawater Desalination Plant (CSDP) project in 2006. PDP 00-02 serves as both an entitlement for the existing EPS and planned CSDP, and as a planning document with text and graphics for the entire power plant property. In Section 21.36.010, the Zoning Ordinance states: *The intent and purpose of the P-U zone is to provide for certain public utility and related uses subject to a precise development plan procedure to:* *(1) Insure compatibility of the development with the general plan and the surrounding developments;* *(2) Insure that due regard is given to environmental factors;* *(3) Provide for public improvements and other conditions of approval necessitated by the development.*	Based on the list of permitted uses, both the existing and proposed power plants and their appurtenant facilities are permitted uses in the P-U Zone. The P-U Zone includes only minimal development standards such as minimum lot area and coverage and parking locations. However, Section 21.36.050 states that it is through the precise development plan that requirements are established: *The city council may impose such conditions on the applicant and the [precise development] plan as are determined necessary and consistent with the provisions of this chapter, the general plan and any specific plans that include provisions for, but are not limited to, the following:* *(1) Setbacks, yards and open space;* *(2) Special height and bulk of building regulations;* *(3) Fences and walls;* *(4) Regulation of signs;* *(5) Landscaping;* *(6) Special grading restrictions;* *(7) Requiring street dedication and improvements (or posting of bonds);* *(8) Requiring public improvements either on or off the subject site that are needed to service the proposed development;* *(9) Time period within which the project or any phases of the project shall be completed;* *(10) Regulation of points of ingress and egress;* *(11) Parking;* *(12) Regulation of the type, quality, distribution* *and use of reclaimed water, or reclaimed*	The proposed project would be located within the Public Utilities ("PU") zone designation of the city of Carlsbad. As the city acknowledges, based on the list of permitted uses in this zone, the proposed project and associated facilities are permitted uses in the P-U zone (COC 2008e). **Consistency:** Based on the proposed CECP's zoning and land use designation for Public Utilities ("PU" and "U," respectively), and the fact that both designations allow for electrical generation, staff concludes that the proposed CECP is consistent with the City of Carlsbad Zoning Ordinance.

Applicable LORS	Description of Applicable LORS[6]	City of Carlsbad Compliance Requirements[7]/Consistency Determination by city of Carlsbad	Energy Commission Staff Conclusion
	Among the uses permitted in the P-U Zone are: *1. Agriculture;* *2. Energy transmission facilities;* *3. Electrical energy generation and transmission;* *4. Processing, using and storage of: (a) natural gas, (b) liquid natural gas, (c) domestic and agricultural water supplies;* *5. Public utility district maintenance, storage and operating facilities; and* *6. Wastewater treatment, disposal or reclamation facilities.*	*wastewater.* Compliance with the Zoning Ordinance would be determined through the Precise Development Plan. Because the CECP may affect or be affected by surrounding land uses, a determination of compliance with the Zoning Ordinance would also require the comprehensive update of SP 144.	
<u>Encina Specific Plan (SP 144)</u>	SP 144 was last amended in 2006 and is described as SP 144(H): • *The purpose of this Specific Plan is to set forth the existing land uses and land use regulations applicable to the area of Carlsbad, which includes the Agua Hedionda Lagoon and certain areas near the lagoon including the Encina Power Station.* • *The purpose of this amendment [SP 144(H)] is to incorporate the Encina Power Station Precise Development Plan 00-02 (PDP 00-02) into Specific Plan 144 while maintaining the conditions and regulations of previous Specific Plan Amendments A through G.* SP 144(H) did not change any land use designations, revise any conditions, or establish any development standards. City Council Resolution 98-145 establishes the requirement for a comprehensive update of SP 144 for any development proposal within its	If Carlsbad had permit authority for the CECP, it would require NRG to first prepare a comprehensive update of the Encina Specific Plan 144, consistent with City Council Policy. NRG has submitted an amendment to SP 144 (SP 144 (I)); however, the proposal amends the document to include the CECP but does not propose the comprehensive update required. The comprehensive amendment of the Encina Specific Plan, SP 144, would involve all property owners and all 680 acres within the specific plan. The update would be applicant-initiated (as has been directed by the City Council) and prepared by a professional planning firm supported by experts in necessary disciplines (e.g., environmental, engineering, traffic, communications). An EIR for the comprehensive update would also be required; the consultant to prepare the EIR would be selected and administered by the city with all expenses paid by the	It should be noted that the California Energy Commission has exclusive authority for approval/licensing of power generating facilities over 50 MW. According to the city, SP 144 overrides the city's General Plan Land Use and Zoning designations for the entire specific plan area. In addition, the city would require the applicant to conduct a comprehensive update of the entire specific plan, including properties not owned by the applicant, in order to obtain approval for the CECP, but for the Energy Commission's exclusive authority to license the proposed project. "The purpose of a specific plan is the 'systemic implementation' (Government Code §65450) of the General Plan" (GOPR 1998). "[A]ll specific plans…must comply with Sections 65450 – 65457 of the Government Code. These provisions require that a specific plan be consistent with the adopted general plan of the

Applicable LORS	Description of Applicable LORS[6]	City of Carlsbad Compliance Requirements[7]/Consistency Determination by city of Carlsbad	Energy Commission Staff Conclusion
	boundaries. This requirement was reiterated by a City Council minute motion in 2002. While the city Council waived the requirement for a comprehensive update for the Carlsbad Seawater Desalination Project, the requirement continues to apply to any other proposal, including the CECP.	applicant, NRG. It is not possible to identify all desired objectives or components of the comprehensive amendment; that will only occur as the amendment process is underway. However, the update would likely need to address the following items, all of which would be applicable to any development proposal in the SP 144, not just the CECP: 1. Ensure consistency with state law requirements regarding specific plans; 2. Establish an overall land use vision for SP 144, which would likely incorporate the findings of the Proposition D Committee for the South Shore of the Lagoon and produce the ultimate land use plan for the power plant property both east and west of the railroad tracks. This land use vision would likely change some existing land use designations and zonings, including but not limited to those applicable to the power plant, to incorporate the goals of the South Carlsbad Coastal Redevelopment Plan. Furthermore, this land use vision should ensure compatibility between SP 144 and all surrounding land uses; 3. Provide a land use study with alternatives for land surrounding the CECP site; 4. Ensure consistency between all affected land use documents (PDP 00-02, SP 144, Agua Hedionda Land Use Plan, South Carlsbad Coastal Redevelopment Plan, Habitat Management Plan, Airport Compatibility Land Use Plan, Zoning Ordinance, and General Plan); 5. Update the existing SP 144 to remove provisions that are outdated and/or no longer appropriate and replace them with germane	jurisdiction within which it is located" (GOPR 1998). In addition, "the existing uses of a land within the planning area [of a specific plan] must be analyzed to determine the influence they will have and the role they will play under the specific plan. Existing…industrial…uses may substantially affect the type of uses planned for adjacent properties. The continuation of existing uses may dramatically affect planned uses set forth by the specific plan" (GOPR 1998). Given this information provided by the Governor's Office of Planning and Research (GOPR), staff interprets the city's ability to update and revise SP 144 to be consistent with these State requirements. In other words, with each project proposed within the SP 144 area, the specific plan must be amended to be consistent with the city's General Plan and Zoning Ordinance. In addition, based on a review of the different versions of SP 144 (i.e., A-H versions), staff has determined that each version of the amended specific plan is focused on the new proposed use and not the entire specific plan area. The various versions of SP 144 do not expressly prohibit the existing power generation use and associated facilities that are located within the specific plan area. As such, SP 144 (along with the associated PDP-see below for discussion) appears to have permit-like characteristics which sets development standards and requirements for any particular new proposed use at the time the application for that use is filed with the city. For example, the most recent

Applicable LORS	Description of Applicable LORS[6]	City of Carlsbad Compliance Requirements[7]/Consistency Determination by city of Carlsbad	Energy Commission Staff Conclusion
		requirements that are appropriate and consistent with other documents as expressed in item 2; 6. Update the Agua Hedionda Land Use Plan to ensure all maps, policies, and standards regarding land use, public access, environmental protection, and buildings, among other things, are appropriate and consistent with other documents as expressed in item 3; 7. Review SP 144 and other affected land use documents to ensure consistency with all Coastal Act policies. This is important since SP 144 was adopted prior to Coastal Act approval; 8. Fix inconsistent land use and zoning designations (both City and Coastal) within SP 144; 9. Incorporate and recognize the goals of the South Carlsbad Coastal Redevelopment Plan; 10. Establish trails, public access, and public places, including connections with properties east of Interstate 5 and access to and use of lagoon water bodies and the beach; 11. Consider the design, location, and type of appropriate public amenities; 12. Establish public infrastructure requirements (e.g., street widening, sewer facilities, storm drains); 13. Develop appropriate development and use standards for all properties; 14. Engage all affected property owners, and; 15. Develop and implement a public outreach plan to ensure the public is involved in and aware of the update process. If Carlsbad had permit authority for the CECP, it would require NRG to first prepare	version, SP 144H, amended the specific plan to allow for development of the city's Carlsbad Seawater Desalination Plant, which is industrial in nature. It should be noted that the applicant has submitted to the city an application for the amendment of SP 144 and the existing PDP for the EPS to include the proposed CECP (SR 2007a). **Consistency:** Given the information above, the applicant's attempts to obtain an amendment to SP 144 and the EPS PDP specifically for development of the proposed CECP appears to be consistent with the city's practice in the past to amend these LORS documents as each project is proposed. Staff encourages the applicant to continue working with the city on developing and incorporating project features and components into the CECP that would help reduce environmental impacts to the greatest extent feasible. With regard to the proposed project's consistency with SP 144, staff concludes that SP 144 does not appear to be applicable to the proposed project for the following reasons: • The proposed project is consistent with the city's General Plan Land Use and Zoning Ordinance designations for the site (both of which are the overarching LORS documents guiding the site's development); • SP 144 and the associated PDP (which implements it) have permit-like characteristics that are inconsistent with existing zoning and land use controls applicable to the CECP site;

Applicable LORS	Description of Applicable LORS[6]	City of Carlsbad Compliance Requirements[7]/Consistency Determination by city of Carlsbad	Energy Commission Staff Conclusion
		a comprehensive update of the Encina Specific Plan 144 as described above. Preparation of the update before proceeding with the CECP would be mandatory to determine the appropriateness of the CECP with surrounding existing and proposed uses.	as such SP 144 and the associated PDP are pre-empted by the Energy Commission's "in-lieu" permit ; and • The proposed CECP is physically compatible with the existing surrounding predominantly industrial land uses of the EPS.
Encina Power Station (EPS) Precise Development Plan (PDP 00-02)	The adopted precise development plan (PDP 00-02) for the EPS follows Section 21.36.050 of Carlsbad's Zoning Ordinance. It divides the EPS into planning areas with general development standards for each. It elaborates on parking requirements and provides basic aesthetic and landscaping requirements. PDP 00-02 also contains an inventory of existing uses and facilities at the power station and provides general review and approval criteria for any future improvements. Moreover, through the PDP 00-02, the city was able to condition a number of public improvements and public land or use dedications both in and adjacent to the EPS. As previously stated, a purpose and intent of the P-U Zone is to "insure compatibility of the development with the general plan and the surrounding developments." As stated in the approved PDP 00-02 document, it satisfies this purpose and intent by providing: • A baseline of existing conditions (as of January 2006) • Guidance for building permit and entitlement issuance for allowed uses • Establishment of planning areas, standards and provisions • Amendment and implementation	As noted in Zoning Ordinance Section 21.36.050, the City Council may impose a number of requirements to ensure consistency with the General Plan, including setback and height standards, landscaping, and public improvements. Until the comprehensive update of Specific Plan 144 is complete and, based on that update, use of the CECP site and surrounding properties is known, it is not possible to determine all requirements that should be set forth in PDP 00-02(A) and thus the requirements that would be applied to the CECP. PDP 00-02(A) as submitted by NRG was not prepared in conjunction with the comprehensive specific plan update; therefore, it is not adequate. Based on the requirements set forth in the Zoning Ordinance, if the city were reviewing the proposed application from NRG for compliance purposes, staff would recommend NRG first prepare a comprehensive update of the Encina Specific Plan 144. Once complete, it would then be possible to determine compliance of the proposed CECP from a land use perspective and, if appropriate, the contents of PDP 00-02(A).	See the discussion above regarding SP 144. The PDP appears to be a site-specific permit addressing the details of site utilization and configuration. The PDP does not authorize a range of different land uses to be developed in the future. Therefore, the PDP must be consistent with the overarching Zoning Ordinance. In addition, the current version of the PDP [PDP 00-02(a)] does not expressly disallow Public Utilities uses, because it is the zoning mechanism for the city's Seawater Desalination Plant, which is an industrial/public utility use. **Consistency:** As discussed above under SP 144, staff concludes that because SP 144 appears to be inapplicable to the proposed CECP, a PDP amendment also in turn would not be applicable to the proposed CECP for the following reasons: • The proposed project is consistent with the city's General Plan Land Use and Zoning designations for the site; • SP 144 and the associated PDP (which implements it) have permit-like characteristics that are inconsistent with existing zoning and land use controls applicable to the CECP site;

Applicable LORS	Description of Applicable LORS[6]	City of Carlsbad Compliance Requirements[7]/Consistency Determination by city of Carlsbad	Energy Commission Staff Conclusion
	procedures • Linkage to other related regulations, approvals, and documents. The only development contemplated at the EPS upon the adoption of PDP 00-02 was the Carlsbad Seawater Desalination Plant. Therefore, the document recognized that future significant improvements such as the CECP would require a City Council-approved major amendment to PDP 00-02. Through this major amendment, development standards and other requirements tailored to the proposal would be developed. Accordingly, NRG has submitted a major amendment to the approved precise development plan in the form of PDP 00-02(A).		as such SP 144 and the associated PDP are pre-empted by the Energy Commission's "in-lieu" permit authority; and • The proposed CECP is physically compatible with the existing surrounding industrial land uses. Nevertheless, for the proposed CECP, the applicant has submitted an application to the city for amendment of the existing EPS PDP and SP 144. Staff encourages the applicant to continue working with the city on developing and incorporating project features and components into the CECP that would help reduce environmental impacts to the greatest extent feasible.
Carlsbad Local Coastal Program/Agua Hedionda Land Use Plan	While it does not issue coastal development permits for projects in the AHLUP, the city does review such projects for consistency with the requirements of the plan. Under a typical processing scenario, this consistency determination is made as part of the review of any city permits required. Once Carlsbad's review process is complete, then the applicant would apply to the Coastal Commission to obtain a coastal development permit. The Agua Hedionda Land Use Plan contains eight different sections: land use, agriculture, environmental, geologic hazards, public works, recreation/visitor facilities, shoreline access, and visual resources. These sections contain policies affecting the EPS and other properties. As with the Encina Specific	If the city were the lead agency on the CECP application, it would require NRG to demonstrate compliance with the provisions of the AHLUP. This would be accomplished first through the comprehensive update of SP 144, the method Carlsbad has consistently identified to develop and determine appropriate standards for land uses in the AHLUP area. Once the update was complete, a determination of compliance could then be made. Until this occurs, no such determination can be made, and the CECP cannot be found consistent with the AHLUP. Additionally, since a SP 144 update would require changes to the AHLUP, the city would require NRG to submit a Local Coastal Program Amendment (LCPA). The LCPA would be the application to amend the	The reader is referred to the detailed analysis of the proposed CECP's compliance with the California Coastal Act provided above in the text narrative under the section entitled **Conflict with Any Applicable Land Use Plan, Policy, or Regulation.** In summary, staff has determined that the project would be consistent with the land use related policies of the Coastal Act based on staff's review of the project and the applicable Coastal Act policies. Although staff has solicited Coastal Commission comments on CCA conformity, the agency has repeatedly stated that it will not provide such, and that it is up to the Commission staff to provide such analysis. The Energy Commission's license is in lieu of the Coastal Commission permit. The Coastal

Applicable LORS	Description of Applicable LORS[6]	City of Carlsbad Compliance Requirements[7]/Consistency Determination by city of Carlsbad	Energy Commission Staff Conclusion
	Plan 144, the AHLUP has yet to undergo a comprehensive update and has not had any substantial revisions since its adoption over 25 years ago. The city has intended that the comprehensive update of SP 144 would include the simultaneous, complete update of the AHLUP. In fact, the specific plan does not address the regulations and restrictions of the AHLUP; accordingly, the update of the AHLUP and review to ensure consistency between it, the SP 144, and all other land use documents are identified as items to complete in the specific plan update process.	policies of the AHLUP and would be processed concurrently with the specific plan update. The LCPA would require City Council and Coastal Commission review and approval. Furthermore, and under typical permitting procedures, once NRG had obtained all entitlements from the city, it would then need to apply for a coastal development permit from the Coastal Commission. This permit would be in addition to the need to obtain a LCPA.	Commission on several occasions has reiterated that they would not be issuing a report or a Coastal Development Permit for the proposed project. The Coastal Commission has requested that the Energy Commission conduct the consistency determination for the CECP per the standing 2005 Memorandum of Understanding between the two agencies. Therefore, the Energy Commission's licensing of the proposed project would, in effect, include the Coastal Development Permit for the CECP. **Consistency:** the AHLUP, which is the applicable portion of the city's LCP, designates the proposed CECP site and the surrounding EPS as "Utilities" (U) (COC 1982) consistent with the city's General Plan Land Use and Zoning designations for the site, which allow for electrical generation. Based on this factor, along with the proposed project's consistency with the Coastal Act, staff concludes that the proposed CECP is consistent with the LCP/AHLUP.
South Carlsbad Coastal Redevelopment Project Area Plan	As a result of research on the issues surrounding the existing power plant and related land uses and facilities, the city decided to form a redevelopment area known as the South Carlsbad Coastal Redevelopment Area, the boundaries for which include the power plant property. The intent was for the redevelopment plan and agency to assist in facilitating the development of a new, high efficiency replacement plant to improve air quality and other environmental conditions with	The South Carlsbad Coastal Redevelopment Plan (SCCRP) states the following: *The land uses permitted by this Plan shall be those permitted by the General Plan and zoning ordinance, and all other state and local building codes, guidelines, or specific plans as they now exist or are hereafter amended, with the exception that new development which provides for one or more of the following specific uses may be permitted in the Project Area only after all of*	As acknowledged by the city, the SCCRP permits land uses permitted under the General Plan and Zoning Ordinance. In addition, the proposed project would site the new power generation facilities between the railroad tracks onsite at the EPS and I-5 consistent with the SCCRP. The proposed project also would include the decommissioning of EPS Tanks 5, 6, and 7, and the eventual retirement of EPS Units 1, 2, and 3 (once CECP is operational). It should be noted that the

Applicable LORS	Description of Applicable LORS[6]	City of Carlsbad Compliance Requirements[7]/Consistency Determination by city of Carlsbad	Energy Commission Staff Conclusion
	the concurrent decommissioning of the existing power plant. The underlying intent of the Redevelopment Plan was to convert the industrial land west of the railroad tracks (where the current plant is located) to another, more appropriate land use that would provide greater benefit to the community and would eliminate the possibility of an intensification of industrial applications at that site. At the time, the thought was that a replacement facility would be more aesthetically and geographically desirable than any retrofit to the existing power plant facility, and would be far more efficient. These were incentives for both the power plant property owner and the city to encourage redevelopment of the site, decommissioning of the existing plant, and potential replacement of the existing plant at another location on the EPS site.	*the following are satisfied a) the Carlsbad Housing and Redevelopment Commission approves a finding that the land use serves an extraordinary public purpose. and b) a precise development plan or other appropriate planning permit or regulatory document is first approved by the Commission which sets forth the standards for development of the project, and c) the Commission has issued a Redevelopment Permit for the project:* *(i) Desalination Plant and other facilities for the production, generation, storage, treatment or transmission of water;* *(ii) Generation and transmission of electrical energy;* *(iii) Public Utility district maintenance and service facilities;* *(vi) Governmental maintenance, storage and operating facilities;* *(v) Processing, using and storage of natural gas, liquid natural gas, and domestic and agricultural water supplies;* *(vi) Energy transmission facilities, including rights-of-way and pressure control or booster stations for gasoline, electricity, natural gas, synthetic natural gas, oil or other forms of energy sources; and/or* *(vii) Wastewater treatment, disposal or reclamation facilities and other facilities for the production, generation, storage, treatment or transmission of wastewater.* Based on the above requirements set forth in the SCCRP, if the Redevelopment Agency were reviewing the proposed application from NRG for permit compliance purposes [the city] would require: -a Precise Development Plan amendment to	city's proposed Carlsbad Seawater Desalination Plant would be located at the site of existing EPS Tank 3. In addition, as discussed above, staff has concluded that SP 144 and PDP 00-02 are not applicable to the proposed CECP. Nevertheless, for the proposed CECP, the applicant has submitted an application to the city for amendment of the existing EPS PDP and SP 144 to include the proposed CECP. Staff encourages the applicant to continue working with the city on developing and incorporating project features and components into the CECP that would help reduce environmental impacts to the greatest extent feasible. **Consistency:** Given these factors, staff concludes that the proposed CECP is consistent with the SCCRP.

Applicable LORS	Description of Applicable LORS[6]	City of Carlsbad Compliance Requirements[7]/Consistency Determination by city of Carlsbad	Energy Commission Staff Conclusion
		set forth the development standards for the power plant. The standards would include agreed upon height, setbacks, architectural design, etc, as well as other appropriate revisions to the current Precise Development Plan. -a comprehensive amendment to the Encina Specific Plan (SP 144). -the applicant to submit an application for a major redevelopment permit and obtain approval of that permit, which would require a comprehensive review of the project details from both a land use perspective as well as a design standpoint. -to approve the above noted permits and/or plans, the Housing and Redevelopment Commission acting for the Redevelopment Agency would need to approve a finding that the proposed land use serves an extraordinary public purpose (emphasis added). Based on the application submitted by NRG, staff believes the Commission would not be able to make this finding for the proposed new power plant. The new power plant potentially serves a regional need for electricity. However, there are several reasons why this does not equate to extraordinary public purpose for Carlsbad, including but not limited to: 1. No assurances that the electricity generated would be used specifically for Carlsbad residents and/or local businesses/services; 2. No guarantees that the generation of this power would eliminate the risk of “black outs” or require other energy conservation measures in Carlsbad; 3. No measures that would prevent	

Applicable LORS	Description of Applicable LORS[6]	City of Carlsbad Compliance Requirements[7]/Consistency Determination by city of Carlsbad	Energy Commission Staff Conclusion
		substantial electrical rate increases within the City; 4. No assurances that the existing power plant will be decommissioned at a date certain, which is a key goal for the redevelopment plan; 5. A general concern that the proposed land use (new power plant) would be an incompatible land use and potentially preclude other more desirable development such as visitor-serving commercial uses, hotels, and public amenities and/or services for local resident enjoyment; and 6. No other public benefit amenities were offered by NRG. Considering the scale of the CECP, not only in terms of its size and height but also its long term potential environmental impacts and influence on land use, the threshold for what constitutes an extraordinary public benefit should be very high.	
North County Multiple Habitat Conservation Plan (MHCP) and the Carlsbad Habitat Management Plan (HMP) for Natural Communities[8]	The MHCP is a multi-jurisdictional planning effort and each city is tasked with developing a sub-area plan in order to set policies and regulatory mechanisms to carry out the goals outlined in the regional MHCP. The MHCP establishes a regional effort conducted in conjunction with Section 10a of the Federal Endangered Species Act and the California Natural Communities Conservation Planning Act and is the framework for development of a regional habitat preserve for rare plant and wildlife species in northwestern San Diego County.	YES	The LORS consistency analysis in the **Biological Resources** section provides a detailed discussion of the proposed CECP's compliance with the MHCP/HMP.

[8] The **Biological Resources** section addresses consistency with the MHCP and HMP.

Applicable LORS	Description of Applicable LORS[6]	City of Carlsbad Compliance Requirements[7]/Consistency Determination by city of Carlsbad	Energy Commission Staff Conclusion
	The Habitat Management Plan for Natural Communities in the City of Carlsbad (HMP) serves as the city's sub-area plan.		

Land Use Compatibility

Land use compatibility refers to the physical compatibility of planned and existing land uses. Administrative or conditional use permitting requirements (see discussion in **LAND USE Tables 2a** and **2b**) and project reviews under CEQA are in place to evaluate the compatibility of projects that are not a permitted use or that have elements that may adversely impact public safety, the environment, or that could interfere with or unduly restrict existing and/or future permitted uses. As noted in the discussions above under the section entitled **Physical Disruption or Division of an Established Community** and in **LAND USE Tables 2a** and **2b**, development of the proposed project and its associated features/facilities are compatible with existing surrounding land uses, because the proposed project is located entirely within an existing power plant site (i.e., the EPS), which has been in operation since the 1950s. Land uses at the 95-acre EPS site are industrial in nature and are dominated by utility and energy infrastructure uses as described above under the section entitled **SETTING.** In addition, the proposed 23-acre CECP would be located between two major transportation corridors (i.e., the NCTD Rail Corridor and I-5). The proposed CECP represents an overall "modernization and repowering" program at the EPS (SR 2008e). With implementation of the proposed project, EPS Tanks 5, 6, and 7 would be demolished, and once CECP is operational, EPS Units 1, 2, and 3 would be retired (CECP 2007a; SR 2008h). The proposed CECP is consistent with applicable LORS, including the California Coastal Act and the Warren-Alquist Act (with implementation of **LAND-1**) and city LORS, such as General Plan Land Use and Zoning designations for the proposed project site and the immediately surrounding exiting land uses (i.e., uses within the EPS). Therefore, the proposed project would not result in any physical land use incompatibilities with existing surrounding land uses.

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, and 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 §§42301.6–9) or within 0.25 miles of a sensitive receptor, under CEQA (CCR 2006; CCR 2008). Proximity is not necessarily the deciding factor for a potentially significant impact, but is the threshold generally used to require further evaluation.

The area immediately surrounding the proposed project includes uses associated with an existing EPS and is primarily dominated by industrial uses and public utilities. There are sensitive receptors (such as schools) within a one-mile buffer of the proposed CECP. However, none of these sensitive receptors are in close proximity (i.e., within 0.25 miles) of the proposed project site.

Given the existing permitted uses surrounding the proposed project, and the fact that the proposed project and its associated features/facilities are consistent with local LORS (which are developed by local jurisdictions to mitigate impacts of planned development), the proposed project is not considered an incompatible land use with the surrounding and nearby uses, including sensitive receptors.

Although from a land use perspective, the siting of the CECP at the proposed location within the existing EPS is not incompatible with nearby surrounding sensitive receptors, these sensitive receptors may experience project-related nuisance impacts such as construction-generated noise, dust, and traffic and operation-related public health impacts. The **Air Quality, Hazardous Materials Management, Noise, Public Health, Traffic and Transportation,** and **Visual Resources** sections provide detailed analyses of CECP-related noise, dust, public health hazards or nuisance, and adverse traffic or visual impacts on surrounding sensitive receptors such as residential uses.

Based on analyses cited in **LAND USE Tables 2a** and **2b** (above) and other sections of this document, and considering the zoning and land use designations for the proposed project site and its associated features/facilities, and surrounding locations, the proposed project would not result in a significant project-related impact at any sensitive receptor location.

CUMULATIVE IMPACTS AND MITIGATION

A project may result in a significant adverse cumulative impact where its effects are cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects (CCR 2006, §15065[A][3]).

As noted in detail in Table 5.6-7 of AFC Section 5.6 (Land Use), there are several large-scale planned and approved projects in the immediate vicinity of the proposed CECP, some of which would be located at the EPS. Projects of note that may have cumulative impacts include:

- **Carlsbad Seawater Desalination Plant** – proposed by the city of Carlsbad to be located at the EPS, immediately south of the Agua Hedionda Lagoon. This $320 million desalination plant would occupy an approximately four-acre parcel in the area currently containing the existing EPS Fuel Oil Tank #3 (i.e., EPS Tank 3), which is the southernmost of the three largest existing EPS tanks near Carlsbad Boulevard. This project is a 50-million gallon per day seawater desalination facility that includes pipelines, pumps, and other appurtenant and ancillary water and support facilities to produce and distribute potable water (COC 2005);
- **Vista/Carlsbad Interceptor Sewer Project** – proposed by the city of Carlsbad to be located at the EPS. The project would be located in the NCTD Railroad Corridor from Olive Avenue south across Agua Hedionda Lagoon to the Agua Hedionda Lift Station then would proceed south to the Encina Water Pollution Control Facility. This project includes the construction of approximately 500 linear feet of sewer pipeline (COC 2008j; CECP 2007a);

- **Agua Hedionda Lift Station Project** – proposed by the city of Carlsbad to be located on the south shore of Agua Hedionda Lagoon adjacent to the east side of the NCTD Rail Corridor and possibly within the boundary of the proposed CECP. This project includes the upgrade and replacement of existing city pumps/infrastructure (COC 2008j; CECP 2007a);
- **Interstate 5 (I-5) North Coast Corridor Project** – This 26-mile project is proposed by Caltrans and includes adding highway lanes and operational improvements to provide mobility choices for motorists on I-5 through the northern San Diego region. According to filed information also provided by Caltrans to staff at meetings conducted on April 23, 2008 and January 8, 2009, all of the lane widening alternatives of the I-5 widening project would encroach onto the proposed CECP site. Caltrans is in the process of preparing environmental assessment for this project, and has been provided information regarding the CECP by staff (Caltrans 2008a). Caltrans must include an analysis of its project alternatives impacts on the EPS property (including the CECP site) in its EIR/EIS for the I-5 Project;
- **Coastal Rail Trail** – The goal of the Coastal Rail Trail (CRT) is to provide a multi-modal transportation route that is separated from the roadway (COC 2008k). The CRT was envisioned to be 44 miles within the railroad right-of-way from Oceanside to the train depot in downtown San Diego. Sections of the CRT have been completed, including in the city of Carlsbad. The North County Transit District (NCTD) has indicated that it would not support a trail in the railroad right-of-way, possibly due to liability and plans to install and additional track (see below for description of double-tracking). The city of Carlsbad has considered alignments through the EPS, but outside of the NCTD right-of-way. In addition, the city has considered alignments avoiding the EPS site. The CRT route location has not been finalized in the area of the EPS; and
- **Los Angeles to San Diego (LOSSAN) Double-Tracking Project** - Improvements along the AT&SF Railroad San Diego coastal portion of the LOSSAN corridor include double-tracking of main line and bridges, curve realignment and the addition of crossovers to increase capacity and enhance reliability of the railroad corridor for freight rail service (SANDAG 2008). According to the city, current state budget constraints jeopardize double-tracking expansion plans. Currently, only 28 miles of the corridor within San Diego County consists of double track. The San Diego segment of the corridor is predominantly used for freight service. The *"CP Carl to CP Double Track"* portion of the project would add 1.9 miles of double track and replace a single-track bridge with a double-track bridge, resulting in 3.1 miles of continuous double track in the city of Carlsbad. Projects are in various stages of development from preliminary engineering and environmental review to pre-final design. All projects would be under construction by December 31, 2013, if funded. The Final Programmatic EIR/EIS for the project has been published, but the Record of Decision has not been issued.

Cumulative projects listed that are under construction or that have been approved (e.g., Carlsbad Seawater Desalination Plant and capital improvement projects) by the city planning agency responsible for their jurisdiction have, by nature of their approval, complied with the land use plans, policies and regulations applicable to the project. Projects listed that have not been approved (i.e., the I-5 widening and the LOSSAN Double-Tracking Project) have the potential to conflict with applicable plans, policies,

and regulations. However, in order for these projects to be approved, they would need to conduct an analysis of conformance with these plans, policies, and regulations, and the existing setting (i.e., the EPS).

The area in the vicinity of the proposed CECP site is essentially dominated by similar industrial and utility development. The proposed CECP would represent a similar land use type to adjacent uses. In addition, the proposed CECP would not require encroachment onto lands outside of the existing EPS. The proposed project would not require a General Plan amendment, zoning amendment, or other changes or concessions that would alter the development standards, availability of permits, or use of the project site or surrounding properties.

The proposed project would not make a significant contribution to regional impacts related to new development and growth. The project is planned to serve the existing and anticipated electrical needs of the growing population in the project area by connecting to the existing electric system and other utility infrastructure. The land use effects of the proposed project in combination with past, present, and reasonably foreseeable projects in the area would not be cumulatively considerable. Therefore, cumulative land use impacts of the proposed CECP would be less than significant.

CONCLUSIONS AND RECOMMENDATIONS

- The proposed project would not result in conversion of any Farmland (as classified by the FMMP) to non-agricultural use or conflict with existing agricultural zoning or Williamson Act contracts.
- The proposed project would not disrupt or divide the physical arrangement of an established community.
- As discussed in the **Biological Resources** section, the proposed project is consistent with the San Diego North County Multiple Habitat Conservation Plan (MHCP) and the Carlsbad Habitat Management Plan (HMP) for Natural Communities.
- Pursuant to Coastal Act Section 30413(d), Energy Commission staff concludes that the proposed CECP is consistent with the California Coastal Act.
- Pursuant to § 25529 of the Warren-Alquist Act, the Energy Commission shall require the establishment of an area for public use as a condition of certification of a facility proposed in the Coastal Zone. Staff has determined that implementation of **LAND-1** would best meet the needs of the community, as well as the statutory requirement for a public use area.
- In general, Energy Commission staff believes that the project is consistent with the City of Carlsbad's General Plan Land Use and Zoning designations for the proposed CECP site. Certain city LORS documents, such as the Specific Plan (SP) 144 and the associated PDP 00-02 (which implements it) have permit-like characteristics that are inconsistent with existing zoning and land use controls applicable to the CECP site; as such SP 144 and the associated PDP are pre-empted by the Energy Commission's "in-lieu" permit authority. As discussed in **LAND USE Table 2b,** staff concludes that the CECP is consistent with other applicable city LORS. Staff

encourages the applicant to continue working with the city on developing and incorporating project features and components into the CECP that would help reduce environmental impacts to the greatest extent feasible.

- The proposed project would not be incompatible with existing on-site or nearby uses, as it is consistent with the general character of these permitted uses.
- The proposed project's cumulative land use impacts would be less than significant.

PROPOSED CONDITION OF CERTIFICATION

LAND-1 The project owner shall dedicate an easement for the Coastal Rail Trail within the boundaries of the overall Encina Power Station Precise Development Plan area in a location mutually agreed upon with the city of Carlsbad located west of the north/south AT&SF/North County Transit District Rail Corridor.

Verification: Pursuant to the requirements of § 25529 of the Warren-Alquist Act, the project owner shall dedicate the easement in a location mutually agreed upon with the city of Carlsbad, west of the north/south AT&SF/North County Transit District Rail Corridor, and approved by the Compliance Project Manager (CPM) in consultation with the city of Carlsbad.

If the project owner and the city of Carlsbad cannot reach agreement on the location of the easement west of the north/south AT&SF/North County Transit District Rail Corridor within the boundaries of the Encina Power Station Precise Development Plan area (for example due to public safety and security reasons), the project owner shall provide funds to the city of Carlsbad for use in the development of the Coastal Rail Trail within the city of Carlsbad. The project owner shall provide funding to the city of Carlsbad for development of the Coastal Rail Trail as approved by the Compliance Project Manager (CPM) within 180 days of the start of construction. The amount and payment of funds will be determined by an independent appraisal conducted on available and comparable property on behalf of the city of Carlsbad for development of the Coastal Rail Trail. The project owner shall pay all costs associated with the appraisal. The project owner shall provide documentation to the CPM that the funds have been paid and that the easements will be purchased within three years of start of operation as compensation for CECP project impacts on public use within the Coastal Zone. The documentation also shall guarantee that the easement purchased would be located within the City of Carlsbad. The project owner shall provide to the CPM updates in the Annual Compliance Report on the status of easement purchase(s).

REFERENCES

CCR 2006. California Code of Regulations, Title 14, Chapter 3 (CEQA Guidelines), §§15000-15387, as amended July 11, 2006.

CCR 2008. California Code of Regulations, Health & Safety Code, §§42301.6-42301.9. Site accessed at: http://www.leginfo.ca.gov/cgi-bin/displaycode?section=hsc&group=42001-43000&file=42300-42316. February 7, 2008.

CECP 2007a – California Energy Center Project/T. Hemig (tn: 42299). Application for Certification for the Carlsbad Energy Center Project. 09/11/2007.

Caltrans 2008a – California Department of Transportation/J. Armstrong (tn: 49023) Caltrans District 11 Comment Letter. 11/17/2008

CH2MHILL 2007e – CH2MHILL/R. Mason. Carlsbad Energy Center Project AFC (07-AFC-6): Data Adequacy Supplement A. 10/23/2007

COC 1982. City of Carlsbad Local Coastal Program, Agua Hedionda Land Use Plan. Adopted May 1982 with amendments in 2000, 2003, and 2006.

COC 2005. City of Carlsbad Precise Development Plan and Desalination Plant Final Environmental Impact Report. December 2005.

COC 2008e – City of Carlsbad/R. Patchett (tn: 46114). City of Carlsbad Planning and Land Use Letter. 5/1/2008

COC 2008j – City of Carlsbad/S. Donnell. Letter Regarding the City of Carlsbad's Planned Sewer Replacement Project. 09/10/08

COC 2008k – City of Carlsbad/S. Donnell. E-mail Regarding Coastal Rail Trail Details. 04/03/08.

GOPR 1998. Governor's Office of Planning and Research. The Planner's Guide to Specific Plans. April 1998.

Luster, Tom. California Coastal Commission. Personal communication with Amanda Stennick, October 2006.

NCTD 2009a. North County Transit District. Comment Letter. 01/09/2009

PRC 2005. Public Resources Code §25000 et seq (Division 15 - Warren-Alquist State Energy Resources Conservation and Development Act), Chapter 6 - Power Facility and Site Certification, §§25500-25543; September 2005.

SANDAG 2008. San Diego Association of Governments. LOSSAN Rail Corridor Intermodal Improvements Fact Sheet. February 2008.

SR 2007a – Stoel Rives/ K. Hellwig (tn: 42359). Application for the City of Carlsbad for Amendment to the Precise Development Plan/Specific Plan Amendment/ 09/17/2007.

SR 2008e – Stoel Rives/J. McKenzie (tn: 46613) Project Consistency with City of Carlsbad Land Use Ordinances. 6/03/2008 .

SR 2008h – Stoel Rives/J McKinsey (tn: 47257) Project Enhancement and Refinement Document (12 copies); Effects on Bio Resources of Agua Hedionda Lagoon (4 copies); Revised AQ Modeling Files (6 CDs); Cal ISO Study Report. 7/25/2008.

RESPONSE TO COMMENTS

Responses to comments provided on the **Land Use** section of the PSA are provided in Appendix LU-1 (attached). Note that comments have been summarized by the types of issues raised in the comments.

APPENDIX LU-1

Comment: Comments on the **Land Use** section were provided and city of Carlsbad LORS were cited that reiterated the city's stated opposition to the proposed CECP's proposed siting at the existing Encina Power Station.

Response: While staff respectfully acknowledges the city of Carlsbad's opposition to the location of the proposed CECP, staff believes that the land use analysis adequately analyzes the project's applicable state and local LORS and the CEQA requirements for determining significant environmental impacts. The **Land Use** section provides a detailed analysis and sound reasoning for staff's conclusions as presented in the **Assessment of Impacts and Discussion of Mitigation** section.

Comment: Comments were provided requesting additional information on the existing transmission lines and 138 kV SDG&E switchyard be added to the **Other Project-Related Features and Facilities** section. In addition, there was a request to clarify the retirement of existing EPS units.

Response: The existing uses described in the comments are not part of the proposed project, and do not need to be added to the **Other Project-Related Features and Facilities** section. Staff has clarified the information regarding the retirement of the existing units at the EPS.

Comment: A number of commenters disagree with staff's analysis and conclusions on the city of Carlsbad LORS consistency analysis.

Response: Staff has provided detailed discussion in the section entitled **Conflict with Any Applicable Land Use Plan, Policy, or Regulation**, including **LAND USE Table 2b.** Please note that the CEQA Appendix G checklist item[9] (i.e., Item IX. b) that is used as basis for the threshold of significance to determine consistency with LORS does focus on LORS *"…adopted for the purpose of avoiding or mitigating an environmental effect."* This is an important consideration when siting a power generating facility and an industrial use. Based on reasonable planning practice, it is more prudent to site an industrial facility at an existing Brownfield site with existing and historic industrial uses to minimize and/or avoid significant environmental effects.

Staff reviewed the detailed applicable LORS information provided by the city of Carlsbad. Staff acknowledges the complex and multi-layered nature of the city's planning documents, and appreciates the city's efforts in trying to improve the community through land use planning. However, as part of land use planning, existing uses must remain a major consideration of the planning process. When a jurisdictional authority establishes zoning designations to implement its general plan, it is that agency's responsibility to ensure the compatibility of adjacent zoning and permitted uses and incorporate conditions and restrictions that ensure those uses will not result in

[9] CEQA Appendix G, Environmental Checklist Form, IX. LAND USE AND PLANNING - Would the project: b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?

a significant adverse impact ("minimum of detriment") to surrounding properties. It is therefore assumed that permitted industrial uses, or those deemed equivalent to a permitted use sited on properties zoned Industrial within an area dominated by industrial uses (i.e., EPS) are compatible with surrounding uses and zoning districts. Please refer to the detailed discussions provided in **Land Use Table 2b**.

Staff stands behind its consistency analysis of applicable city LORS and respectfully disagrees with comments that the LORS consistency analysis is inadequate.

Comment: Staff received a number of comments on the **California Coastal Act Consistency Determination** section. The majority of comments maintain that the California Coastal Commission may not delegate the preparation of the analysis of Coastal Act compatibility to a sister agency such as the California Energy Commission. In addition, commenters' disagree that the proposed project would be considered a coastal dependent use, and on that basis should not be sited at the existing EPS.

Response: Note that disagreements about the legal merits of the Energy Commission's authority to make a consistency determination with the Coastal Act and staff's capability to conduct the analysis associated with that consistency determination is a legal matter and will be addressed by Energy Commission Legal Counsel. As staff has pointed out in the Preliminary and Final Staff Assessments, and as reiterated several times by the California Coastal Commission (CCC), the CCC is not able, nor required, to make a consistency determination for any facility under the Energy Commission's jurisdiction.

With regard to Coastal Act Consistency and Coastal Dependent Uses, please refer to the detailed discussion under the section entitled California Coastal Commission***.*** Additional text has been added to this section to support staff's conclusion that the proposed project would be considered a coastal dependent use and is consistent with the Coastal Act.

Comment: A number of comments were received regarding the clarification of Condition of Certification **LAND-1**.

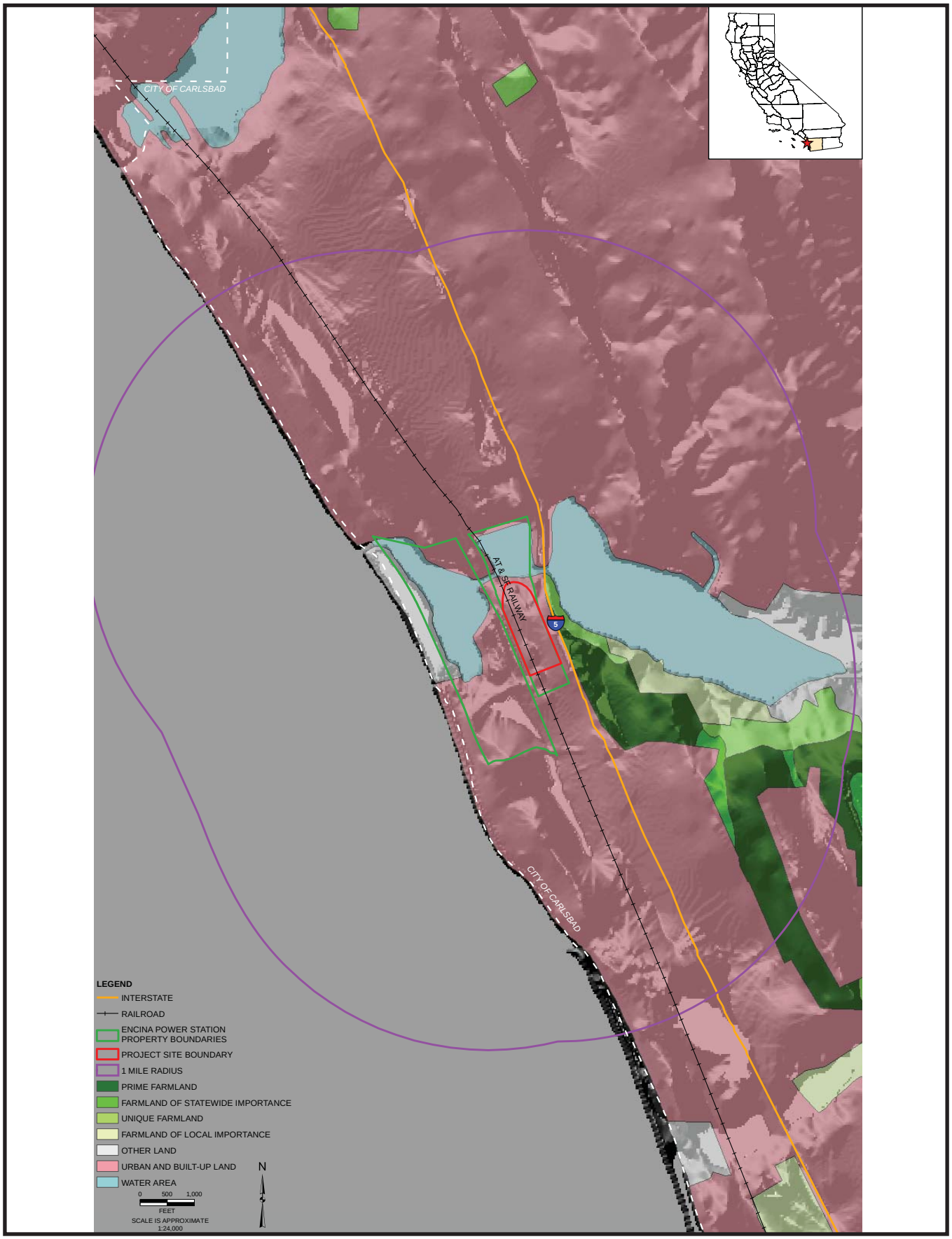
Response: The text of Condition of Certification **LAND-1** has been revised to address these comments.

Comment: Various commenters requested text clarifications in reference to: the West Resort development, Car Canyon Park, and Cannon Park; EPS Units 5, 6, and 7; the Coastal Rail Trail; and the LOSSAN Double-Tracking Project.

Response: Text has been revised and/or added in the **Land Use** section of the Final Staff Assessment to address these comments.

LAND USE - FIGURE 1

Carlsbad Energy Center Project - Prime Farmland Near Project Site

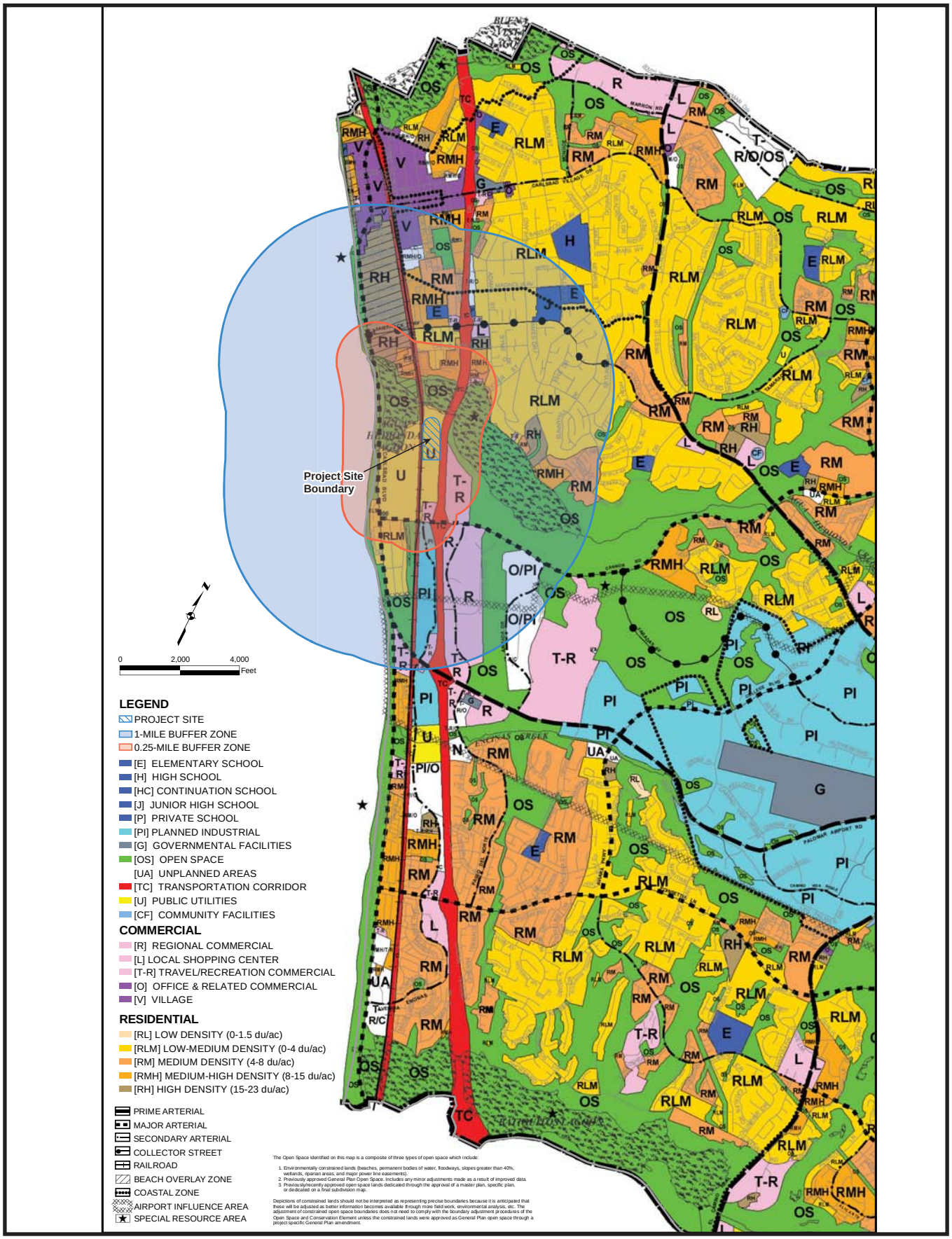


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, NOVEMBER 2009

SOURCE: AFC Figure 5.6-3

LAND USE - FIGURE 2

Carlsbad Energy Center Project - General Plan Land Use Map

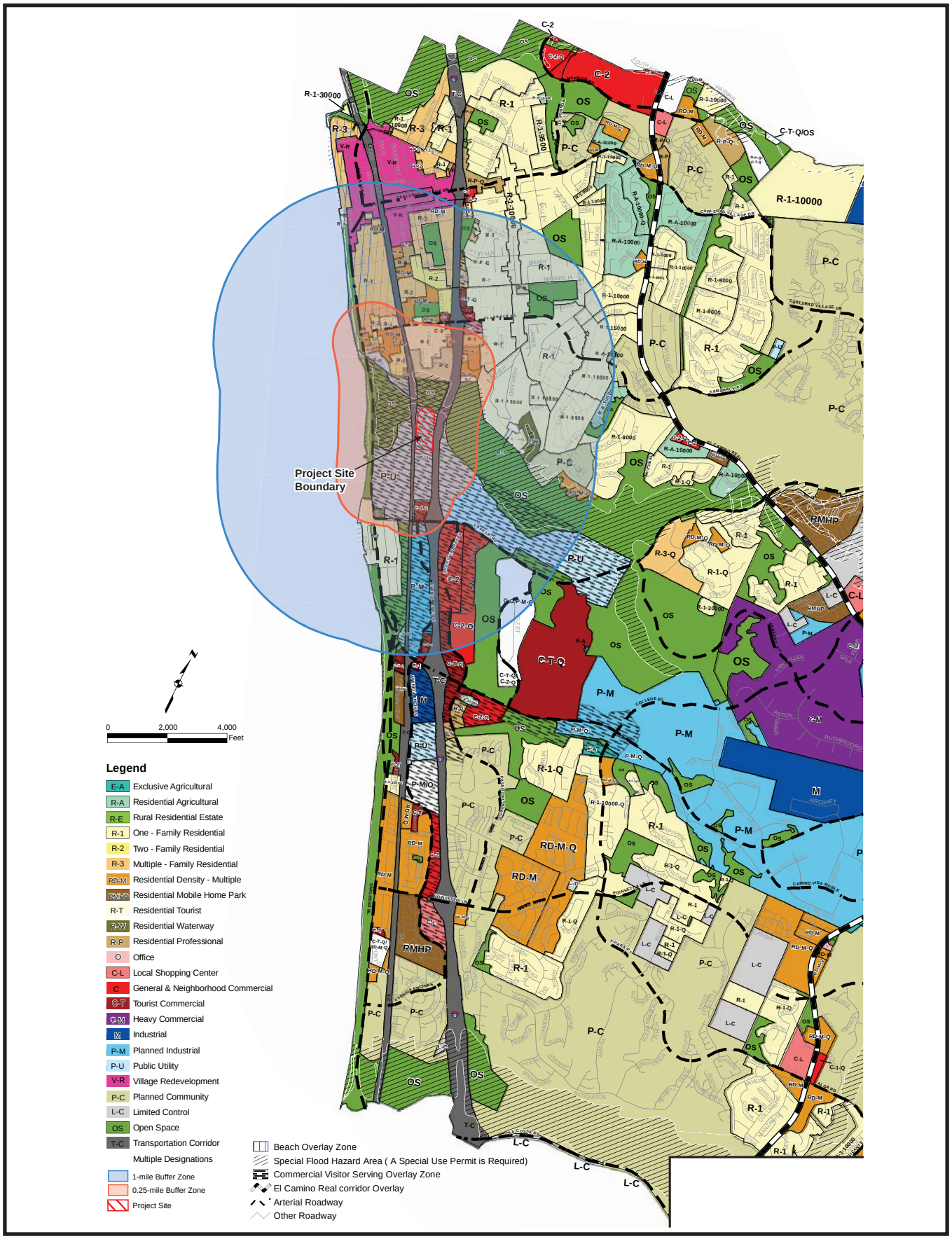


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, NOVEMBER 2009

SOURCE: AFC Figure 5.6-1

LAND USE - FIGURE 3

Carlsbad Energy Center Project - Zoning Map



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

SOURCE: AFC Figure 5.6-2

NOISE AND VIBRATION

Testimony of Steve Baker

SUMMARY OF CONCLUSIONS

California Energy Commission staff concludes that the Carlsbad Energy Center Project can be built and operated in compliance with all applicable noise and vibration laws, ordinances, regulations, and standards and, if built in accordance with the conditions of certification proposed below, would produce no significant adverse noise impacts on people within the affected area, either direct, indirect, or cumulative.

INTRODUCTION

The construction and operation of any power plant creates noise, or unwanted sound. The character and loudness of this noise, the times of day or night that it is produced, and the proximity of the facility to sensitive receptors combine to determine whether the facility would meet applicable noise control laws and ordinances and whether it would cause significant adverse environmental impacts. In some cases, vibration may be produced as a result of power plant construction practices, such as blasting or pile driving. The groundborne 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 Carlsbad Energy Center Project (CECP) 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) and to avoid creation of significant adverse noise or vibration impacts. For an explanation of technical terms and acronyms employed 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 (OSHA): 29 U.S.C. § 651 et seq.	Protects workers from the effects of occupational noise exposure.
State (Cal/OSHA): Cal. Code Regs., tit. 8, §§ 5095–5099	Protects workers from the effects of occupational noise exposure.
Local City of Carlsbad General Plan Noise Element City of Carlsbad Noise Guidelines Manual City of Carlsbad Municipal Code, Ch. 8.48, Noise	 Discourages new residential development where the existing ambient noise level exceeds 60 dBA CNEL. Establishes Land Use Compatibility Guidelines for different land uses. Permits disturbing construction noise only during the hours between 7:00 a.m. and sunset weekdays, 8:00 a.m. and sunset Saturdays, and not at all on Sundays and holidays. Allows the city manager to grant an exception permit.

FEDERAL

Under the Occupational Safety and Health Act of 1970 (29 USC § 651 et seq.), the Department of Labor, Occupational Safety and Health Administration (OSHA) has adopted regulations designed to protect workers against the effects of occupational noise exposure (29 CFR § 1910.95). These regulations list permissible noise exposure levels as a function of the amount of time during which the worker is exposed (see **NOISE Appendix A, Table A4** immediately following this section). The regulations further specify a hearing conservation program that involves monitoring the noise to which workers are exposed, assuring that workers are made aware of overexposure to noise, and periodically testing the workers' hearing to detect any degradation.

There are no federal laws governing off-site (community) noise.

The only guidance available for evaluation of power plant vibration is guidelines published by the Federal Transit Administration (FTA) for assessing the impacts of groundborne vibration associated with construction of rail projects. These guidelines have been applied by other jurisdictions to assess groundborne vibration of 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 groundborne vibration. The FTA measure of the threshold of perception is 65 VdB,[1] 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 California Occupational Safety and Health Administration (Cal/OSHA) has promulgated Occupational Noise Exposure Regulations (Cal. Code Regs., tit. 8, §§ 5095–5099) that set employee noise exposure limits. These standards are equivalent to the federal OSHA standards (see the **Worker Safety and Fire Protection** section of this document, and **NOISE Appendix A, Table A4**).

LOCAL

City of Carlsbad General Plan Noise Element

The City of Carlsbad General Plan Noise Element discourages new residential development where the existing ambient noise level exceeds 60 dBA CNEL[2] (COC 2006).

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[1] VdB is the common measure of vibration energy.

[2] For an explanation of technical terms and acronyms employed in this section, please refer to **NOISE Appendix A** immediately following.

City of Carlsbad Noise Guidelines Manual

Section IV.B of the City of Carlsbad Noise Guidelines Manual describes the City's process to evaluate noise impacts of proposed projects. This process invokes guidelines delineated in Figure IV-1, Land Use Compatibility for Community Noise Environments Matrix. Figure IV-1 sets community noise exposure limits for noise that impacts any residence, schools, libraries, churches, hospitals and nursing homes at 60 dBA CNEL (COC 1995).

City of Carlsbad Municipal Code

Chapter 8.48 of the City of Carlsbad Municipal Code addresses Noise. Section 8.48.010 limits disturbing or offensive construction noise to the hours between 7:00 a.m. and sunset on weekdays and between 8:00 a.m. and sunset on Saturdays, and prohibits such noise on Sundays and on 7 major holidays. Section 8.48.020 allows the city manager to permit exceptions to these limits in nonresidential zones where there are no inhabited dwellings within 1,000 feet of the source of noise (COC 2008a).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

California Environmental Quality Act

The California Environmental Quality Act (CEQA) requires that significant environmental impacts be identified and that such impacts be eliminated or mitigated to the extent feasible. Section XI of Appendix G of CEQA Guidelines (Cal. Code Regs., tit. 14, App. G) sets forth some characteristics that may signify a potentially significant impact. Specifically, a significant effect from noise may exist if a project would result in:

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;

2. exposure of persons to or generation of excessive groundborne vibration or groundborne 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 5 dBA or more at the nearest sensitive receptor.

Staff considers it reasonable to assume that an increase in background noise levels up to 5 dBA in a residential setting is insignificant; an increase of more than 10 dBA is

considered significant. An increase between 5 and 10 dBA should be considered adverse, but may be either significant or insignificant, depending on the particular circumstances of the case.

Factors to be considered in determining the significance of an adverse impact as defined above include:

1. the resulting combined noise level;[3]
2. the duration and frequency of the noise;
3. the number of people affected;
4. the land use designation of the affected receptor sites; and
5. public concern or controversy as demonstrated at workshops or hearings or by correspondence.

Noise due to construction activities is usually considered to be insignificant in terms of CEQA compliance if:

- the construction activity is temporary;
- use of heavy equipment and noisy activities are limited to daytime hours; and
- all industry-standard noise abatement measures are implemented for noise-producing equipment.

Staff uses the above method and threshold to protect the most sensitive populations, including the minority population.

SETTING

The CECP would be constructed on 23 acres of the existing 95-acre Encina Power Station in the City of Carlsbad, San Diego County. The site lies in an area zoned Public Utility. The site is bounded to the north by the Agua Hedionda Lagoon, to the east by Interstate 5 and agricultural land, to the north and south by residential neighborhoods, and to the west by the AT&SF Railway tracks, the Encina Power Station, Carlsbad Boulevard and the Pacific Ocean (CECP 2007a, AFC §§ 1.2, 1.3, 2.1, 2.5.2, 5.7.4).

The ambient noise regime in the project vicinity is dominated by traffic on Interstate 5. The nearest sensitive noise receptors are residences to the north of the Agua Hedionda Lagoon, approximately 1/3 mile from the project site (CECP 2007a, AFC § 5.7.4).

[3] 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.

Ambient Noise Monitoring

In order to establish a baseline for comparison of predicted project noise to existing ambient noise, the applicant has presented the results of an ambient noise survey (CECP 2007a, AFC § 5.7.4.1; Tables 5.7-5 through 5.7-12; Figure 5.7-3). The survey was conducted July 23 through 25, 2007, and monitored existing noise levels at the following locations, shown on **NOISE AND VIBRATION Figure 1**:

1. Measuring Location M1: West of the West Hotel and Restaurant, near the AT&SF rail line, approximately 2,400 feet south of the center of the CECP site and near the San Diego Gas & Electric switchyard. Short-term monitoring showed that ambient noise consisted chiefly of traffic on Interstate 5, with some noise from the switchyard and intermittent rail traffic.

2. Measuring Location M2: In front of a residence at 5120 El Arbol Drive, part of a residential neighborhood approximately 3,100 feet south of the center of the site. Short-term monitoring showed ambient noise levels as low as 40 dBA at night, due mainly to traffic on Interstate 5. Daytime noise was from freeway and rail traffic, and from aircraft overflights.

3. Measuring Location M3: In front of the residence at 5022 Tiera Del Oro Drive, approximately 3,100 feet south of the center of the site. Short-term monitoring showed ambient noise consisting chiefly of surf noise and intermittent traffic. Daytime noise included traffic and aircraft overflights.

4. Measuring Location M4: On a bluff above the ocean, just north of Tiera Del Oro and approximately 2,800 feet southwest of the center of the site. Short-term monitoring showed noise due to surf and traffic on Carlsbad Boulevard, with some aircraft overflights.

5. Measuring Location M5: On a bluff above the Hubs-SeaWorld facility and on a residential property line, approximately 2,400 feet northwest of the center of the project site. Long-term (25-hour) monitoring showed noise due to traffic on Carlsbad Boulevard and Interstate 5, as well as rail traffic and surf noise.

6. Measuring Location M6: In the cul-de-sac of Olive Avenue, adjacent to the railroad tracks and approximately 2,500 feet northwest of the center of the site. Short-term monitoring showed noise levels from traffic, though this site is shielded from Interstate 5 by apartment buildings and a sound wall.

7. Measuring Location M7: On a bluff at the end of Harbor Drive, overlooking the Agua Hedionda Lagoon and Interstate 5, approximately 1,750 feet north northwest of the center of the project site. This represents the residential receptor nearest the site. Short-term noise monitoring showed a noise regime dominated by traffic on Interstate 5.

NOISE Table 2 summarizes the ambient noise measurements (CECP 2007a, AFC Tables 5.7-5 through 5.7-12):

NOISE Table 2
Summary of Measured Ambient Noise Levels

Measurement Location	Measured Noise Levels, dBA		
	L_{eq} – Daytime	L_{eq} – Nighttime	L_{90} – Nighttime
M1: West Hotel and Restaurant	65	52	47
M2: 5120 El Arbol Drive	58	58	36
M3: 5022 Tierra Del Oro Drive	57	47	45
M4: North of Tierra Del Oro	62	—	—
M5: Above Hubs-SeaWorld	56[1]	55[2]	47[3]
M6: Olive Avenue	54	39	35
M7: End of Harbor Drive[4]	—	56	52

Source: CECP 2007a, AFC Tables 5.7-5 through 5.7-12
[1] Staff calculations of average of 15 daytime hours
[2] Staff calculations of average of 9 nighttime hours
[3] Staff calculations of average of 4 consecutive quietest hours of the nighttime
[4]Represents nearest sensitive receptor

DIRECT IMPACTS AND MITIGATION

Noise impacts associated with the project can be created by short-term construction activities and by normal long-term operation of the power plant.

Construction Impacts and Mitigation

Construction noise is usually considered a temporary phenomenon. Construction of the CECP will occur during a single-phase, 25 months period (SR 2008h §§1.1.2, 2.4).

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 City of Carlsbad Municipal Code exempts all construction and demolition noise from numerical noise limits, but restricts noise to certain hours of the day. The applicant offers to restrict disturbing construction and demolition work to the hours from 7 a.m. to 7 p.m. (CECP 2007a, AFC § 5.7.5.2.2); the Municipal Code requires that noisy work be limited to the hours between 7 a.m. and sunset on weekdays and 8 a.m. to sunset on Saturdays, and not be performed at all on Sundays and 7 major holidays. Staff proposes Condition of Certification **NOISE-6**, below, to ensure that noisy construction is limited to these hours.

CEQA Impacts

Power Plant Site

To evaluate construction noise impacts, staff compares the projected noise levels to the ambient. Since construction noise typically varies continually with time, it is most appropriately measured by, and compared to, the L_{eq} (energy average) metric.

Aggregate construction noise may be expected to reach levels as high as 58 dBA L_{eq} at the residence at M7 (the nearest sensitive noise receptor) and 55 dBA at the residential property line at M5 (CECP 2007a, Table 5.7-14; and staff calculations). Comparing projected noise levels to the ambient noise levels at M5 and M7 (see **NOISE Table 3**, below) shows an increase at M5 of 3 dBA during both daytime and nighttime, and an increase at M7 of 4 dBA during the nighttime. Such an increase is barely noticeable. Furthermore, these projected noise levels are conservative, based on surveys of construction equipment taken 26 years ago. Modern construction equipment is quieter, so actual noise levels should be less than predicted. Since noisy construction work would be restricted to daytime hours, staff believes it will be barely noticeable, and would not constitute a significant adverse impact.

NOISE Table 3
Predicted Power Plant Construction Noise Impacts

Receptor	Highest Construction Noise Level[1] (dBA L_{eq})	Measured Existing Ambient[2] (dBA L_{eq})	Cumulative (dBA L_{eq})	**Change (dBA)**
M5 —Residential property line above Hubs SeaWorld	55	56 daytime	59 daytime	+3 daytime
		55 nighttime	58 nighttime	+3 nighttime
M7 — Nearest residence at end of Harbor Drive	58	—	—	—
		56 nighttime	60 nighttime	+4 nighttime

1 Source: CECP 2007a, AFC Table 5.7-14 and staff calculations
2 Source: CECP 2007a, AFC Table 5.7-9 and staff calculations of average of daytime and nighttime hours; and Table 5.7-12.

In the event that actual construction noise should annoy nearby residents, staff proposes Conditions of Certification **NOISE-1** and **NOISE-2**, which would establish a Notification Process to make nearby residents aware of the project, and a Noise Complaint Process that requires the applicant to resolve any problems caused by noise from the project.

Linear Facilities

Linear facilities include pipelines for natural gas, water and wastewater, and lines interconnecting to the electrical transmission system. All linears will lie within the boundaries of the existing Encina Power Station, so their construction noise impacts will be similar to those of the power plant itself (CECP 2007a, AFC Figure 1.2-3). Limiting

noisy construction to daytime hours should provide adequate mitigation of impacts. To ensure compliance with this restriction, staff proposes Condition of Certification **NOISE-6**, below.

Pile Driving

The applicant predicts that pile driving will be required (CECP 2007a, AFC § 5.7.5.2.3). Information from other projects examined by Energy Commission staff shows the noise from pile driving could be expected to reach 104 dBA at a distance of 50 feet. Pile driving noise would thus be projected to reach a level of 70 dBA at M5 and 73 dBA at M7, the nearest residential receptor (staff calculations). Assuming daytime noise levels at M5 of 56 dBA and at M7 of 57 dBA, adding pile driving noise to the daytime ambient levels would produce increases of 19 dBA at M5 and 16 dBA at M7 (see **NOISE Table 4** below). This represents a tripling or quadrupling in noise level, and would likely constitute an annoyance. Since pile driving is only a temporary operation lasting a couple weeks or so, staff believes that limiting pile driving to daytime hours, as proposed by the applicant, would result in impacts that are tolerable to residents. Staff proposes Condition of Certification **NOISE-6**, below, to limit this operation to daytime hours.

NOISE Table 4
Pile Driving Noise Impacts

Receptor	Pile Driving Noise Level (dBA L_{eq})	Daytime Ambient Noise Level (dBA L_{eq})	Cumulative Level (dBA)	Change (dBA)
M5	75	56	75	+19
M7	73	57[1]	73	+16

Source: CECP 2007a, AFC § 5.7.5.2.3 and staff calculations
[1]Assumed from nighttime ambient noise level and correlation of daytime to nighttime ambient noise levels at M5.

Vibration

The only construction operation likely to produce vibration that could be perceived off site would be pile driving, should it be employed. Vibration attenuates rapidly; it is likely that no vibration would be perceptible at any appreciable distance from the project site. Staff therefore believes there would be no significant impacts from construction vibration.

Worker Effects

The applicant has acknowledged the need to protect construction workers from noise hazards and has recognized those applicable LORS that would protect construction workers (CECP 2007a, AFC § 5.7.5.2.1). To ensure that construction workers are, in fact, adequately protected, staff has proposed Condition of Certification **NOISE-3**, below.

Steam Blows

Typically, the loudest noise encountered during construction, inherent in building any project incorporating a steam turbine, is created by the steam blows. After erection and assembly of the feed water and steam systems, the piping and tubing that comprise the

steam path have accumulated dirt, rust, scale, and construction debris such as weld spatter, dropped welding rods, and the like. If the plant were started up without thoroughly cleaning out these systems, all this debris would find its way into the steam turbine, quickly destroying the machine.

In order to prevent this, before the steam system is connected to the turbine, the steam line is temporarily routed to the atmosphere. Traditionally, high pressure steam is then raised in the boiler or a temporary boiler and allowed to escape to the atmosphere through the steam piping. This flushing action, referred to as a *high pressure steam blow*, is quite effective at cleaning out the steam system. A series of short steam blows, lasting two or three minutes each, is performed several times daily over a period of two or three weeks. At the end of this procedure, the steam lines are connected to the steam turbine, which is then ready for operation. Alternatively, high pressure compressed air can be substituted for steam.

High pressure steam blows, if unsilenced, can typically produce noise levels as high as 129 dBA at a distance of 50 feet; this would amount to roughly 95 dBA at M5 and roughly 98 dBA at M7. With a silencer installed on the steam blow piping, noise levels are commonly attenuated to 89 dBA at 50 feet; this would yield approximately 55 dBA at M5 and 58 dBA at M7. These represent the same impacts expected from plant construction in general (see **NOISE Table 3**, above). Requiring a silencer on high pressure steam blows, as specified in proposed Condition of Certification **NOISE-7**, below, would reduce any impacts to a level of insignificance.

A newer, quieter steam blow process, referred to as *low pressure steam blow* and marketed under names such as QuietBlow™ or Silentsteam™, has become popular. This method utilizes lower pressure steam or compressed air over a continuous period of approximately 36 hours. Resulting noise levels reach about 80 dBA at 100 feet; such a process would yield noise levels at M5 of approximately 52 dBA and 55 dBA at M7. Nighttime noise from a low pressure continuous steam blow would not likely disturb people trying to sleep and would not constitute a significant impact.

Operation Impacts and Mitigation

The primary noise sources of the CECP include the gas turbine generators, gas turbine air inlets, heat recovery steam generators and their exhaust stacks, fin-fan cooler fans, electrical transformers, fuel gas compressors and metering equipment, and various pumps and fans (CECP 2007a, AFC § 1.2). Staff compares the projected noise with applicable 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.

The applicant included the following noise mitigation measures in performing computer modeling of noise impacts from project operation (CECP 2007a, AFC §§ 2.1, 2.2.4.1, 5.7.5.3.2):

- metal acoustical gas turbine enclosures; and
- location of the project in a depression.

As detailed project design progresses, if noise modeling shows that the project will produce too much noise, the applicant may employ one or more of the following

mitigation measures to reduce plant operating noise to acceptable levels (CECP 2007a, AFC § 5.7.5.3.2):

- exhaust stack silencers;
- additional equipment enclosures; and
- dirt berms.

Compliance with LORS

The applicant performed noise modeling to determine the project's noise impacts on sensitive receptors (CECP 2007a, AFC § 5.7.5.3.2; Table 5.7-16). Project operating noise at M5 and M7 (the two nearest noise-sensitive residences, 2,400 feet and 1,750 feet northwest of the project site, respectively) is predicted not to exceed 51 dBA L_{eq}. The City of Carlsbad Noise Guidelines Manual sets a limit for residential land uses of 60 dBA CNEL. For a steady, continuous noise source such as a power plant, this is equivalent to 53 dBA L_{eq}; see **NOISE Table 5**. Project noise at all sensitive receptors is thus predicted to comply with this LORS; no other LORS apply to project operational noise. While the applicant has not yet performed detail design and chosen the exact noise mitigation measures to be employed in the project, the final project design will be adjusted to ensure that this noise level (51 dBA L_{eq} at M7) is not exceeded. Staff proposes Condition of Certification **NOISE-4**, below, to ensure compliance.

NOISE Table 5
Plant Operating Noise LORS Compliance

Receptor	LORS	LORS Limit	Projected Noise Level
M1— West Hotel and Restaurant	City of Carlsbad Noise Guidelines Manual	60 dBA CNEL (equivalent to 53 dBA L_{eq})	52 dBA L_{eq}
M2— 5120 El Arbol Drive			47 dBA L_{eq}
M5— Residential property line above Hubs SeaWorld			51 dBA L_{eq}
M7— Nearest residence at end of Harbor Drive			51 dBA L_{eq}

Source: COC 1995; CECP 2007a, AFC § 5.7.5.3.2, Table 5.7-16

CEQA Impacts

Power plant noise is unique. Essentially, a power plant operates as a steady, continuous, broadband noise source, unlike the intermittent sounds that comprise the majority of the noise environment. As such, power plant noise contributes to, and becomes part of, the background noise level, or the sound heard when most intermittent noises cease. Where power plant noise is audible, it will tend to define the background noise level. For this reason, staff compares the projected power plant noise to the existing ambient background (L_{90}) noise levels at the affected sensitive receptors. If this comparison identifies a significant adverse impact, then feasible mitigation must be incorporated in the project to reduce or remove the impact.

In many cases, a power plant will be intended to operate around the clock for much of the year. The applicant specifically states that the CECP is intended to operate primarily as an intermediate duty power plant, running chiefly on summer afternoons when called upon. Nighttime operation should be relatively rare (CECP 2007a, AFC §§ 1.2.1, 2.2.16, 2.3.2.1, 2.3.3, 5.7.5.3.2). Staff typically evaluates project noise emissions by comparing them to the nighttime ambient background level; this assumes the potential for annoyance due to power plant noise is greatest at night when residents are trying to sleep. Nighttime ambient noise levels are typically lower than the daytime levels; differences of 5 to 10 dBA are common. Staff believes it is prudent to average the lowest nighttime hourly background noise level values to arrive at a reasonable baseline for comparison with the project's predicted noise level. At M5, this is the span from 1:00 a.m. to 5:00 a.m. (see CECP 2007a, AFC Table 5.7-9). This value is 47 dBA L_{90}. At M7, the sole measure of background level was a pair of spot measurements taken around 1:30 a.m.; this value is 52 dBA L_{90} (see CECP 2007a, AFC Table 5.7-12).

In the case of an intermediate load facility, where nighttime operation can be expected to occur only rarely, it may be reasonable to evaluate noise impacts on receptors during the daytime, when the plant is most likely to operate. In this case, since the ambient noise levels are unusually constant from day to night (due to the dominance of freeway noise), staff employs its normal method of evaluating power plant noise emissions against nighttime background levels.

Power plant noise levels at both M5 and at M7, the nearest sensitive receptor, are predicted to reach 51 dBA L_{eq}; see **NOISE Table 6**.

NOISE Table 6
Power Plant Noise Impacts at Nearest Sensitive Receptor

Receptor	Power Plant Noise Level, dBA L_{eq}[1]	Nighttime Ambient Background Level, dBA L_{90}	Cumulative Noise Level, dBA	Change from Ambient Background Level
M5	51	47[2]	52	+5
M7	51	56[3]	57	+1

[1] Source: CECP 2007a, AFC § 5.7.5.3.2.
[2] Source: CECP 2007a, AFC Table 5.7-9 and staff calculations of average of four quietest consecutive nighttime hours.
[3] Source: CECP 2007a, AFC Table 5.7-12.

When projected plant noise at M5 is added to the nighttime ambient value (as calculated by staff), the cumulative level is 5 dBA above the ambient value (see **NOISE Table 6**). This increase is at the bottom of the range that staff considers a potentially significant adverse impact and would, in fact, be noticeable but likely not annoying. Staff considers this a less than significant impact. When projected plant noise at M7 is added to the nighttime ambient value, the cumulative level is 1 dBA above the ambient value. This is an inaudible increase, and would constitute an insignificant impact. Since the plant is unlikely to operate a significant portion of the time during nighttime hours, staff believes any noise impacts would be insignificant. To ensure this noise level is not further exceeded, staff proposes Condition of Certification **NOISE-4**, below.

Tonal Noises

One possible source of annoyance would be strong tonal noises. Tonal noises are individual sounds (such as pure tones) that, while not louder than permissible levels, stand out in sound quality. The applicant plans to avoid the creation of annoying tonal (pure-tone) noises by balancing the noise emissions of various power plant features during plant design (CECP 2007a, AFC § 5.7.5.3.3). To ensure that tonal noises do not cause annoyance, staff proposes Condition of Certification **NOISE-4**, below.

Linear Facilities

All water and gas piping lie underground and would be silent during operation. Noise effects from the electrical interconnection line typically do not extend beyond the right-of-way easement of the line and would thus be inaudible to any receptors (CECP 2007a, AFC § 5.7.5.3.5).

Vibration

Vibration from an operating power plant could be transmitted by two chief means; through the ground (groundborne vibration) and through the air (airborne vibration).

The operating components of a combined cycle power plant consist of high-speed gas turbine generators, steam turbine generators, compressors, and various pumps and fans. All of these pieces of equipment must be carefully balanced in order to operate; permanent vibration sensors are attached to the turbines and generators. Based on experience with numerous previous projects employing similar equipment, Energy Commission staff believes that groundborne vibration from the CECP would 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. In staff's experience, airborne vibration impacts from a plant such as the CECP are typically imperceptible at any significant distance from the plant. The CECP's chief source of airborne vibration would be the gas turbines' exhaust. In a power plant such as the CECP, however, the exhaust must pass through the heat recovery steam generators before it reaches the atmosphere. These units act as very efficient mufflers; this makes it highly unlikely that the CECP would cause perceptible airborne vibration effects.

Worker Effects

The applicant has acknowledged the need to protect plant operating and maintenance workers from noise hazards and has committed to comply with applicable LORS (CECP 2007a, AFC § 5.7.5.3.1). Signs would be posted in areas of the plant with noise levels exceeding 85 dBA (the level that OSHA recognizes as a threat to workers' hearing), and hearing protection would be required. To ensure that plant operation and maintenance workers are, in fact, adequately protected, Energy Commission staff has proposed Condition of Certification **NOISE-5**, below.

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, are considerable or that compound or increase other environmental impacts. The CEQA Guidelines require that the discussion reflect the severity of the impacts and the likelihood of their occurrence, but need not provide as much detail as the discussion of the impacts attributable to the project alone.

The applicant has identified several projects in the vicinity of the CECP (CECP 2007a, AFC § 5.7.5.3.6). The one most likely to pose a potential for cumulative noise impacts is the construction of the Carlsbad Seawater Desalination Plant, to be located at the existing Encina Power Station, along the southern edge of the Aqua Hedionda Lagoon. The Desalination Plant, at a predicted 35 dBA CNEL (28 dBA L_{eq}), would not contribute significantly to ambient noise levels. It is highly unlikely that the two projects could create a significant cumulative noise impact. The remaining projects have not progressed sufficiently to perform meaningful cumulative impacts analyses, but it is unlikely that any significant cumulative noise impacts would result.

FACILITY CLOSURE

In the future, upon closure of the CECP, all operational noise from the project would cease, and no further adverse noise impacts from operation of the CECP would be possible. The remaining potential temporary noise source is the dismantling of the structures and equipment and any site restoration work that may be performed. Since this noise would be similar to that caused by the original construction, it can be treated similarly. That is, noisy work could be performed during daytime hours, with machinery and equipment properly equipped with mufflers. Any noise LORS that were in existence at that time would apply. Applicable conditions of certification included in the Energy Commission decision would also apply unless modified.

RESPONSE TO COMMENTS

No comments were received from members of the public.

The City of Carlsbad submitted two sets of comments regarding Noise and Vibration. Data Request Set 3B (COC 2008m) included Data Requests 98 through 101, and Comments on Preliminary Staff Assessment (COC 2009a) included two pages of comments. Intervenors Kerry Siekmann (Terramar Association, KS2009a, *Q15, 16*) and Julie Backer (Power of Vision, POV2009a, *Noise*) both submitted Preliminary Staff Assessment (PSA) comments specific to noise (re: screening walls and construction noise) that were issues also raised by the City of Carlsbad in their PSA comments, and will thus be addressed jointly in the responses to the city's PSA comments that follow.

Data Request Set 3B

A Background section (p. 7) states that the applicant's interpretation of the City's LORS, Municipal Code Section 8.48.010, is incorrect. Staff disagrees; staff's analysis of compliance with this LORS is correct. This section further states that the City does not accept staff's proposed Condition of Certification **NOISE-6**, claiming that mitigation is necessary for nighttime construction activities. Staff disagrees, and maintains that **NOISE-6** would provide adequate protection of sensitive noise receptors from nighttime construction noise.

Data Request 98: *Specify all noise sensitive land uses within 1,000 feet of the proposed project site and conduct a noise analysis of potential noise levels at these receptors during construction activities. If different construction activities are proposed during daytime and nighttime hours, the Applicant should specify what equipment is proposed when and incorporate usage factors for proposed equipment in order to model noise levels generated during specific construction activities.*

Response:
There exists no "noise sensitive land" to be used within 1,000 feet of the proposed site. The nearest sensitive receptor is a residence at the end of Harbor Drive, approximately 1,750 feet north northwest of the center of the project site. Ambient noise at this and other nearby receptors was monitored (CECP 2007a, AFC Table 5.7-12) and construction noise at this location was predicted (CECP 2007a, AFC Table 5.7-14) and evaluated by staff in the staff assessment (**NOISE Table 3**, above).

Data Request 99: *Include a determination of noise impacts for daytime and nighttime construction activities regardless of whether a variance or exception to the noise level limits is anticipated. An exception or variance would allow a project to exceed certain noise level limits, but would not reduce an impact to below a level of significance. Mitigation must be incorporated to reduce impacts to below a level of significance or an unmitigated impact would result.*

Response:

This analysis appears in the staff assessment (see **NOISE Table 3**) and shows that projected construction noise impacts are insignificant, day and night. No variance should be required.

Data Request 100: *The City is concerned that nearby residents and other in close proximity to project construction could be impacted by construction noise. Indicate if there will be any blasting on the site.*

Response: The AFC does not address blasting, but does include the possibility of pile driving. This is expected to be the noisiest component of project construction. Noise impacts from pile driving are addressed in the staff assessment (see **NOISE Table 4**).

Data Request 101: *Will the heavy equipment have back-up beepers?*

Response: Yes; such beepers are required by federal and state safety LORS. Noise from beepers has been considered in projecting construction noise impacts.

Comments on Preliminary Staff Assessment

Comment 4-6.1: *There is a large regional sewer interceptor (pipe) that is immediately adjacent to the proposed CECP. This pipe was constructed nearly 50 years ago and is in the process of being upgraded due to the City's concerns regarding capacity and structural integrity. Please identify and analyze impacts of pile driving activities on the*

existing sewer line, including the bridge which supports the line across the Agua Hedionda Lagoon. Please provide a map of the vibration intensity and impacts to the adjacent areas.

Response: Any pile driving that takes place would be within the footprint of the major power block structures, i.e., the gas turbine generators, steam turbine generators and HRSGs. These structures lie more than 120 feet from the site boundaries (AFC, Figure 2.2-1). Since the sewer interceptor lies outside the site boundaries, it also lies more than 120 feet from any likely pile driving activity. Pile driving is highly unlikely to cause any vibration impacts to a sewer pipe at such a distance. The bridge would lie even further away, and be even less like to suffer any impacts.

Comment 4.6-1: *Please identify any impacts to the rail line adjacent to the proposed CECP.*

Response: As with the sewer connector, the rail line lies sufficiently far from any likely pile driving activity as to preclude any impacts from vibration.

Comment 4.6-2: *As identified earlier, the City has historically not allowed a 24-hour work schedule. Please adjust proposed work schedule to reflect what is allowed (Municipal Code Section 8.48).*

Response: Staff has proposed Condition of Certification **NOISE-6**, which would limit noisy construction work to the hours embodied in the Municipal Code. Any work performed outside these hours would be sufficiently quiet as not to annoy sensitive receptors, or even be unnoticeable (see **NOISE Table 3** and associated analysis, above).

Comment 4.6-3: *With regards to discussion on the City's Noise Guidelines Manual, text should be corrected to state that 60 dBA CNEL, not 65, is the acceptable maximum for noise that impacts schools, libraries, churches, hospitals, and nursing homes. Sixty-five dBA CNEL is the <u>conditionally</u> acceptable limit.*

Response: This correction has been made.

Comment 4.6-5: *Did the analysis consider noise (both construction and operational) generated from the proposed and relocated switchyards and the approved desalination plant?*

Response: While staff's analysis did not specifically consider these noise sources, noise from these features would be mitigated to a level of insignificance by incorporation of staff's proposed conditions of certification into the Commission Decision. Through these conditions, the Commission sets permissible noise limits that must be met during construction and operation of the project, limits that the staff analysis shows would neither violate LORS nor cause significant impacts. There are not aspects of these features that lead staff to believe that they could not be constructed and operated within these limits.

Comment 4.6-5: *The Coastal Rail Trail, a public recreation facility which will be used heavily, will be located adjacent to the CECP. Please identify ongoing noise levels that the public will be subject to while on the CRT.*

Response: Assuming the Coastal Rail Trail is installed to the east of the railroad ROW (see the **Land Use** section of this document), it would lie approximately 300 feet from the acoustic center of the CECP. This would result in noise levels of about 66 dBA at the trail (CECP 2007a, AFC § 5.7.5.3.2 and staff calculations). The City of Carlsbad Noise Guidelines Manual, Figure IV-1, Land Use Compatibility for Community Noise Environments Matrix, sets as conditionally acceptable noise levels up to 70 dBA CNEL for uses such as outdoor spectator sports venues, playgrounds and parks. Since use of the trail would be to pass by the CECP and not loiter nearby, staff believes this conditionally acceptable level to be appropriate. A sound level of 70 dBA CNEL corresponds to a steady-state noise level of 63dBA L_{eq}, only 3 dBA less than the projected plant noise level of 66 dBA. Staff believes this level to be acceptable for this use.

Comment 4.6-6: *Noise Table 2 should include the 48-acre commercially designated SDG&E property east of I-5 as a noise measurement location.*

Response: Assuming the property in question lies approximately 650 feet from the acoustic center of the CECP (staff estimate based on CECP 2007a, AFC Figure 5.7-2), plant noise levels would approach 60 dBA L_{eq}. This is within the guidelines of the City of Carlsbad Noise Guidelines Manual, Figure IV-1, Land Use Compatibility for Community Noise Environments Matrix, which specifies that levels up to 65 dBA CNEL are acceptable, and up to 75 dBA CNEL are conditionally acceptable for Commercial land uses. These levels correspond to 58 and 68 dBA L_{eq}, respectively. Since the property lies adjacent to I-5, the predominant noise source in this area, staff believes the plant noise level of 60 dBA L_{eq} would comply with this standard.

Comment 4.6-6: *Recognizing that a fundamental goal of the South Carlsbad Coastal Redevelopment Area is the redevelopment of the existing EPS into a more public oriented use, please identify ongoing noise levels on the Encina property located west of the railroad tracks.*

Response: Plant noise levels to be expected west of the railroad tracks would be less than the 66 dBA identified in the response to Comment 4.6-5, Coastal Rail Trail, above.

Comment 4.6-8: *Are pile driving noise impacts to the nearest residential receptors cumulative; i.e., inclusive of other CECP construction noise?*

Response: Pile driving noise would be sufficiently loud to mask other construction noise. Staff's analysis of pile driving noise impacts thus considers other construction noise.

Comment 4.6-9: *Please identify noise impacts of steam blows on the West Hotel which is immediately south of the proposed CECP.*

Response: Noise from *silenced high pressure steam blows* would reach 55 dBA at M1 (the monitoring location representing the West Hotel). This is 10 dBA lower than the daytime ambient noise level at M1, which would render this noise less than annoying, and probably not noticeable. Noise from *low pressure continuous steam blows* would reach 52 dBA at M1. This would be equal to the nighttime ambient noise level (52 dBA L_{eq}); while barely noticeable, it would not be annoying. This level would also exceed the nighttime ambient *background* noise level (47 dBA L_{90}) by 5 dBA, an amount not likely to annoy. (Source: **NOISE Table 2** and staff calculations)

Comment 4-6.10: *Exhaust stack silencers, dirt berms and equipment enclosures are noted as ways to reduce plant noise if noise modeling shows the project will produce too much noise. Details on appearance and locations of the silencers, berms and enclosures are needed. Further, do the silencers increase stack height or dimensions? Details on these potential features as well as analysis of their possible visual and locational impacts are needed now to fully disclose impacts and feasibility.*

Response: Exhaust stack silencers are wholly enclosed within the stacks. They are not visible, and do not increase the height or diameter of the stacks. Dirt berms can be landscaped to soften their visual impacts. Equipment enclosures are typically only slightly higher or wider than the equipment they shield. Since they closely mask the equipment, they do not add to the visible mass of the plant, and would be unnoticeable from outside the plant boundary.

Comment 4.6-13: *Cumulative noise impacts and mitigation. Does analysis include the relocated and new switch stations? It is not clear if the cumulative discussion is considering operational or construction noise.*
Design of screening and visual assessment based on a widened I-5 condition must consider following Carlsbad General Plan Noise Element limitations, all of which discourage the use of walls:

"a. Noise Element land use policy C.7: Enforce the policy…that site design techniques…be the first tool used to mitigate noise impacts…rather than the construction of walls or berms.

"b. Noise Element land use policy C.9: Discourage the exclusive use of noise walls…as mitigation for noise along…roadways.

"c. Noise Element land use policy C.10: Utilize natural barriers…. When noise walls are…the only feasible solution…a(n)…innovative wall design technique shall be used…."

Response: While staff's analysis did not specifically consider the relocated and new switchyards, noise from these features would be mitigated to a level of insignificance by incorporation of staff's proposed conditions of certification into the Commission Decision. Through these conditions, the Commission sets permissible noise limits that must be met during construction and operation of the project, limits that the staff analysis shows would neither violate LORS nor cause significant impacts. There are no aspects of these features that lead staff to believe that they could not be constructed and operated within these limits. Please note that staff has not specifically proposed noise walls as mitigation in this document.

CONCLUSIONS AND RECOMMENDATIONS

The CECP, if built and operated in conformance with the proposed conditions of certification listed below, would comply with all applicable noise and vibration LORS for both operation and construction and would produce no significant adverse noise impacts on people within the affected area, directly, indirectly, or cumulatively.

PROPOSED CONDITIONS OF CERTIFICATION

NOISE-1 At least 15 days prior to the start of ground disturbance, the project owner shall notify all residents within one-half mile of the site, by mail or other effective means, of the commencement of project construction. At the same time, the project owner shall establish a telephone number for use by the public to report any undesirable noise conditions associated with the construction and operation of the project and include that telephone number in the above notice. If the telephone is not staffed 24 hours per day, the project owner shall include an automatic answering feature, with date and time stamp recording, to answer calls when the phone is unattended. This telephone number shall be posted at the project site during construction in a manner visible to passersby. This telephone number shall be maintained until the project has been operational for at least one year.

Verification: Prior to ground disturbance, the project owner shall transmit to the Compliance Project Manager (CPM) a statement, signed by the project owner's project manager, stating that the above notification has been performed and describing the method of that notification, verifying that the telephone number has been established and posted at the site, and giving that telephone number.

NOISE COMPLAINT PROCESS

NOISE-2 Throughout the construction and operation of the CECP, the project owner shall document, investigate, evaluate, and attempt to resolve all project-related noise complaints. The project owner or authorized agent shall:

- Use the Noise Complaint Resolution Form (below), or a functionally equivalent procedure acceptable to the CPM, to document and respond to each noise complaint;
- Attempt to contact the person(s) making the noise complaint within 24 hours;
- Conduct an investigation to determine the source of noise related to the complaint;
- Take all feasible measures to reduce the noise at its source if the noise is project related; and
- Submit a report documenting the complaint and the actions taken. The report shall include: a complaint summary, including final results of noise reduction efforts, and if obtainable, a signed statement by the complainant stating that the noise problem is resolved to the complainant's satisfaction.

Verification: Within five days of receiving a noise complaint, the project owner shall file a copy of the Noise Complaint Resolution Form with the CPM, documenting the resolution of the complaint. If mitigation is required to resolve a complaint, and the complaint is not resolved within a three-day period, the project owner shall submit an updated Noise Complaint Resolution Form when the mitigation is implemented.

NOISE-3 The project owner shall submit to the CPM for review and approval a noise control program and a statement, signed by the project owner's project manager, verifying that the noise control program will be implemented throughout construction of the project. The noise control program shall be used to reduce employee exposure to high noise levels during construction and also to comply with applicable OSHA and Cal/OSHA standards.

Verification: At least 30 days prior to the start of ground disturbance, the project owner shall submit to the CPM the noise control program and the project owner's project manager's signed statement. The project owner shall make the program available to Cal/OSHA upon request.

NOISE RESTRICTIONS

NOISE-4 The project design and implementation shall include appropriate noise mitigation measures adequate to ensure that operation of the project will not cause noise levels due solely to plant operation to exceed an average of 51 dBA L_{eq} measured at monitoring location M7, the residence at the end of Harbor Drive. No new pure-tone components may be caused by the project. No single piece of equipment shall be allowed to stand out as a source of noise that draws legitimate complaints.

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 residential locations to determine the presence of pure tones or other dominant sources of plant noise.

A. When the project first achieves a sustained output of 80 percent or greater of rated capacity, the project owner shall conduct a community noise survey at monitoring location M7 or at closer locations acceptable to the CPM. This survey shall be performed during power plant operation and shall also include measurement of one-third octave band sound pressure levels to determine whether new pure-tone noise components have been caused by the project.

B. If the results from the noise survey indicate that the power plant average noise level (L_{eq}) at M7 exceeds the above value, mitigation measures shall be implemented to reduce noise to a level of compliance with this limit.

C. If the results from the noise survey indicate that pure tones are present, mitigation measures shall be implemented to eliminate the pure tones.

Verification: The survey shall take place within 30 days of the project's first achieving a sustained output of 80 percent or greater of rated capacity. Within 15 days after completing the survey, the project owner shall submit a summary report of the survey to the CPM. Included in the survey report 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.

NOISE-5 Following the project's first achieving a sustained output of 80 percent or greater of rated capacity, the project owner shall conduct an occupational noise survey to identify the noise 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 and Title 29, Code of Federal Regulations section 1910.95. The survey results shall be used to determine the magnitude of employee noise exposure.

The project owner shall prepare a report of the survey results and, if necessary, identify proposed mitigation measures that will be employed to comply with the applicable California and federal regulations.

Verification: Within 30 days after completing the survey, the project owner shall submit the noise survey report to the CPM. The project owner shall make the report available to OSHA and Cal/OSHA upon request.

CONSTRUCTION TIME RESTRICTIONS

NOISE-6 Noisy construction work relating to any project features shall be restricted to the times of day delineated below:

Weekdays	7:00 a.m. to sunset
Saturdays	8:00 a.m. to sunset

Haul trucks and other engine-powered equipment shall be equipped with mufflers that meet all applicable regulations. Haul trucks shall be operated in accordance with posted speed limits. Truck engine exhaust brake use shall be limited to emergencies.

For purposes of this condition, "noisy construction work" shall be defined as steam blows and any other project-related work that draws a legitimate noise complaint. A legitimate noise complaint refers to a noise caused by the construction of the CECP project, as opposed to another source, as verified by the CPM. A legitimate complaint constitutes either: a violation by the

project of any noise condition of certification, which is documented by another individual or entity affected by such noise; or a minimum of three complaints over a 24-hour period that are confirmed by the CPM, the project owner, or any local or state agency that would, but for the exclusive jurisdiction of the Energy Commission, otherwise have the responsibility for investigating noise complaints or enforcing noise mitigation.

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.

STEAM BLOW RESTRICTIONS

NOISE-7 The project owner shall equip high pressure steam blow piping with a temporary silencer that quiets the noise of steam blows to no greater than 89 dBA measured at a distance of 50 feet.

Verification: At least fifteen (15) days prior to the first steam blow, the project owner shall submit to the CPM drawings or other information describing the temporary steam blow silencer and the noise levels expected.

EXHIBIT 1 - NOISE COMPLAINT RESOLUTION FORM

Carlsbad Energy Center Project
(07-AFC-6)

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

CECP 2007a – Carlsbad Energy Center LLC/T. Hemig (tn: 42299). Application for Certification for the Carlsbad Energy Center Project. 09/11/2007. Rec'd 09/14/2007.

COC 1995. City of Carlsbad Noise Guidelines Manual, September, 1995.

COC 2006. City of Carlsbad General Plan Noise Element, November 7, 2006.

COC 2008a. City of Carlsbad Municipal Code, January 8, 2008.

COC 2008m. City of Carlsbad Data Requests, Set 3B, September 15, 2008.

COC 2009a. City of Carlsbad/J. Garuba (tn: 50009). Comments on Preliminary Staff Assessment of Carlsbad Energy Center Project, January 30, 2009.

KS2009a – Kerry Siekmann/Terramar Assn. (tn: 49956). Comments on Preliminary Staff Assessment. 1/28/2009

POV2009a – Power of Vision/Julie Backer (tn: 49934). Comments on Preliminary Staff Assessment. 1/30/2009

SR 2008h – Stoel Rives/J McKinsey (tn: 47257). Project Enhancement and Refinement Document. 7/25/2008

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, those higher levels nevertheless are considered to be levels of noise adverse to public health.

Various environments can be characterized by noise levels that are generally considered acceptable or unacceptable. Lower levels are expected in rural or suburban areas than 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 (U.S. Environmental Protection Agency, Effects of Noise on People, December 31, 1971).

To help the reader understand the concept of noise in decibels (dBA), **NOISE Table A2** illustrates 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.
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 1 dB cannot be perceived.

2. Outside of the laboratory, a 3-dB change is considered a barely noticeable difference.

3. A change in level of at least 5 dB is required before any noticeable change in community response would be expected.

4. A 10-dB change is subjectively heard as an approximate doubling in loudness and almost always causes an adverse community response (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 3-dB increase (i.e., the resultant sound level is the sound level from a single passing automobile plus 3 dB). **NOISE Table A3** indicates the rules for decibel addition used in community noise prediction.

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 6 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, as shown in **NOISE Table A4**.

NOISE Table A4
OSHA Worker Noise Exposure Standards

Duration of Noise (Hrs/day)	A-Weighted Noise Level (dBA)
8.0	90
6.0	92
4.0	95
3.0	97
2.0	100
1.5	102
1.0	105
0.5	110
0.25	115

Source: 29 CFR § 1910.95.

NOISE AND VIBRATION - FIGURE 1

Carlsbad Energy Center Project - Noise Monitoring Locations

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

SOURCE: 07- AFC -6: Figure 5.7-3

PUBLIC HEALTH

Testimony of Alvin J. Greenberg, Ph.D.

SUMMARY OF CONCLUSIONS

Staff has analyzed potential public health risks associated with construction and operation of the Carlsbad Energy Center Project (CECP), and does not expect there would be 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 CECP project was based on 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 CECP would not contribute significantly to morbidity or mortality in any age or ethnic group residing in the project area.

Staff has also conducted a cumulative health risk assessment that evaluated emissions from both the proposed CECP and the existing Encina Power Station (EPS), and has determined that the concurrent operation of both power plants will not result in a significant risk to the public or on-site workers.

INTRODUCTION

The purpose of this Final Staff Assessment (FSA) is to determine if emissions from the proposed CECP project 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.

Staff addresses potential impacts of regulated or criteria air pollutants, including small particulate matter that have been linked to causing or exacerbating respiratory diseases, in the **AIR QUALITY** section of this FSA. 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. Project releases in the form of hazardous and nonhazardous wastes are described in the **WASTE MANAGEMENT** section.

LAWS, ORDINANCES, REGULATION, AND STANDARDS

Public Health Table 1 Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
Federal	
Clean Air Act section 112 (42 U.S. Code section 7412)	Requires new sources which emit more than ten tons per year of any specified hazardous air pollutant (HAP) or more than 25 tons per year of any combination of HAPs to apply Maximum Achievable Control Technology (MACT).
State	
California Health and Safety Code 25249.5 et seq. (Proposition 65)	Establishes 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 CCR Section 1752.5, 2300-2309; and Division 2 Chapter 5, Article 1, Appendix B, Part (1); California Clean Air Act, H&SC 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.
Local	
San Diego Air Pollution Control District (SDAPCD) Regulation XII, Toxic Air Contaminants, Rule 1200	This rule (New Source Review) specifies acceptable cancer and non-cancer risk thresholds for toxic air contaminants in order to limit public exposure.

SETTING

This section describes the environment in the vicinity of the proposed project site from the public health perspective. Features of the natural environment, such as meteorology and terrain, affect the project's potential for causing impacts on public health. An emissions plume from a facility may affect elevated areas before lower terrain areas, due to a reduced opportunity for atmospheric mixing. Consequently, areas of elevated terrain can often be subjected to increased pollutant impacts. Also, the types of land use near a site influence the surrounding population distribution and density, which, in turn, affects public exposure to project emissions. Additional factors affecting potential public health impacts include existing air quality and environmental site contamination. Existing air quality and public health concerns are described in subsequent sections.

SITE AND VICINITY DESCRIPTION

Land uses in the vicinity of the proposed project include open space, public utilities, travel/recreation commercial, elementary and junior high schools, planned industrial, and some commercial use (CECP 2007a Section 5.6.4.2). The proposed project site is entirely within the area designated for public utilities. The natural gas pipeline proposed to be constructed for this project would be about 1,100 feet long and would run east from the proposed site along the railroad tracks to an existing tie-in station (CECP 2007a Section 2.2.6).

The nearest residence is approximately 0.44 miles northeast of the site, and additional residences are located about 0.49 miles and 0.51 miles from the site to the northwest and southwest, respectively (CECP 2007a Section 5.9.3). The nearest sensitive receptors are two schools located north of the project site, and an elder care facility located northeast of the project site, both about 0.8 miles away. All sensitive receptors within three miles of the project site are depicted in figures 5.9A-1 through -5b (CECP 2007a Appendix 5.9A). As mentioned above, the location of sensitive receptors near the proposed site is an important factor in considering potential public health impacts.

The topography of the site is essentially flat (about 29 feet above sea level) with the pacific ocean lying to the west and hills rising to the north, east, and south of the project site.

METEOROLOGY

Meteorological conditions, including wind speed, wind direction, and atmospheric stability, affect the extent to which pollutants are dispersed into ambient air as well as the direction of pollutant transport. This, in turn, affects the level of public exposure to emitted pollutants and associated health risks. When wind speeds are low and the atmosphere is stable, for example, dispersion is reduced and localized exposure may be increased.

Mild and cool summers and relatively warm winters characterize the subtropical climate of San Diego County. Most of the rainfall occurs during the winter, and temperatures rarely drop below freezing or rise above 100°F (CECP 2007a Section 5.1.1.2). The climate at the project site 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. Wind flow in the region is light and mostly from the west and northwest. Atmospheric stability is high, which increases the potential for pollution accumulation.

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 San Diego Air Pollution Control District (SDAPCD). By examining average toxic concentration levels from representative air monitoring sites in the project vicinity 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 from all causes is about 1 in 3, or 333,000 in one million. For the year 2004, the American Cancer Society estimated that the death rate due to cancer was 23.1%, about 1 in 4.

The air quality monitoring site nearest to the proposed CECP site is the Camp Pendleton monitoring station, approximately 12 miles from the project site. However, this station only monitors ozone and NO_2. The Escondido monitoring station located about 15 miles southeast from the project site measures particulate matter, and so data from this station is used to estimate background concentrations of PM10 and PM2.5 at the CECP site (CECP 2007a Section 5.1.3). The annual arithmetic mean concentrations of PM10 recorded at the Escondido station between the years 1997 and 2006 range from 19 $\mu g/m^3$ to 33 $\mu g/m^3$ (CECP 2007a, Table 5.1-6). The annual arithmetic mean concentrations of PM2.5 recorded at the Escondido station between the years 1999 and 2006 range from 11.5 $\mu g/m^3$ to 18.0 $\mu g/m^3$ (CECP 2007a, Table 5.1-7).

The San Diego APCD does not have data on ambient airborne toxic air contaminants, as the monitoring stations were recently installed and the data is currently under review. The nearest California Air Resources Board (ARB) air toxics monitoring stations that actively report values for this area are located at El Cajon and Chula Vista, approximately 35 miles southeast and 40 miles south of Carlsbad, respectively. Although staff does not consider these locations to be representative of air quality in the Carlsbad area, they do serve to show the upper-bound levels of toxic air contaminants found in the SDAPCD. In 2007, the background cancer risk calculated by the ARB for the El Cajon site was 119 in one million and for the Chula Vista site, the background cancer risk was 77 in one million (ARB 2008). The pollutants 1,3-butadiene and benzene, emitted primarily from mobile sources, were the two highest contributors to risk and together accounted for over half of the total at each site. The risk from 1,3-butadiene was about 34 in one million at El Cajon and 21 in a million at Chula Vista, while the risk from benzene was about 44 in one million at El Cajon and 25 in one million at Chula Vista. Formaldehyde accounts for about 16% of the 2007 average calculated cancer risk based on air toxics monitoring results for the El Cajon and Chula

Vista stations, with a risk of about 19 and 13 in one million, respectively. Formaldehyde is emitted directly from vehicles and other combustion sources, such as the proposed CECP.

The use of reformulated gasoline, beginning in the second quarter of 1996, as well as other toxics reduction measures, have led to a decrease of ambient levels of toxics and associated cancer risk in all areas of California during the past few years. For example, in one large air district, cancer risk was 342 in one million based on 1992 data and in 2002, the average inhalation cancer risk decreased to 162 in one million (BAAQMD 2004, p. 12). Similar reductions occurred throughout the state's major metropolitan areas. In comparison to these "background" risks from all stationary and mobile sources, staff has estimated the theoretical maximum cancer risk as a result of all emissions from the proposed CECP project to be 0.56 in one million, a value less than 5% of the existing background cancer risk found in Chula Vista.

EXISTING PUBLIC HEALTH CONCERNS

When evaluating a new project, staff considers existing public health issues in the project vicinity, in particular respiratory diseases such as asthma. According to information obtained from the County of San Diego Health and Human Services Agency website, the Carlsbad area experiences between 28 and 50 annual asthma hospitalization cases per 100,000 people (CECP 2007a Section 5.9.3). The asthma rates are far below the Healthy People 2010 objectives (DHHS 2006) and thus staff concludes that the population of the Carlsbad area does not experience above-average incidence of asthma.

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 CECP 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 through inhalation, ingestion, and dermal contact; and
- Characterize potential health risks by comparing worst-case exposure to safe standards based on known health effects.

Initially, a screening level risk assessment is performed using simplified assumptions that are intentionally biased toward protection of public health. That is, an analysis is designed that overestimates public health impacts from exposure to project emissions. In reality, it is likely that the actual risks from the power plant will be much lower than the risks 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 12-100% of a lifetime, or from eight to seventy 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 RELs are based on the most sensitive adverse health effect reported in the medical and toxicological literature, and include margins of safety. The margin of safety addresses uncertainties associated with inconclusive scientific and technical information available 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 the California Office of Environmental Health Hazard Assessment - 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

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, non-criteria 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 non-cancer health effects by calculating a “hazard index.” A hazard index is a ratio comparing exposure from facility emissions to the reference (safe) exposure level. A ratio of less than one signifies that the worst-case exposure is below the safe level. The hazard index for every toxic substance 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 one 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 non-cancer project-related public health impacts.

Cancer Risk

Staff relies upon regulations implementing the provisions of Proposition 65, the Safe Drinking Water and Toxic Enforcement Act of 1986 (Health & Safety Code, §§ 25249.5 et seq.) for guidance 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 ten in one million, or 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 which applies to Proposition 65.

The significant risk level of ten in one million is consistent with the level of significance adopted by the SDAPCD. SDAPCD Rule 1200 (Toxic Air Contaminant, New Source Review) states that a project with an incremental cancer risk of between one and ten in one million is acceptable if best available control technology has been applied to reduce risk (CECP 2007a Section 5.1.5.3.8). In general, SDAPCD would not approve a project with a cancer risk exceeding ten in one million.

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 staff is confident that that risk and hazard are not underestimated. 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 (because these populations often have a greater incidence of pre-existing medical conditions). In order to accomplish this goal, staff utilizes the most current acceptable public health exposure levels (both acute and chronic) set to protect the public from the effects of 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. If facility risk, based on refined assumptions, exceeds the significance level of ten in one 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 ten in one 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 demolition of existing structures, 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 in 2007 concluded that the areas beneath existing structures, including the east tank farm (comprised of aboveground storage Tanks 4-7), may have environmental conditions that would require remediation (stored fuel oil no. 6), and that this should be assessed during the time these structures are removed (CECP 2007a, Section 5.14.3.1.1). As part of the CECP Project Enhancement and Refinement (SR 2008h, Section 2.3.3), the applicant proposes to have three of the fuel-oil storage tanks (5, 6 and 7) demolished, and the soil beneath them remediated (Tank 4 will not be demolished). The details of the tank removal and soil sampling and remediation plan are provided in New Appendix 2H (SR 2008h). To address the possibility that soil contamination would be encountered during construction of the CECP, 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. Staff believes that adherence to current ordinances and to staff's proposed Conditions of Certification mentioned above will be adequate to address any soil or groundwater contamination that exists on this site. See the final 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 cough, 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 (SRP) on Toxic Air Contaminants recommended a chronic REL (see REL discussion in Method of Analysis section above) for diesel exhaust particulate matter of 5 $\mu g/m^3$ and a cancer unit risk factor of $3x10^{-4}$ $(\mu g/m^3)^{-1}$ (SRP 1998, p. 6). [The SRP, established pursuant to California Health and Safety Code section 39670, evaluates the risk assessments of substances proposed for identification as Toxic Air Contaminants by ARB and the Department of Pesticide Regulation (DPR). The SRP reviews the exposure and health assessment reports and the underlying scientific data upon which the reports are based.] The SRP did not recommend a value for an acute REL, since available data in support of a value was deemed insufficient. On August 27, 1998, ARB listed particulate emissions from diesel-fueled engines as a toxic air contaminant and approved SRP's recommendations regarding health effect levels.

Construction of the CECP, including site preparation, is anticipated to take place over a period of 25 months (SR 2008h Revised Figure 1.4-1a). As noted earlier, assessment of chronic (long-term) health effects assumes continuous exposure to toxic substances over a significantly longer time period, typically from eight to seventy years.

AFC Appendix 5.1E presents diesel exhaust emissions from engines and fugitive dust from construction activities. The applicant estimated worst-case total emissions of 67.7 lb/day of particulate matter less than 10 microns (PM10) and 33.6 lb/day of particulate matter less than 2.5 microns (PM2.5) for on-site construction activities, fugitive dust, and off-site construction traffic (CECP 2007a Table 5.1E-1). The applicant's modeling of diesel particulate matter emissions from construction equipment over a period of nine years resulted in a cancer risk of 39 in one million for an area that extends about 300 meters from the site and covers parts of I-5. The applicant's modeling of worst-case construction emissions adjusted to a 25-month period found that the cancer risk was estimates at 9.1 in one million, below the level of significance (10 in one million) (CECP 2007a Table 5.9B-11). When construction activities including impacts of fugitive dust over a 12-month period were estimated by the applicant, they predicted an annual average concentration of 5 $\mu g/m^3$ of PM10 and 2 $\mu g/m^3$ PM2.5 at any location (CECP

2007a Table 5.1E-4). Mitigation measures are proposed by both the applicant and Air Quality staff to reduce the maximum calculated PM10 as well as PM2.5 concentrations. These include the use of extensive fugitive dust control measures. The fugitive dust control measures are assumed to result in 90% reduction of fugitive dust emissions.

In order to mitigate potential impacts from particulate emissions during the operation of diesel-powered construction equipment, Air Quality staff recommends the use of ultra low-sulfur diesel fuel and Tier 2 or Tier1 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%. Such filters will reduce diesel emissions during construction and further reduce the impacts associated with diesel exhaust. (See the Air Quality section of this FSA for staff's proposal to control particulate matter.)

OPERATION IMPACTS AND MITIGATION

Emissions Sources

The emissions sources at the proposed CECP site include two natural gas-fired combustion turbines and one diesel-fueled emergency fire water pump engine.

As noted earlier, the first step in a health risk assessment is to identify potentially toxic compounds that may be emitted from the facility.

Table 5.9B-1 of the Application for Certification (AFC) lists non-criteria pollutants and their emission factors that may be emitted from the CECP combustion turbines as combustion byproducts. Table 5.9B-2 lists the emergency fire pump diesel engine toxic air pollutant emission rates. Emission factors are from the U.S. EPA emission factors database (AP-42) or the California Air Toxics Emission Factors (CATEF II) database. Table 5.9-5 of the AFC lists toxicity values used to characterize cancer and noncancer health impacts from project pollutants. The toxicity values include RELs, 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 toxic emissions and shows how each contributes to the health risk analysis. For example, the first row shows that oral exposure to acetaldehyde is not of concern, but if inhaled, may have cancer and chronic (long-term) noncancer health effects, but not acute (short-term) effects.

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				✓	✓
Benzene			✓	✓	✓
1,3-Butadiene			✓	✓	
Diesel Exhaust			✓	✓	
Ethylbenzene				✓	
Formaldehyde			✓	✓	✓
Hexane				✓	
Naphthalene		✓	✓	✓	
Polycyclic Aromatic Hydrocarbons (PAHs)	✓	✓	✓	✓	
Propylene				✓	
Propylene oxide			✓	✓	✓
Toluene				✓	✓
Xylene				✓	✓

*Source: OEHHA 2003 Appendix L and CECP 2007a Table 5.9-5.

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. In this case, stack emissions from the two combustion turbines have not been measured by a “source test” and thus staff uses emission factors from similar turbines tested and reported on the California Air Resources Board’s data base called CATEF (California Toxic Emission Factors). This data base is routinely used by staff and others in California when source test data is not available. The ARB considers the use of these factors to be a reliable source of emission factors. Staff agrees with this approach and has allowed applicants to use CATEF in health risk assessments for power plant siting cases since the CATEF data base was established. According to ARB, not all reported emission factors are included in the data base and that over half of the tests collected were eliminated and not used in emission factor development. Staff also uses the CATEF data base in its health risk assessment.

The next step in the health risk assessment process is to estimate the ambient concentrations of toxic substances that may result from the project. 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) modeling program. Finally, ambient concentrations were used in conjunction with RELs and cancer unit risk factors to estimate health effects which 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 revised screening health risk assessment for the project (SR 2008h Appendix 5.9C), including combustion and non-combustion emissions, resulted in a maximum acute hazard index of 0.09 and a maximum chronic hazard index of 0.003 at the point of maximum impact (PMI). As **Public Health Table 3** shows, both acute and chronic hazard indices are under the significance level of 1.0, indicating that no short- or long-term adverse health effects are expected.

Public Health Table 3 Operation Hazard/Risk at Point of Maximum Impact

Type of Hazard/Risk	Hazard Index/Risk	Significance Level	Significant?
Acute Noncancer	0.09	1.0	No
Chronic Noncancer	0.003	1.0	No
Individual Cancer	0.1 in one million	10 in one million	No

Source: SR 2008h, **Revised** Table 5.9-6

As shown in **Public Health Table 3**, total worst-case individual cancer risk was calculated by the applicant to be 0.10 in one million at the location of maximum impact (SR 2008h Table 5.9-6).

Staff conducted its own independent quantitative risk assessment that included emission factors during start-up, shut-down, commissioning, and normal operations. Staff obtained emission factors from the San Diego Air Pollution Control District as presented in the District's Rule 1200 Health Risk Assessment report ["Review of Health Risk Assessment evaluation for the Carlsbad Energy Center Project (CECP)" dated November 20, 2008, which is referred to in this FSA as "Rule 1200 HRA report"] and in the District's "Final Determination of Compliance" (FDOC) dated August 4, 2009. The District's reports include risks due to normal operation, start-up and shut-down events and commissioning of the gas turbines as "combined risks". Staff conducted additional modeling to evaluate the cumulative risks posed by the existing Encina Power Station and the proposed CECP and this assessment is different from the following "combined risks" assessment.

MODELING PROCEDURE FOR CECP EMISSIONS DURING ALL PHASES OF OPERATION ("combined risks")

Emitting units for this project include two natural gas-fired combustion turbines and a diesel fire water pump, for a total of three emitting sources evaluated at the proposed facility.

Staff's quantitative analysis of facility operations included the following:

- Stack parameters, building parameters, emission rates and locations of sources were obtained from the AFC and modeling files provided by the applicant. Combustion turbine generator stacks were modeled at the increased stack height of 139 feet.

- Emissions from the two combustion turbine generator stacks and the diesel fire water pump were included in the analysis.

- Used a receptor grid of -1000 to 1000 m east and -1000 to 1000 m north, at 100 m increments.

- Exposure pathways assessed include inhalation, dermal absorption, soil ingestion, homegrown produce and mother's milk.

Atmospheric dispersion modeling was conducted using the ARB/OEHHA Hotspots Analysis and Reporting Program (HARP), Version 1.4a. Screening meteorological data was used, as local meteorological data compatible for use in the HARP ISCST analysis was not provided by the applicant.

Four separate modeling analyses were run in order to evaluate four separate operational scenarios:

<u>SCENARIO 1:</u>
Expected operations in a standard year (normal operations of 4,100 hours/year with 300 startups/year)

<u>SCENARIO 2:</u>
Worst case operations in a standard year (normal operations of 8,760 hours/year with 1,460 startups/year)

<u>SCENARIO 3:</u>
Expected operations in a commissioning year (normal operations of 4,100 hours/year with 300 startups/year and 415 hours/year commissioning operations)

<u>SCENARIO 4:</u>
Worst case operations in a commissioning year (normal operations of 8,760 hours/year with 1,460 startups/year and 415 hours/year commissioning operations)

The HARP model was used for health risk calculations for all four scenarios. For cancer risk staff used the "Derived(Adjusted)Method" and for chronic noncancer hazard the "Derived(OEHHA)Method" was used.

The following receptor locations were quantitatively evaluated in staff's analysis:

- Location of the Point of Maximum Impact (PMI) located east of the site (70 year residential scenario); two PMIs are evaluated: the one identified in staff's modeling (located approximately 236 feet east of the facility fenceline) and the one reported in the AFC (located approximately 354 feet east of the facility fence line);

- Location of the Maximally Exposed Individual Resident (MEIR) located approximately 2,440 feet southeast of the site (70 year residential scenario); staff used the location of the MEIR reported in the AFC; and

- Location of the Maximally Exposed Individual Worker (MEIW) located approximately 2300 feet southeast of the site; staff used the location of the MEIW reported in the AFC.

Normal Operations: The emission factors for gas turbine emissions used in staff's analysis of cancer risk and hazard were obtained from Table 2-2 of the District's Rule 1200 HRA report (same values were used in the FDOC), which lists Uncontrolled and Controlled Emission Factors in units of pounds per million standard cubic foot (lb/MMscf). In this analysis, Controlled Emission Factors are converted to units of lb/hour assuming a maximum heat input rate of 2,085 MMBtu/hour and a heating value for natural gas of 1,019 British Thermal Units per standard cubic foot (Btu/scf) (obtained from page 3 of the Rule 1200 HRA report). The hourly emission rate is then multiplied by annual operations of 4,100 hours/year for expected operations (Scenarios 1 and 3) or 8,760 hours/year for worst-case operations (Scenarios 2 and 4). The hourly and annual emission factors used in staff's analysis are listed in **Public Health Table 4**.

Fire Water Pump Engine: Diesel emission rates from the fire water pump engine were obtained from AFC Table 5.9B-1 and are equivalent to 0.07 lbs/hour and 0.2 lbs/year.

Startups/shutdowns: In the analysis described in the District's Rule 1200 HRA report, the worst-case one-hour turbine startup/shutdown event would include approximately 22 minutes with emissions elevated above normal operating levels during startup, followed by 31 minutes of normal operating emission levels, and ending with 7 minutes of elevated emissions during shutdown. Fuel heat input and release parameters used in the District's modeling of these events are provided in Table 3-3 of the Rule 1200 HRA report. Annual average and hourly emission rates for these events are not provided, however, and it is beyond the scope of this analysis to derive the emission rates which are needed to model risks due to this scenario. Thus, the estimated potential health impacts at the Point of Maximum Impact due to startup/shutdown events that are presented in the District's Rule 1200 HRA report (Table 4-2), are used in staff's analysis for all receptors evaluated. The incremental cancer risk at the PMI due to simultaneous startup of both turbines is 2.516 per million based on the assumption that emissions

occur for 8,760 hours per year. Chronic noncancer health hazard index is 0.0588 and acute noncancer health hazard index is 0.444.

Turbine Commissioning: Similar to the startup/shutdown analysis described above, average annual and hourly emission rates for turbine commissioning events are not provided in the District's analysis, and it is beyond the scope of this analysis to derive these rates. Thus, the estimated potential health impacts at the PMI due to turbine commissioning that are presented in the District's Rule 1200 HRA report (Table 4-2) are used in staff's analysis for all receptors evaluated. The incremental cancer risk at the PMI due to turbine commissioning is 1.9 per million based on the assumption that emissions occur for 8,760 hours per year. Chronic noncancer health hazard index is 0.0456.

"Combined" Annual Impacts: In order to evaluate risks due to turbine operations, startup/shutdown events and turbine commissioning, annual risks due to each of these types of events is weighted based on the number of hours each event occurs, in order to determine combined annual impacts. The methodology for this procedure is described on page 14 of the District's Rule 1200 HRA report. Specifically, the following algorithm is presented to estimate combined health impacts for cancer risks and chronic health impacts when a commissioning year is not included:

$$HI = [(N - S - C)/8760]*R_n + (S/8760)*R_s + (C/8760)*R_c$$

where

- HI = the combined health impact
- N = the maximum number of normal operating hours per turbine
- S = the number of startup hours per turbine
- C = the number of commissioning hours per turbine
- R_n = the maximum estimate potential health impact for 8760 hours of normal operations for both turbines combined
- R_s = the maximum estimated potential health impact for 8760 hours of startups for both turbines combined
- R_c = the maximum estimated potential health impact for 8760 hours of commissioning for both turbines combined

In order to estimate potential cancer health risks including commissioning, the following algorithm is used:

$$HI = [(N - S - (1/70)*C)/8760]*R_n + (S/8760)*R_s + ((1/70)*C/8760)*R_c$$

"Combined" Acute Noncancer Health Impacts

Staff's modeling revealed the following acute health hazard index values for normal turbine emissions:

Expected operations (4100 hrs/year)	Acute HI
PMI (determined in staff's analysis):	0.045
PMI (determined in AFC):	0.016
MEIR:	0.0075
MEIW:	0.0051
Worst-case operations (8760 hrs/year)	
PMI (determined in staff's analysis):	0.044
PMI (determined in AFC):	0.015
MEIR:	0.0073
MEIW:	0.0050

These acute hazard index values for normal operations are less than the acute hazard index value determined in the District's Rule 1200 HRA report, which is 0.44. The acute hazard index determined in the District's FDOC (SDAPCD 2009) is 0.16.

RESULTS OF THE OPERATIONS SCENARIOS ("combined risks")

Results of staff's analysis are summarized in **Public Health Table 5** and are compared to the results presented in the District's Rule 1200 HRA report. In **Public Health Table 6,** staff's results are compared to the results presented in the District's FDOC (SDAPCD 2009) which evaluated risks for worst-case operations during a commissioning year including 1,460 startups. Substance-specific risks for Normal Operations (standard year, 8760 hours) are presented in **Public Health Table 7** for the Point of Maximum Impact determined in this analysis and in **Public Health Table 8** for the maximum impacted residence.

Public Health Table 4 Emission Rates for Each Combustion Turbine Used in this Analysis for Normal Operations in an Expected Operations Year (4,100 hrs/yr) and in a Worst Case Operations Year (8,760 hrs/yr) for Cancer Risk and Hazard Analyses

			EXPECTED OPERATIONS (4100 hrs/yr)	WORST CASE OPERATIONS (8,760 hrs/yr)
Chemical Name	Emission Factor (Controlled) lb/MMscf	Emission Factor (Controlled) lb/hr	Emission Factor (Controlled) lb/yr	Emission Factor (Controlled) lb/yr
Ammonia	6.95E+00	1.42E+01	5.83E+04	1.25E+05
Acetaldehyde	2.04E-02	4.17E-02	1.71E+02	3.66E+02
Acrolein	3.27E-03	6.69E-03	2.74E+01	5.86E+01
Benzene	6.10E-03	1.25E-02	5.12E+01	1.09E+02
1,3-Butadiene	2.20E-04	4.50E-04	1.85E+00	3.94E+00
Ethyl Benzene	1.63E-02	3.34E-02	1.37E+02	2.92E+02
Formaldehyde	4.59E-01	9.39E-01	3.85E+03	8.23E+03
n-Hexane	1.30E-01	2.66E-01	1.09E+03	2.33E+03
Naphthalene	6.65E-04	1.36E-03	5.58E+00	1.19E+01
Propylene	3.86E-01	7.90E-01	3.24E+03	6.92E+03
Propylene Oxide	1.48E-02	3.03E-02	1.24E+02	2.65E+02
Toluene	6.65E-02	1.36E-01	5.58E+02	1.19E+03
Xylenes	3.27E-02	6.69E-02	2.74E+02	5.86E+02
PAHs				
Acenapthene	9.50E-06	1.94E-05	7.97E-02	1.70E-01
Acenapthylene	7.35E-06	1.50E-05	6.17E-02	1.32E-01
Anthracene	1.69E-05	3.46E-05	1.42E-01	3.03E-01
Benzo[a]anthracene	1.13E-05	2.31E-05	9.48E-02	2.03E-01
Benzo[a]pyrene	6.95E-06	1.42E-05	5.83E-02	1.25E-01
Benzo[b]fluoranthene	5.65E-06	1.16E-05	4.74E-02	1.01E-01
Benzo[e]pyrene	2.72E-07	5.57E-07	2.28E-03	4.88E-03
Benzo[g,h,i]perylene	6.85E-06	1.40E-05	5.75E-02	1.23E-01
Benzo[k]fluoranthene	5.50E-06	1.13E-05	4.61E-02	9.86E-02
Chrysene	1.26E-05	2.58E-05	1.06E-01	2.26E-01
Dibenz[a,h]anthracene	1.18E-05	2.41E-05	9.90E-02	2.12E-01
Fluoranthene	2.16E-05	4.42E-05	1.81E-01	3.87E-01
Fluorene	2.90E-05	5.93E-05	2.43E-01	5.20E-01
Indeno(1,2,3-cd)pyrene	1.18E-05	2.41E-05	9.90E-02	2.12E-01
Phenanthrene	1.57E-04	3.21E-04	1.32E+00	2.81E+00
Pyrene	1.39E-05	2.84E-05	1.17E-01	2.49E-01

Public Health Table 5 Results of Staff's Analysis and the SDAPCD's Rule 1200 HRA Analysis for Cancer Risk and Chronic Hazard

	CANCER RISK (per million)		CHRONIC HAZARD INDEX	
	STAFF'S RESULTS	RULE 1200 HRA	STAFF'S RESULTS	RULE 1200 HRA
SCENARIO 1: Standard Year, Expected Operations 4100 hours PLUS 300 startups/year				
PMI from Staff's Modeling	0.46	n/a	0.092	n/a
AFC PMI	0.22	0.28	0.088	0.005
AFC MEIR	0.15	0.22	0.087	0.004
AFC MEIW	0.093	0.14	0.087	0.005
SCENARIO 2: Standard Year, Worst-case Operations 8760 hours PLUS 1460 startups/year				
PMI from Staff's Modeling	1.1	n/a	0.431	n/a
AFC PMI	0.66	0.82	0.423	0.017
AFC MEIR	0.54	0.71	0.421	0.015
AFC MEIW	0.43	0.54	0.421	0.017
SCENARIO 3: Commissioning Year, Expected Operations 4100 hours PLUS 300 startups/year				
PMI from Staff's Modeling	0.46	n/a	0.182	n/a
AFC PMI	0.22	0.28	0.178	0.007
AFC MEIR	0.15	0.22	0.177	0.006
AFC MEIW	0.095	0.14	0.177	0.007
SCENARIO 4: Commissioning Year, Worst-case Operations 8760 hours PLUS 1460 startups/year				
PMI from Staff's Modeling	1.1	n/a	0.520	n/a
AFC PMI	0.66	0.83	0.513	0.019
AFC MEIR	0.54	0.71	0.511	0.017
AFC MEIW	0.43	0.54	0.511	0.019

Public Health Table 6 Results of Staff's Analysis and the SDAPCD's FDOC Analysis for Cancer Risk and Chronic Hazard

	CANCER RISK (per million)		**CHRONIC HAZARD INDEX**	
	STAFF'S RESULTS	FDOC HRA	STAFF'S RESULTS	FDOC HRA
SCENARIO 4: Commissioning Year, Worst-case Operations 8760 hours PLUS 1460 startups/year				
PMI from Staff's Modeling	1.1	n/a	0.520	n/a
AFC PMI	0.66	1.22	0.513	n/a
AFC MEIR	0.54	0.47	0.511	0.01
AFC MEIW	0.43	0.27	0.511	0.01
8-hour Hazard Index	-	-	0.15	0.12

Public Health Table 7 Contribution to Total Cancer Risk by Individual Substances from All Sources at the Point of Maximum Impact, Determined for Normal Operations (Standard Year, 8760 hours)

	Cancer Risk (per million)			
Chemical Name	**TURBINE 1**	**TURBINE 2**	**DIESEL FIRE PUMP**	**ALL SOURCES**
Benzene	0.011	0.014		0.025
1,3-Butadiene	0.0024	0.0031		0.0055
Formaldehyde	0.18	0.23		0.40
Naphthalene	0.0015	0.0019		0.0033
Propylene Oxide	0.0035	0.0045		0.0080
Acetaldehyde	0.0037	0.0048		0.0085
Ethyl Benzene	0.0026	0.0033		0.0059
DieselExhPM			0.014	0.014
B[a]anthracene	0.012	0.015		0.027
B[a]P	0.072	0.092		0.16
B[b]fluoranthene	0.0058	0.0075		0.013
B[k]fluoranthene	0.0056	0.0073		0.013
Chrysene	0.0013	0.0017		0.0030
D[a,h]anthracene	0.042	0.054		0.096
In[1,2,3-cd]pyrene	0.012	0.016		0.028
TOTAL RISK	0.35	0.45	0.014	0.82

Public Health Table 8 Contribution to Total Cancer Risk by Individual Substances from All Sources at the Maximum Impacted Residence, Determined for Normal Operations (Standard Year, 8760 hours)

	Cancer Risk (per million)			
Chemical Name	**TURBINE 1**	**TURBINE 2**	**DIESEL FIRE PUMP**	**ALL SOURCES**
Benzene	0.0023	0.0020		0.0043
1,3-Butadiene	0.00049	0.00043		0.00092
Formaldehyde	0.036	0.032		0.067
Naphthalene	0.00030	0.00026		0.00056
Propylene Oxide	0.00072	0.00063		0.0013
Acetaldehyde	0.00076	0.00067		0.0014
Ethyl Benzene	0.00053	0.00046		0.0010
DieselExhPM			0.0053	0.0053
B[a]anthracene	0.0024	0.0021		0.0045
B[a]P	0.015	0.013		0.027
B[b]fluoranthene	0.0012	0.0010		0.0022
B[k]fluoranthene	0.0012	0.0010		0.0022
Chrysene	0.00026	0.00023		0.00050
D[a,h]anthracene	0.0086	0.0075		0.016
In[1,2,3-cd]pyrene	0.0025	0.0022		0.0047
TOTAL RISK	0.072	0.063	0.0053	0.14

CUMULATIVE IMPACTS

The applicant had contacted the SDAPCD and obtained a list of nearby projects that may contribute to a public health cumulative impact. The list provided by the SDAPCD contained no facilities that meet the criteria for having potential cumulative public health impacts other than the existing Encina Power Station (EPS). The applicant stated that no other sources of emissions were identified in the project vicinity and therefore a cumulative impacts analysis is not required (CECP 2007a, Section 5.9.5). Staff has reviewed this matter and agrees that cumulative impacts would only be significant if other sources were so close that the emission plumes would produce a significant cumulative risk where insignificant individual risks exist. Since the maximum cancer risk for emissions from the CECP (calculated by staff as scenario 4 above) is 0.89 in one million, staff believes that this additional increment would not cause a significant cumulative impact. Staff has modeled cumulative impacts at other projects in the state and has yet to find a significant cumulative impact. However, members of the public and some interveners have expressed concern and have asked staff to consider the existing EPS cumulatively with the proposed CECP. Therefore, staff conducted a quantitative health risk assessment.

The existing Encina Power Station (EPS) consists of one small gas turbine, and five boilers, three of which (EPS Units 1-3) are scheduled to be retired. Thus, if the CECP is certified, built, and operated the remaining operating units at the existing EPS would include one gas turbine which can be fueled on natural gas or on diesel (max. 876 hours/year) and two boilers (EPS Units 4-5), which can be fueled by natural gas or fuel oil, and are exhausted from the same stack. Since both fuel oil and diesel has been phased out, and will not be used in the future (CAISO 2008), emission factors based on natural gas firing of the gas turbine and boilers at the Encina Power Station were used in the cumulative risk assessment and are presented in **Public Health Table 8**.

Staff's quantitative analysis of cumulative impacts included the following:

- Stack parameters, building parameters, emission rates and locations of sources were obtained from the AFC and modeling files provided by the applicant.

- Use of a receptor grid of -1000 to 1000 m east and -1000 to 1000 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. Screening meteorological data was used, as local meteorological data compatible for use in the HARP ISCST analysis was not provided by the applicant.

One potential operational scenario was evaluated quantitatively in this assessment: cumulative risks due to worst case operations in a standard year (normal operations of 8,760 hours/year) at CECP plus operation of the turbine and boilers at the Encina Power Station, fueled on natural gas.

Public Health Table 8 -- Emission Rates for the Encina Power Station Turbine and Boilers Fueled with Natural Gas

	BOILER 4		BOILER 5		GAS TURBINE	
Chemical Name	**Emission Factor lb/yr**	**Emission Factor lb/hr**	**Emission Factor lb/yr**	**Emission Factor lb/hr**	**Emission Factor lb/yr**	**Emission Factor lb/hr**
Propylene	4.32E+02	4.93E-02	4.63E+02	5.28E-02		
Benzene	5.86E+01	6.69E-03	6.27E+01	7.16E-03	3.32E+01	3.79E-03
Formaldehyde	2.09E+03	2.39E-01	2.24E+03	2.56E-01	1.97E+03	2.25E-01
Hexane	3.63E+01	4.14E-03	3.88E+01	4.43E-03	7.06E+02	8.05E-02
Naphthalene	1.70E+01	1.94E-03	1.82E+01	2.08E-03	3.54E+00	4.04E-04
Dichlorobenzene	3.35E+01	3.82E-03	3.58E+01	4.09E-03		
Toluene	9.48E+01	1.08E-02	1.02E+02	1.16E-02	3.62E+02	4.14E-02
1,3-Butadiene					1.20E+00	1.37E-04
Acetaldehyde	2.47E+02	2.82E-02	2.65E+02	3.02E-02	1.11E+02	1.27E-02
Acrolein	2.23E+01	2.55E-03	2.39E+01	2.73E-03	1.77E+01	2.02E-03
Ethyl Benzene	1.92E+03	2.20E-01	2.06E+03	2.35E-01	8.88E+01	1.01E-02
PAHs (other)	2.79E+00	3.18E-04	2.99E+00	3.41E-04	5.99E+00	6.84E-04
Xylenes	5.58E+02	6.37E-02	5.97E+02	6.82E-02	1.78E+02	2.03E-02
Propylene Oxide					8.06E+01	9.21E-03

Cumulative risk estimated at the PMI located east of the site (same location as the PMI identified in the AFC), is 9.05 in a million. Ninety-eight percent (98%) of the risk at the PMI (8.85 in a million) is due to emissions from the Encina Power Station and 94% of that risk (8.35 in a million) is due to emitted PAHs (polycyclic aromatic hydrocarbons).

Staff believes that because the contribution of the CECP project to both cancer risk and chronic and acute noncancer hazard are very small, and the cumulative analysis with the EPS also shows that cumulative risk is less than 10 in one million and the cumulative Hazard Indices are much less than 1.0 (acute 0.035; chronic 0.018), the operation of the CECP project concurrently with the EPS would not pose a significant risk. Since staff and the applicant have not analyzed the cumulative risk with backup diesel and fuel-oil use in the existing Encina boilers and combustion turbine, staff recommends a condition of certification prohibiting these fuels in CECP, the existing Encina boilers and combustion turbine, unless analyzed for cumulative impacts and risks.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Please see Appendix A for responses to comments.

COMPLIANCE WITH LORS

Staff concludes that construction and operation of the CECP will be in compliance with all applicable LORS regarding long-term and short-term project impacts in the area of **PUBLIC HEALTH**.

CONCLUSIONS

Staff has analyzed potential public health risks associated with construction and operation of the CECP 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 CECP 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 CECP project would not contribute significantly to morbidity or mortality in any age or ethnic group residing in the project area. Furthermore, a quantitative assessment of the impacts of the CECP combined with the emissions from the EPS would not result in a significant cumulative impact, as long as natural gas is the only fuel used in Carlsbad Energy Center Project, Encina Unit 4, Encina Unit 5 and Encina EGT. This restriction is thus included in the proposed condition of certification **Public Health-1**.

PROPOSED CONDITIONS OF CERTIFICATION

Public Health-1 The project owner shall only use pipeline quality natural gas in the Carlsbad Energy Center Project, Encina Unit 4, Encina Unit 5 and Encina EGT.

Verification: The project owner shall provide a statement to the CPM in the yearly compliance report that only natural gas has been used to fuel the CECP and the EPS.

REFERENCES

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PUBLIC HEALTH APPENDIX A

Response to Agency and Public Comments

POWER OF VISION Comments

POV2009a – Power of Vision/Julie Backer (tn: 49934). Comments on Preliminary Staff Assessment. 1/30/2009

Comment: The air pollution generated by the existing Encina Plant and the proposed CEC reside at a single location and, in terms of public health, should be considered as a single source. Since pollutants emitted at the source fail to meet existing state and federal public health standards, any new construction that does not fully rectify the ongoing threat to public health should be rejected.

Response: Staff has conducted a cumulative human health risk assessment that includes emissions of Toxic Air Contaminants (TACs) from the proposed CECP and the remaining sources of emissions from the existing Encina Power Station (EPS). (Note that if the CECP is certified by the Commission, built by the applicant, and begins operations, some sources at the EPS will shut down and cease to emit TACs so it is only proper to access only those sources which will continue to emit.) Staff's analysis can be found above and the result is that the combined impacts on public health would be less than significant.

KERRY SIEKMANN Comments

KS2009a – Kerry Siekmann/Terramar Assn. (tn: 49956). Comments on Preliminary Staff Assessment (Comments 2, 4, 11, 12). 1/28/2009

Comment : Meteorological Conditions-The climate description (p. 4.1-4,5) does not mention or appear to evaluate the marine layer that frequently persists on site and along the coast, especially during May and June and how that affects emission dispersion and the chemical reactions resulting from the emissions and their dispersions. Fog is another frequent climate condition that needs thorough evaluation and how it effects emission dispersion and the chemical reactions that result from fog mixed with emissions. Please consider evaluating these conditions.

Response: Staff assessed both the short-term (acute) impacts on public health due to the worst-case weather conditions and the long-term impacts. Again, staff has found that if certified and built, the proposed CECP would not result in significant impacts on public health.

Comment : Air Quality-Have all environmental impacts been considered, under CEQUA guidelines, in a cumulative assessment -during startup and shutdown of units 6-7, along with startup and shutdown of units 4-5, while 8-10 lanes of rush hour traffic are sitting next to the proposed CECP during a Santa Ana event?

Response: Staff has conducted a cumulative human health risk assessment that addresses the emissions of TACs from both facilities and has included start-up and shut-down of the proposed CECP. Staff has not evaluated the impacts of I-5 traffic

emissions as they now exist because those emissions are included ion the background risk to public health from all other sources. Any new increased emissions that may occur from increased traffic on I-5 should be assessed in the EIR of the I-5 expansion because if the project is certified by the Commission, the CECP would be built and running long before the I-5 corridor is expanded and the increase or decrease in emission (due to increased fuel economy, decreased emissions from vehicles, and the increased use of ZEVs) would be considered at that time.

Comment: Air Quality-The neighborhoods surrounding three sides of the proposed CECP have many elderly, people with health risks and children living in them. The pollution impacts from construction, no matter how much mitigation is performed, will be enormous. The proposed time period for construction is very long. Often, as we all know, construction time frames become even longer. It would be a great hardship for the residential neighborhoods to endure the additional pollutants created by the construction of the proposed CECP.

Response: As described above in the section on **Method and Threshold for Determining Significance,** staff uses toxicological information, reference levels, and cancer potency factors that take into account and protect the most sensitive members of the public. These values are determined by the Cal EPA Office of Environmental health hazard Protection. Thus, the risk assessment is designed to protect public health and staff found that the risk posed to all persons living in the vicinity of the proposed power plant due to emissions of TACs from construction vehicles and during operations would be less than significant.

CITY OF CARLSBAD Comments

COC 2009a– City of Carlsbad /J Garuba (tn: 50009). City of Carlsbad Comments regarding the Preliminary Staff Assessment (p. 29). 1/30/2009

Comment: Please clarify if the public health analysis evaluated the cumulative emission impacts from both the proposed CECP and the existing EPS. If the analysis did not take the emissions from the EPS into account, please do so.

Response: Staff can confirm that a cumulative human health risk assessment was conducted and it included emissions from both the proposed CECP and the sources that will continue to operate from the EPS after shutting down some sources.

SOCIOECONOMICS

Testimony of Marie McLean

SUMMARY OF CONCLUSIONS

California Energy Commission (Energy Commission) staff has determined that the 540-MW, combined cycle, natural gas-fired generating facility, Carlsbad Energy Center Project (CECP), in Carlsbad, California, would not cause a significant adverse direct or cumulative socioeconomic impact on the area's housing, schools, police, emergency services, hospitals, and parks and recreation.

In its analysis staff considered two construction projects proposed by Carlsbad Energy Center, LLC (applicant)—one described in the Application for Certification (AFC); the other in its *Project Enhancements and Refinements* (PEAR) supplement (CECP2008c), submitted to the Energy Commission in July 2008. The construction projects, which will occur simultaneously, include:

- **Single-Phase Construction**. Simultaneous construction of both generating units to begin in third quarter, 2009, with a commercial online date (COD) of summer, 2011.Total of 25 months for construction and commissioning of both units.
- **Project Enhancements and Refinements Construction**. Construction activities relating to the new San Diego Gas and Electric (SDG&E) 230-kV switchyard to begin third quarter, 2009, with a completion date in month nine of the single-phase construction schedule.

Public benefits from the project include capital costs, construction payroll, property taxes, and sales taxes.

INTRODUCTION

In this socioeconomics analysis, staff presents information obtained through its analysis of the estimated impacts of the construction and operation of the CECP. In addition, staff provides information about the Energy Commission's environmental justice procedures relating to this project. In preparing its analysis, staff evaluated project-induced fiscal changes as well as changes to public services and infrastructure. Staff also evaluated the city of Carlsbad's objections as they pertain to socioeconomic aspects of the project.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

California *Education Code*, section 17620, authorizes the governing board of any school district to levy a fee, charge, dedication, or other requirements for the purpose of funding the construction and reconstruction of school facilities.

SETTING

San Diego County is the affected area for socioeconomics as defined by the applicant for the proposed Carlsbad Energy Center Project (CECP) in the Application for Certification (AFC) and the *Project Enhancements and Refinements* (PEAR) supplement (CECP2008c), and considered by staff. San Diego County also encompasses the San Diego-Carlsbad-San Marcos Metropolitan Statistical Area (MSA). The proposed CECP, a 540-MW, natural gas-fired, combined cycle facility, will be located on 23 of the approximate 95 acres of the existing Encina Power Station site in Carlsbad, California, and owned by NRG Energy, Inc.

The site is bounded by the Pacific Ocean and Carlsbad Boulevard to the west; San Diego Freeway to the east; Carlsbad State Beach and Agua Hedionda Lagoon to the north; and to the south, Cannon Road, San Diego Gas & Electric (SGD&E) maintenance yard, and adjacent residential areas. The plant would be operated to meet the energy needs of SDG&E (CECP 2007a).

The project consists of many components including two generating units; a generating facility; 230-kV underground electrical interconnection directly from the plant to the new 230-kV SDG&E switchyard located on the existing Encina Power Station; and a natural gas transmission pipeline connecting directly to the existing Southern California Gas Company (SoCalGas) transmission pipeline, which is adjacent to the site. (CECP 2007b; CECP 2008c).

DEMOGRAPHIC SCREENING

Staff's demographic screening analysis is conducted according to the U.S. Environmental Protection Agency's (EPA) document "Final Guidance for Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analyses" (April 1998). According to that document, the purpose of an environmental justice screening is to determine whether a below-poverty-level or minority population or both exist within the potentially affected area of the proposed site. That determination is made using U.S. Census block data for the potentially affected area.

Staff conducted an environmental justice demographic screening for the CECP. People of color, as identified in EPA's 1998 document, are identified when either (1) the minority population of the affected area is greater than 50 percent of the affected area's general population; (2) the percentage of a minority population is greater than the minority percentage in the general population or other appropriate geographic analysis; or (3) when one or more Census blocks in the affected area have a minority population greater than 50 percent.

According to the publication, *Environmental Justice: Guidance Under the National Environmental Policy Act* (Council on Environmental Quality, 1997), *minority* is said to mean individuals who are members of the following population groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic. Low-income populations are identified according to the annual statistical poverty thresholds found in the U.S. Census Bureau's consumer income reports, P60 series.

The most current report, “Income, Poverty, and Health Insurance Coverage in the United States: 2005,” (P60-231) was published in 2006.

To identify potential minority populations and low-income populations within a one-mile and six-mile radius of the CECP site, staff reviewed Year 2000 U.S. Census Bureau Census block data. Within a one-mile radius, staff identified a total population of 6,148 persons and a total minority population of 1,680, resulting in a total minority population of 27.32 percent. Within the six-mile radius, staff identified a total population of 196,209 persons and a total minority population of 125,882 persons, resulting in a 35.84 percent minority population. However, several Census blocks with a minority population of greater than 50 percent exist within the six-mile boundary. See **Socioeconomics Figure 1**.

Within a one-mile buffer, staff identified a total population of 6,670 persons; and 514 of those persons, or 7.7 percent, were identified as having an income below the poverty level. Within a six-mile buffer, staff identified a total population of 189,182 persons. Of those persons, 19,921, or 10.53 percent, were identified as having income below the poverty level. However, one Census block with a poverty population of greater than 50 percent exists within the six-mile boundary. See **Socioeconomics Figure 2**.

Environmental justice is also considered in other sections of this staff assessment. Please see the **Air Quality** and **Public Health** sections of this document.

ASSESSMENT OF IMPACTS

To arrive at the socioeconomic analysis and conclusions contained in this document, staff independently (1) reviewed the CECP AFC; and (2) collected and analyzed socioeconomic data from various governmental agencies, trade associations, and public interest research groups. In preparing the assessment of impacts, staff considered the following areas: (1) method and threshold for determining significance; and (2) direct, indirect, and induced impacts.

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

If a sufficient number of workers is not available within the project area, workers will likely travel to the project from outside the project area. Employing those workers can result in significant socioeconomic impacts. Those impacts occur due to an increase in demand for housing, public services, and recreation.

According to Appendix G of the *California Environmental Quality Act (CEQA) Guidelines* (July 27, 2007), a project may have a significant effect on population and housing, public services, and recreation if it would:

- Induce substantial population growth either directly or indirectly.
- Displace substantial numbers of people or existing housing, or both, necessitating the construction of replacement housing elsewhere.
- Adversely affect acceptable levels of service for fire and police protection, schools, parks and recreation, and other public facilities.

To determine if the CECP would have any significant impacts within the project area, staff analyzed the current status of community services and capacities to determine if project-related impacts would significantly strain or degrade those services. If services and capacities were significantly affected by the CECP, staff would consider that to be a significant adverse impact and propose mitigation.

Conversely, the CECP could also have beneficial effects on the project area. For example, property taxes, sales taxes, or local school impact or development fees resulting from the construction and operation of the project could help local governments augment needed public services. Consequently, in this socioeconomic analysis, staff examined the beneficial impacts on local finances from property and sales taxes as well.

DIRECT/INDIRECT/INDUCED IMPACTS

Analyzing direct, indirect, and induced impacts of a proposed power plant is a primary task in developing a socioeconomic analysis. For purposes of this analysis, direct impacts are said to exist if the project resulted in permanent jobs and wages; increased population; or a demand for new housing and recreational facilities. Indirect impacts are said to exist if, jobs, wages, and sales resulted from the construction of the project; induced impacts, from the spending of wages and salaries on food, housing, and other consumer goods. This section includes information about the method and categories of analysis for direct, indirect, and induced impacts.

Method of Analysis

To analyze direct, indirect, or induced impacts of the CECP, the applicant used the Impact Analysis for Planning Model (IMPLAN). IMPLAN, a nationally recognized software package for producing economic impact analyses, was developed in 1985 by the University of Minnesota to perform three functions: (1) data retrieval; (2) data reduction and model development; and (3) and impact analysis. In 1993, the Minnesota IMPLAN Group was founded to continue the work begun at the university.

Based on the accounting conventions used in the “Input-Output Study of the U. S. Economy,” prepared by the Bureau of Economic Analysis in 1980 and the UN System of National Accounts, IMPLAN consists of two parts: (1) a national-level technology matrix; and (2) estimates of sectorial activity for final demand, final payments, industry output, and employment for each county in the U.S. along with state and national totals. The software allows users to construct custom input-output models for any number of custom geographies, including cities and counties. IMPLAN also includes a separate matrix, SAM (Social Accounting Matrix for Induced Impacts), to estimate household spending. New databases are developed annually by the Minnesota IIMPLAN Group.

Staff reviewed the results of the IMPLAN model and found them to be reasonable, considering data provided by the applicant as well as data obtained from governmental agencies, trade associations, and public interest research groups.

Categories of Analysis

Staff completed its own socioeconomic analysis of population, employment, housing, schools, parks and recreation, law enforcement, , medical services, and fiscal and nonfiscal effects. The results of those analyses follow.

Population and Employment

According to the U.S. Census Bureau's 2007 estimate, California has a total population of 36,553,215 people. San Diego County has a population of 2,942,454 residents according to the U.S. Census Bureau's 2006 estimate. By 2010, projections indicate that San Diego County will have a population of 3,199,706 (DOF 2007a). San Diego County's seasonally unadjusted unemployment rate in February 2008 was 5 percent (CEDD 2008a). That figure does not represent San Diego County's full employment rate, which is estimated at around 3 percent (SDIPR 2008).

California's unemployment rate in February 2008 was 5.7 percent or 1,043,000 people (CEDD 2008a). San Diego County's seasonally unadjusted unemployment rate for the same time period was 5 percent (CEDD 2008a). Carlsbad, California, the location of the CECP, has a population of 101,337 (DOF 2007b).

The applicant estimated that the construction workforce would come from the San Diego-Carlsbad-San Marcos Metropolitan Statistical Area (MSA) and commute to the job on a daily basis. The applicant also estimated that additional workers would be available from the surrounding counties and, if necessary, those workers would live in the area during the week and go home on weekends.

Based on its analysis of the labor market in the San Diego-Carlsbad-San Marcos MSA, staff accepts the applicant's conclusions. In March 2008, the San Diego-Carlsbad-San Marcos MSA was home to 79,600 construction workers (CEDD 2008b). Consequently, staff used the San Diego-Carlsbad-San Marcos MSA labor market area for its evaluation of construction workers' availability as well as for its analysis of impacts of this workforce on community services and infrastructure. In addition, staff used the San Diego-Carlsbad-San Marcos MSA to identify fiscal and nonfiscal (private sector) benefits and other potential socioeconomic impacts from the project.

In its analysis, staff determined that the annual averages of employment by craft are large when compared with the project's needs. See **Socioeconomics Table 1**. Consequently, staff accepts the applicant's estimate that the construction workforce would come from the San Diego-Carlsbad-San Marcos MSA and commute to the job on a daily basis. Staff cites the 1982 study by the Electric Power Research Institute (EPRI). In that study ERPI found that construction workers will commute as much as two hours one way from their communities rather than relocate.

Staff also accepts the applicant's assertion that additional workers would be available from the surrounding counties, and if necessary, those workers would likely commute to the project site and return home on weekends. The San Diego Building and Construction Trades Council estimated that all workers would be available from the San Diego-Carlsbad-San Marcos MSA (Lemmon 2008). The Council also estimated that, if needed, additional workers would be available from other counties, particularly Orange

County, and would commute to the job on a daily or weekly basis. If the CECP should require workers from surrounding counties, San Diego County has approximately 52,000 rooms available, with an average occupancy rate of 72.9 percent (SDCC&V B January 2008).

Once the CECP becomes operational, the applicant proposes to retire units one, two, and three of the existing Encina Power Station and begin the planning process for retiring units 4 and 5. Due to the retirement of Encina's units one through three, employees for the CECP will be transferred from the Encina plant to the CECP. Consequently, the operation of the CECP would not result in a demand for new workers (CECP 2007c).

Socioeconomics Table 1
Available Labor by Skill in San Diego-Carlsbad-San Marcos Metropolitan Statistical Area (MSA), 2004 Through 2014

Craft	Annual Average Employment, 2004	Average Annual Employment, 2014	Maximum Needed per Month by Carlsbad Energy Center**
Boiler Makers	150	170	24
Carpenters	20,750	23,620	32
Cement Masons	2,350	2,770	5
Contractor Staff	N/AV*	N/AV	52
Electricians	6,000	6,690	40
Insulation Workers	420	420	20
Ironworkers	6,300	7,600	34
Laborers	13,140	13,520	46
Millwrights	N/AV	N/AV	18
Operating Engineers	3,630	4,200	38
Painters	8,100	8,980	5
Pipefitters	6,660	7,630	42
Plant and System Operators	1,480	1,670	54
Plasterers	1,030	1,090	5
Sheetmetal Workers	2,520	2,830	12
Sprinkler Fitters	6,600	7,630	8
Surveyors	700	830	6
Teamsters (Truck Drivers, Heavy and Tractor-Trailer	6,690	8,050	28
Contractor Staff	N/AV	N/AV	52

Source: State of California Employment Development Department, Occupational Employment Projections, 2004-2014; and Carlsbad Energy Center Project AFC.
* Not Available (N/AV)
** Includes commissioning and operation phases.

Construction Phase Employment

According to the applicant, the plant's construction would follow a single-phase, 25-month construction phase. Construction would begin third quarter 2009. The single-phase construction would result in a commercial on-line date of summer 2011.

In addition, as part of that construction, a project enhancement and refinement project will be completed during the first nine months. Workers will participate in the construction of the new SDG&E 230-kV switchyard. The applicant plans to connect to the switchyard through underground cable and eliminate the aboveground electrical interconnection.

The number of workers required for the 25-month, single-phased construction, including connecting to the 230-kV switchyard, would peak in the nineteenth month with 357 workers. The fewest number of workers on the project would occur during the ninth month of construction at 76 workers.

The contractor's administrative staff would peak at 54 workers in the tenth through twelfth months for single-phased construction. The contractor staff workers would not be local workers and likely would come from outside the MSA (CECP 2007d).

Operational Phase Employment

According to the applicant, the CECP is expected to begin operating in the summer, 2011 with a workforce of up to 14 full-time employees.

Once CECP becomes operational, the applicant proposes to retire Units 1, 2, and 3 of the existing Encina Power Station and begin the planning process for retiring Units 4 and 5. Due to the retirement of Encina Units 1 through 3, employees for the CECP would be transferred from the Encina plant to the CECP. Consequently, no increase in population and no significant impact on local employment would occur (CECP 2007e). The applicant has expressed a desire to expand CECP to 640 MW by 2011 and then demolish the existing Encina Power Station (*San Diego Union Tribune*, July 23, 2006).

Indirect and Induced Jobs

Information about indirect and induced jobs is organized into "Single-Phased Construction," "Project Enhancements and Refinements," and "Operations." Project enhancement and refinements includes information about the indirect and induced jobs resulting from the construction of the 230-kV switchyard.

Single-Phased Construction. Total indirect and induced jobs resulting from the single-phased construction of the CECP is estimated to be 555 jobs with a total of indirect and induced labor income of approximately $20,039,080. The applicant estimates the construction phase employment multiplier to be 3.3. Annual local construction expenditures resulting from the construction of the CECP is estimated to be $18,900.000; the annual average construction payroll (disposable), $21,725,050; indirect income impact, $11,019,540; induced income impact, $10,019,540. Based on the information provided in this paragraph, the construction phase income multiplier is 1.5 (CECP 2007f).

Project Enhancements and Refinements. Total indirect and induced jobs from the construction of the 230-kV switchyard would be 77 jobs. These additional jobs result from about $3 million in annual local construction expenditures and about $2,546,460, the disposable portion of the annual local construction payroll. Based on the information provided in this section, the multiplier for the project enhancements and refinements phase of project construction is approximately 6.9. Indirect income for this phase of the project was estimated at $2,744,760 and induced income, $1,371,580. Assuming a total annual local construction expenditure of about $5,546,460, the multiplier for the project enhancement and refinements portion of construction is approximately 1.6 (CECP2008c).

For operations, 12 indirect jobs and 9 induced or secondary jobs are projected. Indirect income impacts are estimated at $1,338,830; induced, $339,420. The income multiplier is approximately 1.4 (CECP 2007h).

Housing

Staff concludes that no significant adverse socioeconomic impacts on housing would occur due to the construction and operation of the CECP. The CECP would not result in the displacement of any housing. As of January 1, 2008, San Diego County had 1,139,749 housing units (SDCDP&LU 2008). However, during construction, the majority of workers would commute to the project from within San Diego County. For those who do not commute, an ample supply of hotels and motels exist in San Diego County according to the San Diego County Convention and Visitors' Bureau. In addition, recreational vehicle (RV) parks are located in 14 cities within 32 miles of the CECP, including Escondido, San Clemente, and La Mesa.

According to the San Diego County Convention and Visitors' Bureau, as of February 2008, the county had approximately 52,000 rooms available, with an average occupancy rate of 72.9 percent. In addition, the vacancy rate for housing in San Diego County is 4.5 percent. If necessary, out-of-county workers will have a housing choice of hotel, motel, or house. During operation, the plant would be staffed by workers currently living in San Diego County and employed by the Encina Power Station. Units 1 through 3 of the plant would be closed; and the 50 workers would transfer to the CECP (CECPi). Consequently, no housing impacts would occur due to the plant's operation.

Schools

Staff concludes that no significant impacts to educational services would occur during the construction and operation of the CECP. The city of Carlsbad, in which the CECP is located, has 13 elementary and middle schools, 2 home school academies, and 1 high school. Total school population is 10,471 students. The Carlsbad Unified School District is not considered overcrowded (CSDE 2005a).

Construction workers would most likely commute to the project site. If the CECP were to employ nonlocal construction workers, those workers would not likely relocate family members for the relatively short construction period. Instead, they would likely commute weekly to the project area and return home for the weekends. Once the plant is operational, Units 1 through 3 of the existing Encina Power Station would be shut down. Workers from the Encina Power Station would be transferred to the CECP.

Consequently, the operation of the plant would have no effect on city of Carlsbad schools.

California *Education Code*, section 17620, authorizes a school district to levy a fee against any construction projects with chargeable covered and enclosed space built within the district. Local and state agencies are precluded from imposing additional fees or other required payments on development projects to mitigate enrollment impacts to schools. Currently, the one-time school impact fee is $0.42. However, the CECP would not be assessed a school impact fee. No chargeable covered and enclosed space would be constructed; and workers would occupy a building already on site.

Parks and Recreation

Staff concludes that no significant impacts on parks and recreation would occur because of the construction and operation of the Carlsbad Energy Center. Staff agrees with the applicant that the labor force needed for the construction of the plant would commute to the work site, either from San Diego County or Orange County. The workers needed for the plant's operation currently work on the same site as the proposed Carlsbad Energy Center and would transfer to the Energy Center once it is operational. Units 1 through 3 of the Encina Power Station, their current place of employment, would be shut down, allowing them to easily transition to the CECP.

Law Enforcement

Staff finds no significant adverse socioeconomic impacts associated with law enforcement due to the construction and operation of the CECP. The city of Carlsbad Police Department would provide services for the CECP. Located at Orion Way, the Carlsbad Police Department's average time to a call from the CECP is 5 minutes for a Type 1 incident and 5 to 10 minutes for a Type 2 incident. Approximately 148 authorized officers serve the city of Carlsbad from this location (CECP 2007j).

The state highways and roads near the CECP are patrolled by the California Highway Patrol (CHP). The CHP enforces applicable laws; controls traffic, investigates accidents; and manages hazardous materials spills.

Population wise, the demand for law enforcement should not be significantly increased because most of the labor force would be commuting. For the operational phase, the change in population would be nonexistent. Hence, there would be no change to existing demand for law enforcement services.

Medical Services

Staff finds no adverse socioeconomics impacts associated with medical services. Medical services for the Carlsbad Energy Center would be provided by the city of Carlsbad Fire Department, Station Number 1, 1275 Carlsbad Village Drive, in Carlsbad, and the Scripts Memorial Hospital. The medical services available from the city of Carlsbad Fire Department and Scripts Memorial Hospital are adequate; and providing those services to the CECP would not result in a significant adverse impact either to the fire department or hospital.

The city of Carlsbad Fire Department, Station Number 1, has a response time of five minutes for medical services. The fire department is also the first responder for emergencies involving hazardous materials. The fire department has a contract with the San Diego County Department of Environmental Health Hazardous Materials Division, which responds jointly with the San Diego Fire-Rescue Department Hazardous Incident Response Team (DEH-HIRT) to investigate and mitigate chemically related emergencies or complaints. DEH-HIRT provides for mitigation, containment, and control as well as hazard identification, which includes evaluating the threat to the location population and the environment (CECP 2007k).

Scripts Memorial Hospital, 9988 Genesse Avenue, La Jolla, is located about 19 miles from the project site. Scripts is one of the county's six designated trauma centers and offers a wide range of clinical and surgical services. Scripts has 293 licensed beds (CECP 2007l).

For additional information about fire protection and medical services, please see the following sections of this assessment: **Worker Safety and Fire Protection** and **Hazardous Material Management**.

Fiscal and Nonfiscal Impacts

Fiscal and non-fiscal impacts are important economic considerations in assessing the effects a power plant may have on the community and surrounding area in which it is located. Fiscal impacts affect the city's public treasury or revenues. Nonfiscal impacts affect the private sector—the businesses located in the community and surrounding area, for example.

Fiscal Impacts

Fiscal impacts of the CECP include (1) property tax revenue for San Diego County; (2) state and local taxes resulting from construction; (3) state and local taxes resulting from the operation of the plant; and (4) gas franchise fees. Information about all four items follows (all in constant 2007 dollars):

1. San Diego County property tax revenue (estimated)

   $3,564,610 to $4,583,070 per year; over a 20-year period, $71.3 to $91.6 million

2. state and local taxes: construction:$2,325,000

3. state and local taxes: operation: $348,750 per year

4. gas franchise fees: $2.4 million per year

Nonfiscal Impacts

Nonfiscal impacts include (1) total capital costs; (2) construction payroll for the single-phased and phased construction; (3) costs of construction materials and supplies; and (4) costs of operation and maintenance supplies.

1. total capital costs: $350 to $450 million
2. construction payroll (single-phase): $54.6 million

3. construction payroll (project enhancements and refinement phase): $4.042 million
4. construction materials and supplies: (single-phase) $30 million
5. construction materials and supplies: (project enhancements and refinement phase: $3 million
6. operation and maintenance supplies: $4.5 million

CUMULATIVE IMPACTS AND MITIGATION

A project may result in significant adverse cumulative impacts when its effects are cumulatively considerable; that is, when the incremental effects of an individual project are significant when viewed in connection with the effects of (1) past projects; (2) other current projects; and (3) probable future projects (Public Resources Code § 21083; Cal. Code of Regulations, Title 14, §§ 15064(h); 15065(c); 15130; and15355). Mitigation involves taking feasible measures to avoid or substantially reduce the impacts.

Cumulative Impacts

For a socioeconomic analysis, cumulative impacts could occur when more than one project has an overlapping construction schedule, thus creating a demand for workers that cannot be met by local labor. That increased demand for labor could result in an influx of non-local workers and their dependents, resulting in a severe strain on housing, schools, parks and recreation, law enforcement, and medical services.

According to the applicant, the city of Carlsbad has received applications for seven proposed projects. Those projects could be under construction during all or a portion of the time when the CECP is expected to be under construction. Those projects consist of a desalination plant on the same site as the CECP; Interstate Five North Coast Corridor improvement project; and five public utilities upgrades.

Although the projects would require a labor supply, only the Carlsbad desalination plant would compete for the same workers as the CECP. However, staff concludes that a sufficient supply of skilled labor exists in the San Diego-Carlsbad-San Marcos MSA, particularly since the more than 350 workers from the Otay Mesa Generating Project would be available in early 2009 (see **Socioeconomics Table 2**).

The CECP would be constructed in one single phase. The average number of workers for the 25-month single-phase construction is approximately 209 workers per month, with a peak of 357 workers during month nineteen. In addition, construction activities related to the new San Diego Gas and Electric (SDG&E) 230-kV switchyard will begin third quarter, 2009, with a completion date in month nine of construction.

In addition to the CECP, six power plants are operating or proposed for San Diego County. See **Socioeconomics Table 2**, which follows.

Socioeconomics Table 2
Proposed or Operating Power Plants in San Diego County

Name of Plant	Date of Operation	Average Number of Workers	Average Number of Workers During Peak Month
Chula Vista Energy Upgrade Project , 100 MW	Third Quarter, 2009	100	160
Escondido, 49.5 MW	First Quarter, 2006	NA	NA
Larkspur, 90 MW	Second Quarter, 2001	NA	NA
Otay Mesa, 510 MW	First Quarter, 2009	348	361
Orange Grove, 96 MW	First Quarter, 2010	NA	NA
Palomar, 546 MW	First Quarter, 2006	NA	NA

Data from California Energy Commission, "Alphabetical List of Power Plant Projects Since 1999."

The peak labor needed to construct the Carlsbad Energy Center, Chula Vista Energy Upgrade Project, and Otay Mesa totals 757 construction personnel. The construction workforce of 757 is .96 percent of the total workforce of 79,600 construction workers in San Diego County as of March 2008 (CEED 2008b).

NOTEWORTHY PUBLIC BENEFITS

Important public benefits examined in the "Fiscal and Non-Fiscal Impacts" subsection include fiscal impacts pertaining to (1) property tax revenue for San Diego County; (2) state and local taxes resulting from construction; (3) state and local taxes resulting from the operation of the plant; and (4) gas franchise fees.

Nonfiscal impacts include (1) total capital costs; (2) construction payroll; (3) costs of construction materials and supplies; and (4) costs of operation and maintenance supplies.

AGENCY AND PUBLIC COMMENTS

On May 1, 2008, the city of Carlsbad notified the Energy Commission of its lack of support for and its objections to the CECP. Some of the city's objections concern perceived impacts to housing and recreational areas.

Information about the city's objections pertaining to housing and recreational areas and staff's socioeconomic analysis and conclusions follow.

CITY OF CARLSBAD OBJECTIONS

On May 1, 2008, the Energy Commission received a 17-page letter from Joe Garuba, Municipal Projects Manager, Carlsbad City Manager's Office, in which he expressed the city of Carlsbad's objections to the CECP. In that letter, Mr. Garuba indicated that if the city had approval authority for the CECP, the city would not approve the project. [1]

Mr. Garuba cites noncompliance with the city's zoning ordinances and related land use plans, including those of the Carlsbad Housing and Redevelopment Commission, as reasons for the city not approving the project. Information about the city's objections to the CECP and staff's socioeconomic analysis and conclusions follow.

Overview of City's Objections

The city of Carlsbad's objections center around the location of the CECP and the zoning and redevelopment actions the city has taken since 1998 to (1) facilitate the orderly incorporation of the Encina Power Station and adjoining land into its development objectives; and (2) create the South Coast Redevelopment Area. Information about both objections follows.

Location

The CECP would be located on a 680-acre site bounded by the Pacific Ocean and Carlsbad Boulevard to the west and the Carlsbad State Beach and Agua Hedionda Lagoon to the north. To the south the project is bounded by Cannon Road; a San Diego Gas and Electric (SGD&E) maintenance yard; and adjacent residential areas. Of that 680-acre site, CECP's owner, NRG Energy, Inc., owns about 100 acres in the northeastern portion of the site. The power plant would be built on 23 acres of the NRG site, which is zoned PU, which allows for public utilities, including electrical generation facilities. The Encina Power Station, which is also located on the NRG property, would be updated and continue to operate as part of the California ISO's Reliability Must Run program.

City's Redevelopment Objectives

Because of the 680-acre site's central location and proximity to the beach and lagoon, the city of Carlsbad views the area as a gateway to the city and the Pacific Ocean. Consequently, in 1998, the city announced its intention to comprehensively update its Encina Specific Plan (SP 144), which pertains to the 680-acre site, including the Encina Power Station. When the city first published its Encina Specific Plan, the Encina Power Station and adjoining land was owned by San Diego Gas and Electric Company.

In 2000 the city of Carlsbad's Housing and Redevelopment Commission designated the 680-acre area as the South Carlsbad Coastal Redevelopment Project Area and published its first redevelopment plan for the area, the *South Carlsbad Coastal*

[1] Mr. Garuba's objections primarily concerned topics covered in the Land Use section of this Final Staff Assessment (FSA). Please see the Land Use section of this FSA for additional information.

Redevelopment Project—Redevelopment Plan (Carlsbad Housing and Redevelopment Commission, February 4, 2000a). The plan was superseded by the 2005 *Five-Year Implementation Plan for the South Carlsbad Coastal Redevelopment Area* adopted by the city of Carlsbad and the Housing and Redevelopment Agency on January 17, 2006.

The *Five-Year Implementation Plan for the South Carlsbad Coastal Redevelopment Area*, in effect until 2010, includes a portion of Ponto Beach area and the NRG site, the site of the Encina Power Plant and the proposed CECP. In this plan the city listed as one of its ten goals to "facilitate the development of the Encina Power Generating Facility to a smaller, more efficient power plant" (2005 *Five-Year Implementation Plan* 2006a).

As described by the city in its *Ponto Beachfront Village Vision Plan* (Ponto Beachfront Village Vision Plan, 2005a),the entire Ponto Village study area consists of 130 acres on a relatively narrow strip of land approximately one-eighth of a mile wide and one and one-half miles long, located between Carlsbad Boulevard and tracks for the San Diego Northern Railroad.

However, the area considered by the city as viable for development is limited to the Ponto Beachfront Village, which consists of approximately 50 acres (*Ponto Beachfront Village Vision Plan*, 2005b). The city's goals for the Ponto Beachfront Village pertaining to socioeconomics include:

- **Increase hotel accommodations.** The city proposes a beachfront resort, a combination hotel and timeshares; a two-story to three-story hotel in the eastern portion of the property; and a three-story garden hotel with views of the ocean.
- **Enhance recreational functions through trails and walking areas.** To that end, the city aligned its plans for recreational opportunities with the 1984 San Diego Coastal State Park System General Plan.
- **Establish a mixed-use district that encourages local and tourist-oriented retail, commercial, recreational, and residential uses, including increasing and improving the affordable housing supply.** To that end, the Carlsbad Housing and Redevelopment Agency proposes townhouses in a mixed-use center and a live-work neighborhood that utilizes vacant lots. Approximately 172 housing units would be constructed. Approximately 26 will be set aside for low-income residents; 10 units, for very-low income residents. Those houses would be constructed in stages beginning in 2011 and continuing through 2031.

In December 2005, the time the city was preparing to approve its redevelopment plan for the South Carlsbad Coastal Redevelopment Area, the Encina Power Station was sold by Dynergy, Inc., to NRG Energy as part of a $160 million purchase of four California plants. At the time of the sale, NRG's president, David Crane, left open the possibility of one day selling some of its California properties to capitalize on their real estate value (Philip K. Ireland, *North Country Times*; December 28, 2005).

After studying the documents listed in the previous paragraphs, staff notes the following:

1. The Encina Power Station has existed at the same location for approximately 52 years on land zoned Public Utilities (PU), which expressly allows for the

development of electrical generation facilities. The land on which the new CECP will be built is also zoned PU. In 2006, in keeping with that zoning designation, the city approved the construction of an ocean-water desalination plant on NRG's property.[2]

2. The city has updated and created various plans to present to the public its desire to develop the 680 acres of land, including the 98 acres currently owned by NRG Energy. At the time the city updated its plans, the city did not own the land on which the Encina Power Station is located and does not own the land today.

3. In its 2005 *Ponto Beachfront Village Vision Plan*, the city announced as one of its goals its intentions to work with the plan's northern limit at Ponto Drive and its southern limit at the Batiquitos Lagoon. In its 2000 redevelopment plan for the area surrounding Encina Power Station, the city listed as one of its ten objectives its intention to "work towards the complete demolition of the existing power plant at its current location on the existing site and provide for construction of a new physically smaller plant at the rear of the existing site." At the time, the city's preference was to have the new power plant constructed within the area between the railroad tracks and Interstate 5, which is east of the existing power plant site, thereby creating excess property in a prime location that could be developed for private and public use (*South Carlsbad Coastal Redevelopment Project—Redevelopment Plan*; Carlsbad Housing and Redevelopment Commission, February 4, 2000b).

4. In its 2005 *Ponto Beachfront Village Vision Plan*, the city announced as one of its goals its intention to work with the landowner to facilitate a smaller, more efficient power plant at the site. According to the city, working with the landowner would assist it in implementing its other nine redevelopment goals. Those goals include increasing, improving, and preserving the city's supply of housing affordable to very low, low, and moderate income populations (*Ponto Beachfront Village Vision Plan*, 2005a).

5. However, according to the *Ponto Beachfront Village Vision Plan*, even though the Ponto Beach study area consists of a 130-acre, relatively narrow strip of land located between Carlsbad Boulevard and tracks for the San Diego Northern Railroad, all city development is to take place on 50 acres within the plan's northern limit at Ponto Drive and its southern limit at the Batiquitos Lagoon (*Ponto Beachfront Village Vision Plan*, 2005b).

6. In addition, according to the *Ponto Village Beachfront Vision Plan*, no new housing developments are projected to take place until year 2011. Housing developments would continue through 2031. During that period, 172 housing units are expected to be constructed or substantially rehabilitated in the area (*Ponto Beachfront Village Vision Plan*, 2005c).

[2] See the **Land Use** section of this final staff assessment. In that section, based on the proposed CECP's zoning and land use designation for public utilities, staff concludes that the proposed CECP is consistent with the city of Carlsbad's zoning ordinance.

7. On December 28, 2005, Dynergy, Inc., sold its California plants, including the Encina Power Plant, to NRG Energy for $160 million. At the time of the sale, David Crane, NRG president, said that one of the company's goals in purchasing the plants was to "monetize the real estate value of select plants" (Philip K, Ireland, "Encina Power Plant to Be Sold," *North Country Times*, December 28, 2005).

8. In its document, *Carlsbad Energy Center: Fact or Fiction*, nd, NRG indicated that in keeping with the city's 2000 redevelopment plan, it has located the site of the new Carlsbad Energy Center Project east of the railroad tracks and west of Interstate 5 on a recessed location approximately 30 feet below grade (*Carlsbad Energy Center: Fact or Fiction*, ND, a). See item 3, above.

9. Also in its *Carlsbad Energy Center: Fact or Fiction* document, NRG described the Carlsbad Energy Center Project as the first phase of its plan to shut down the older plant when it is no longer needed for system reliability. According to NRG once the older plant is retired, almost 65 acres will be available for redevelopment (*Carlsbad Energy Center: Fact or Fiction*, ND, b).

10. As of the writing of this preliminary staff assessment, NRG has not given a firm date as to when the Encina Power Station could be retired; nor has it indicated its intentions to sell the land to the city or any other buyer. However, NRG has indicated that it may be possible to retire Encina Power Station by 2015 (*Carlsbad Energy Center: Powering California with NRG*, NRG West, 2008a).

Socioeconomic Analysis and Conclusions

On May 1, 2008, the city of Carlsbad notified the Energy Commission of its objections to the CECP. Essentially, in stating its objections, the city implied that the CECP project (1) does not comply with either the city's existing plans for the area or its zoning ordinance; and (2) if allowed to continue in its present configuration the project would result in a significant impact on its proposals for the area in which the CECP is located.

Those proposals include three areas—population growth; housing; and public services, including parks and recreation, police and fire protection, and schools—that pertain to socioeconomics. According to the California Environmental Quality Act (CEQA), impacts on housing and recreation must be evaluated as to their significance if they would:

- induce substantial population growth either directly or indirectly.
- displace substantial numbers of people or existing housing, or both, necessitating the construction of replacement housing elsewhere.
- adversely affect acceptable levels of service for fire and police protection, schools, parks and recreation, and other public facilities.

Population Growth

Staff concludes that the CEPC, if built in its present configuration, would not induce substantial population growth, either directly or indirectly, necessitating the construction of replacement housing elsewhere.

Housing

Information about housing is organized according to the following categories: residential housing and hotels.

Residential Housing

Staff concludes that the CECP, if built in its present configuration, would not displace substantial numbers of people or existing housing, or both, necessitating the construction of replacement housing elsewhere. In addition, it would not prevent the city of Carlsbad from constructing hotels and housing units as it envisions in its plan for the 50-acre Ponto Beachfront Village (Ponto Beachfront Village Vision Plan, 2005d).

In the *Ponto Beachfront Village Vision Plan*, the city proposes to construct in the 50-acre Ponto Beachfront Village 172 housing units. Approximately 26 of those units would be set aside for low-income residents; 10 units, for very-low income residents. However, the first of those housing units are not scheduled for development until 2011. The remaining 172 units would be built over a 20-year period (*Ponto Beachfront Village Vision Plan*, 2005e).

If providing housing, including low-income housing, is the city's primary and urgent concern, the city could construct or encourage the building of housing units in other parts of the city. In addition, low-income housing could be constructed in other parts of the city as part of the city's Inclusionary Housing Program, which it adopted in 1993, to help ensure that low-income housing units would be available.[3]

Hotels

Staff concludes that the CECP would not have an adverse affect on the public accommodations needed by the city of Carlsbad. The city of Carlsbad has confined its *Ponto Beachfront Village Vision Plan* to 50 acres of the 130-acre site. Consequently, hotels proposed to be built by the city in its *Ponto Beachfront Village Vision Plan* are located on land that it currently owns and can develop (*Ponto Village Beachfront Vision Plan*, 2005f). If the city chooses not to do so, accommodations could be found in San Diego County, if not the city of Carlsbad itself. In addition, private entities are likely to construct hotels in the city of Carlsbad if and when it perceives a demand.

For example, according to the *San Diego Business Journal*, in June 2006, Carlsbad had 3,555 hotel rooms, 32 hotels and resorts, and 4 new hotels under construction, the largest hotel boasting 700 rooms. According to the March 3, 2008, *North Country Times*, San Diego County will see a total of 762 rooms open in 2008, including 145 rooms in Carlsbad.

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[3] Designed to assist the city in reaching its lower-income housing goals, the city's Inclusionary Housing Program requires that not less than 15 percent of all residential units in any master plan, specific plan, or residential subdivision be set aside for occupancy for and be affordable to lower income households. Additionally, for those developments required to provide 10 or more units affordable to lower income households, at least 10 percent of the lower income units shall have three or more bedrooms. Today, the city of Carlsbad is home to 15 affordable housing projects with 1,565 units with below-market rents available to lower income households. Two more affordable housing projects with a total of 89 new units are scheduled to open by late 2008. In addition to low-income housing, in 2007, the city of Carlsbad had 43,120 housing units according to the California Department of Finance. The San Diego Association of Governments projects that the number of housing units in the city of Carlsbad will increase to 48,975 in year 2020.

Public Services

Staff concludes that the CECP would not have a significant adverse affect on the city's parks and recreational facilities. The city of Carlsbad hosts 23 parks or recreational facilities as well as 26 miles of trails. In addition, the Aqua Hedionda Lagoon, which borders the South Carlsbad Coastal Redevelopment Area to the north, offers boating, water skiing, boardsailing, and fishing.

Although the city's plan to enhance recreational opportunities through its South Carlsbad Coastal Redevelopment Area plans would provide additional recreational opportunities, the absence of those additional recreational opportunities would not result in an adverse direct, indirect, or cumulative impact. In addition, the location of the CECP and the existing Encina Power Station in the South Carlsbad Coastal Redevelopment Area would not prevent the city from constructing those recreational enhancements on the city's property located in the redevelopment area.

Staff also concludes that the location of the CECP and the existing Encina Power Station in the South Carlsbad Coastal Redevelopment Area would not have a significant adverse affect on other public services, including police, fire protection, and schools. See the **Worker Safety / Fire Protection** section of this final staff assessment for additional information about fire protection and emergency services.

CONCLUSIONS

Staff concludes that construction and operation of the CECP would not cause a significant direct or cumulative adverse socioeconomic impact on the study area's housing; schools; law enforcement; fire protection; emergency medical services; hospitals; and parks and recreational facilities. In addition, no socioeconomic environmental justice issues exist with this project.

Staff also concludes that gross public benefits from this project would accrue to the city of Carlsbad, Carlsbad Redevelopment Agency, and San Diego County. See Socioeconomics Table 3, "Summary of Socioeconomic Findings and Benefits Related to Carlsbad Energy Center," which follows.

Socioeconomics Table 3
Summary of Socioeconomics Benefits and Other Findings Related to Carlsbad Energy Center

Fiscal Benefits	
Estimated annual property taxes	$3,564,610–$4,583,070 per year*
State and local sales taxes	
Single-phase construction	$1,468,420
Project enhancements and refinements	$232,500
State and local sales taxes: Operation	$348,750 per year
Gas franchise fees	$2.4 million per year
Non-Fiscal Benefits	
Total capital costs	$350–$450 million
Construction payroll	
Single-phased construction	$54.6 million
Project enhancements and refinements	$4.042 million
Construction materials and supplies	
Single-phased construction	$30 million
Project enhancements and refinements	$3 million
Operation and maintenance budget	$4.5 million per year
Direct, Indirect, and Induced Benefits	
Estimated Direct Employment	
Single-phased construction (average)	375
Project enhancements and refinements	132 jobs
Operation	14 jobs
Estimated Secondary Employment	
Construction and commissioning	555 jobs
Project enhancement and refinements	77 jobs
Estimated Secondary Income	
Construction; single-phased	$21,039,080
Project enhancements and refinements	$3,116,340
Operation	$1,678,250 per year
Estimated Payroll	
Single-phased construction	$4.042 million
Project enhancements and refinements	$53.9 million
Operation; single-phased construction	No new payroll; workers transferring
Findings	
Existing unemployment rate: San Diego County	5 percent (February 2008)
Percent minority population (one-mile radius)	27.32 percent
Percent poverty population (one-mile radius)	7.70 percent
Percent minority population (six-mile radius)	35.84 percent; however, with concentration of Census blocks with minority populations ranging from 50 to 100 percent
Percent poverty population (six-mile radius)	10.53 percent

*Fiscal information based on 2007 dollars; the 25-month single-phased and 10-month project enhancements and refinements construction periods; and the 30-year life of the power plant. The results of the IMPLAN/Input-Output modeling are for San Diego County for construction and operations and indicate secondary, indirect, and induced impacts as well as direct impacts. Population is calculated using year 2000 U.S. Census Data (Census blocks) for a six-mile and one-mile radius from the location of the power plant.

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APPENDIX: RESPONSE TO LETTER FROM CITY OF CARLSBAD

On January 30, 2009, Joe Garuba, Municipal Projects Manager, City of Carlsbad, sent a letter to Mike Monasmith, Project Manager, Carlsbad Energy Center Project, concerning the city's objections to specific information contained in the Preliminary Staff Assessment (PSA), published December 11, 2008.

The city's 45-page document included comments about 23 sections, including socioeconomics. The city contends that many statements or references or both included in the socioeconomics section are not accurate or relevant. Consequently, contends the city, the conclusions made in the analysis are also inaccurate or irrelevant.

Specifically, the city's objections concerned the following areas:

1. Cumulative socioeconomic impacts to safety and emergency services
2. Worker safety
3. Fiscal impacts and benefits
4. Ponto Village Beachfront Plan
5. Financial viability of applicant

In this paper staff clarifies the purpose of a socioeconomic analysis and in doing so answers the City of Carlsbad's objections.

PURPOSE OF SOCIOECONOMIC ANALYSIS

Staff conducts a socioeconomic analysis according to the requirements found in the California Environmental Quality Act (CEQA) Environmental Checklist Form (Appendix G, California Environmental Quality Act, Socioeconomics). See http://ceres.ca.gov/topic/env_law/ceqa/guidelines/Appendix_G.html). A copy of the guidelines for socioeconomics pertaining to the Carlsbad project follows.

SOCIOECONOMICS
CEQA Environmental Checklist Form

	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
POPULATION AND HOUSING — Would the project:				
B. Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?				X
C. Displace substantial numbers of people, necessitating construction of replacement housing elsewhere?				X
PUBLIC SERVICES —Would the project:				
A. Result in substantial adverse physical impacts associated with the provision of new or physically altered government facilities, need for new of physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service rations, response times, or other performance objectives for any of the public services: Fire protection Police protection Schools Parks Other public facilities				X
RECREATION—Would the project:				
A. Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated				X
B. Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?				X

The City of Carlsbad has identified the following concerns in its January 30, 2009, letter:

1. Cumulative socioeconomic impacts to safety and emergency services
2. Worker safety
3. Fiscal impacts and benefits
4. Ponto Village Beachfront Plan
5. Financial viability of applicant

RESPONSES TO CITY OF CARLSBAD'S CONCERNS

Staff provides the following information, based on the CEQA Environmental Checklist Form, above, to address the city's concerns.

1. **Cumulative Socioeconomic Impacts to Safety and Emergency Services.** As indicated in Public Services, A, above, socioeconomic impacts would occur only if the city or other agency would have to alter or construct facilities in which to provide acceptable levels of those services. The City of Carlsbad is not required to alter or construct facilities to provide those services. Hence, staff conducting a socioeconomics analysis must conclude that providing those services does not result in a cumulative socioeconomic impact.

   As identified by the City of Carlsbad, staff members who prepared the Worker Safety and Fire Protection Section of the PSA do conclude that a significant cumulative impact exists. That conclusion was reached because of the chief of City of Carlsbad's Fire Department concluded that the department's ability to respond during a major crisis may be affected by the operation of the power plant. Hence, staff proposed that the applicant meet with the Carlsbad Fire Department to identify and fund mitigation necessary to increase emergency coverage to a level that results in less than a significant cumulative impact.

   Therefore, it is important to note that (1) requirements for determining a cumulative socioeconomic impact are not the same as those requirements for determining a cumulative worker safety and fire protection impact; and (2) staff proposed mitigation in the Worker Safety and Fire Protection section of the FSA.

2. **Worker Safety.** As indicated in the CEQA Environmental Checklist, above, a socioeconomic analysis does not require an assessment of the conditions pertaining to worker safety. Those conditions are analyzed and included in the section of the PSA entitled "Worker Safety and Fire Protection."

3. **Fiscal Impacts and Benefits.** As indicated in the CEQA Environmental Checklist, above, staff is required only to assess and report on the environmental impacts on housing, public services, and recreation. Conversely, staff is not required to assess or report on the project's fiscal impacts and benefits. Staff includes information on fiscal impacts and benefits to provide a more complete picture of the benefits and costs to the local area of constructing and operating a power plant.

   Staff makes every attempt to ascertain the fiscal impacts and benefits to the local area. Those efforts include contacting state and local agencies to determine

dollar amounts. However, those amounts are reported for informational purposes only, not as a matter of law. In addition, staff has no statutory authority, therefore no requirement to assess the effect on ratepayers of various state and local fees or taxes. That function is performed the California Public Utilities Commission.

4. **Ponto Village Beachfront Plan.** According to the CEQA Environmental Checklist Form, staff has no requirement to assess the Ponto Village Beachfront Plan or any other redevelopment plan proposed by the city unless it would displace a substantial number of existing housing stock or people or both and therefore require the construction of replacement housing elsewhere.

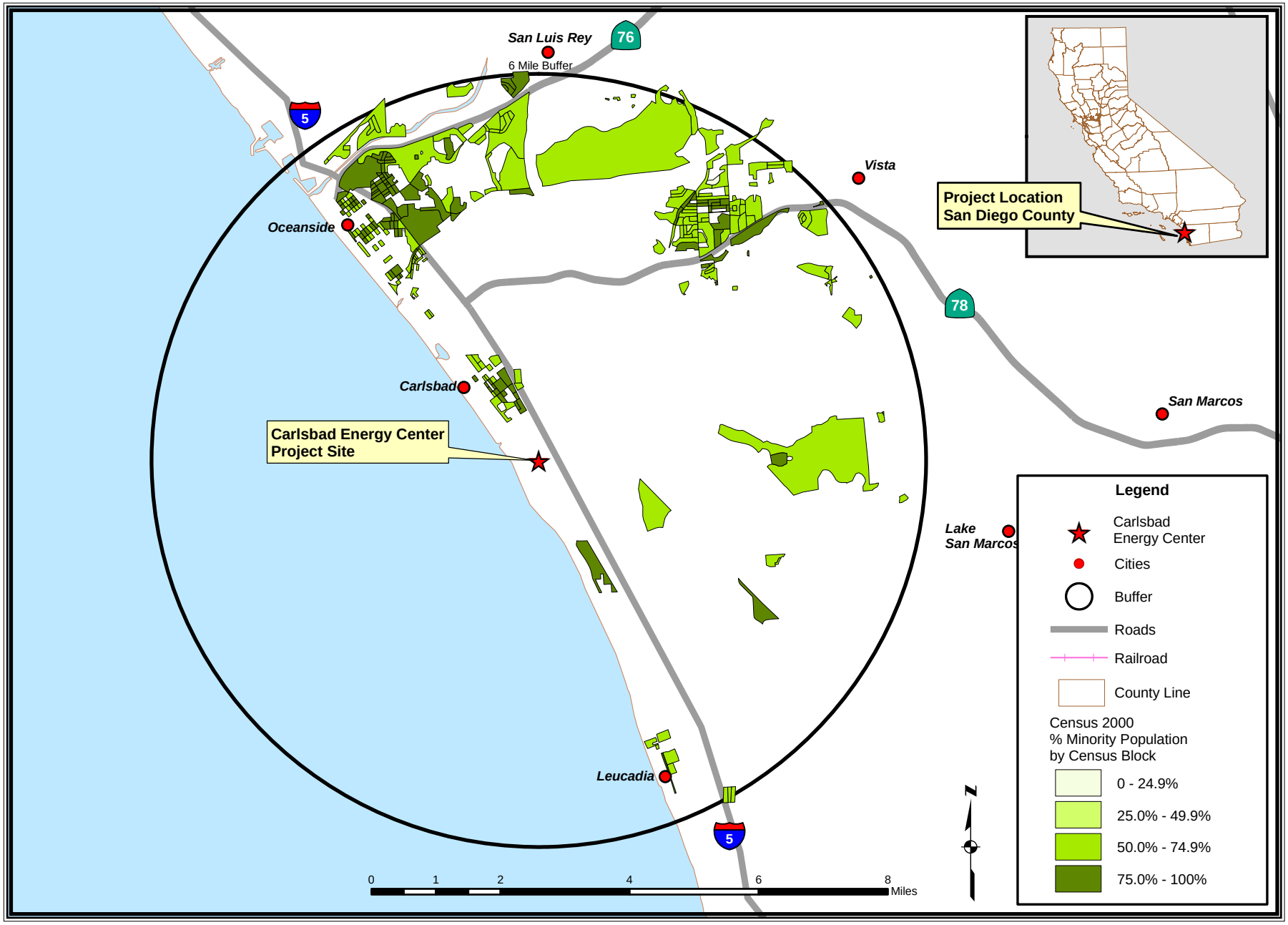
   The analysis is included in the FSA as a response to the City of Carlsbad's May 1, 2008, letter pertaining to land use, specifically to the South Carlsbad Coastal Redevelopment Area Project Plan. To conform to the CEQA Environmental Checklist Form for socioeconomics, a socioeconomics analysis of that plan must consider housing. And from a socioeconomics analysis, the plan did not displace a substantial number of housing, necessitating construction of housing somewhere else; nor did it displace a substantial number of people, requiring housing to be built somewhere else. If anything, the plan was designed, in part, to increase housing, including housing for low-income people. Hence, the redevelopment plan did not result in any adverse socioeconomic impact.

5. **Financial Viability of Applicant.** The financial viability of applicant is not a required topic of analysis for socioeconomics. See the CEQA Environmental Checklist, above. However, since restructuring of the electricity industry, centralized planning for power plants has moved away from investor-owned-utilities and Public Utilities Commission to private investors. Consequently, assessing the financial viability of an applicant who wishes to construct a power plant would likely necessitate a Wall Street investment firm who specializes in energy markets. A simpler analysis often involves calculating debt ratio to equity.

   The Energy Commission is required by law to process applicants for power plants without regard to their source of financing. However, if the financial viability of a company wishing to construct and operate a power plant is of concern to a city or county in which the plant is to be constructed and operated, the governmental entity is not prohibited from investigating the financial viability of the company through all legal means available.

SOCIOECONOMICS - FIGURE 1

Carlsbad Energy Center Project - Census 2000 Minority Population by Census Block - Six Mile Buffer



NOVEMBER 2009

SOCIOECONOMICS

CALIFORNIA ENERGY COMMISSION, SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION NOVEMBER 2009

SOURCE: California Energy Commission Statewide Power Plant Maps 2006 - Census 2000 PL 94-171 Data - Matrix PL2

SOIL AND WATER RESOURCES

Testimony of Richard Latteri & Paul Marshall

SUMMARY OF CONCLUSIONS

Based on its assessment of the proposed Carlsbad Energy Center Project (CECP), California Energy Commission (Energy Commission) staff finds that:

- Impacts to soil and water resources caused by erosion and storm water runoff during construction and operation would be mitigated with the implementation of effective Storm Water Pollution Prevention Plans developed in accordance with the San Diego Regional Water Quality Control Board Order No R9-2007-0001;

- The use of non-potable water for all construction and operation activities that do not require potable water would comply with state and local water use policy and would have no adverse effect on soil or water resources;

- The use of recycled water or desalinated ocean water for CECP industrial and landscape purposes would comply with state water use policy and would have no adverse effect on soil or water resources; and

- Potential adverse effects from on-site soil contamination would be avoided with the adoption and implementation of an effective Hazardous Materials Management Program and Construction Storm Water Pollution Prevention Plan.

Through compliance with the proposed conditions of certification, the impacts to soil and water resources from the construction and operation of the proposed CECP would be less than significant and would comply with all applicable soil and water resources laws, ordinances, regulations, and standards (LORS). Potentially significant impacts would be mitigated through the preparation and implementation of various construction and operation plans, which, if not implemented, could result in soil erosion, contamination to surface and groundwater, or non-compliance with wastewater treatment and discharge requirements.

INTRODUCTION

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 CECP and focuses on the potential for the CECP 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 sufficiency of the proposed industrial water supply (recycled water or desalinated ocean-water) and on-site storage capacity to meet CECP peak power production during a multi-day water outage is addressed in the **POWER PLANT RELIABILITY** section of this FSA. Biological issues associated with ocean-water intake and discharge are addressed in the **BIOLOGIGAL RESOURCES** section. The soil remediation process and removal of any 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 include regulation of storm water discharges during construction and operation of power plant facilities.
Resource Conservation and Recovery Act 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 is prohibited.
California Water Code, section 13170.2	Requires the State Water Resources Control Board (SWRCB) to formulate and adopt a water quality control plan for ocean waters of the state that shall be known as the California Ocean Plan.
California Water Code, section 13260	Requires filing with the appropriate Regional Water Quality Control Board (RWQCB) a report of waste discharge for any discharge that could affect the water quality of the state.
California Water Code, section 13523	Requires the San Diego Regional Water Quality Control Board (SDRWQRB) to prescribe water reuse requirements for water that is to be used as recycled water after consultation with the Department of Public Health (DPH).
California Water Code, section 13550	Requires the use of recycled water for industrial purposes subject to recycled water being available and upon other criteria such as the quality and quantity of the recycled water are suitable for the use, the cost is reasonable, the use is not

	detrimental to public health, and the use will not impact downstream users or biological resources.
Title 17, California Code of Regulations	Requires prevention measures for backflow and cross connection of potable and non-potable water lines.
Title 22, California Code of Regulations	Requires DPH to review and approve new or modified recycled water project to ensure they meet all recycled water criteria for the protection of public health.
Title 23, California Code of Regulations	Requires the RWQCB to issue waste discharge requirements specifying conditions for protection of water quality.
Local LORS	
City of Carlsbad Municipal Code Title 13, Chapters 13.04, 13.10 & 13.16	Requires new sources of domestic and industrial wastewater to obtain discharge permits from the City of Carlsbad.
City of Carlsbad Municipal Code, Title 14, Chapter 14.08	Establishes procedures and requirements for connection to the City of Carlsbad's potable water mains to water pipes on any real property.
City of Carlsbad Municipal Code Title 15, Chapter 15.12	Requires new development and redevelopment projects to abide by the City of Carlsbad's Storm Water Management and Discharge Control provisions consistent with SDRWQCB Order No. R9-2007-0001.
State Policies and Guidance	
Integrated Energy Policy Report (Pub. Resources Code, Div. 15, § 25300 et seq.)	In the *2003 Integrated Energy Policy Report*, consistent with State Water Resources Control Board Resolution 75-58 and the Warren-Alquist Act, the Energy Commission adopted a policy stating it will approve 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

PROJECT, SITE, AND VICINITY DESCRIPTION

The site is located along the shore of the Pacific Ocean in the City of Carlsbad, northern San Diego County. The power plant site would be located on the northeast portion of the existing 95-acre Encina Power Station (EPS), with the laydown and parking areas located throughout the EPS. Approximately 23 acres of the EPS would be used for the CECP, consisting of the project site, the various laydown and parking areas, and the linear features (CH2M HILL 2007a, section 1.2 and CH2M HILL 2008a section 2.1).

Carlsbad Energy Center LLC (applicant) proposes to construct and operate the 558-megawatt (MW) CECP, which would be an air-cooled, natural gas-fired combined cycle generating facility with steam power augmentation and evaporative air inlet cooling. The proposed linear features, with the exception of the recycled water supply line, would be connected to existing facilities within the site or along rights-of-way located immediately adjacent to the site. A more complete description of the project that includes the site layout, linears, and regional maps is contained in the PROJECT

DESCRIPTION section of this FSA (CH2M HILL 2007a, section 1.2 and Appendix 5.15C).

SOILS

In the vicinity of the CECP site, artificial fill overlies older quaternary marine and non-marine deposits. The base soil underlying the CECP site and on-site construction laydown areas is classified as Marina loamy coarse sand, which has superior drainage characteristics and slow-to-medium erosion potential. Within the Application for Certification (AFC),Table 5.11-2 describes the properties and characteristics of this soil type (CH2M HILL 2007a, section 15.11.3.2).

Extensive excavation, grading, and deposition of fill occurred during the EPS construction and during various stages of upgrades and expansions. The East Tank Farm (EPS Tanks Number 5, 6, and 7), where the CECP power block would be located, had been excavated to bedrock during construction of the tank farm. Geotechnical evaluations within the EPS confirm the presence of fill to a depth of at least 10 feet. This fill is expected to consist of a mixture of coarse textured soils suitable for compaction and power plant bearing loads (SR 2008c, section 500.1 and CH2M HILL 2007a, Appendix 5.4A).

GROUNDWATER

The CECP site is located within the Agua Hedionda groundwater basin. The groundwater beneath the EPS is generally brackish and has been designated as having no beneficial uses. The groundwater levels fluctuate between 14 feet to 10 feet above mean sea level due to seasonal and tidal influences. Given the depth to groundwater, no contact with groundwater is expected, unless groundwater is used as a construction water supply. If groundwater is encountered or used as a construction water supply, a sampling and dewatering plan has been proposed by the applicant. Sampling of the groundwater prior to its use would ensure worker safety and its proper use and disposal (SR 2008c, section 300.10 and SR 2008h, section 5.14.2).

SOIL CONTAMINATION

The proposed location of the CECP is in the impoundment basins of the above-ground storage Tanks Number 5, 6, and 7 (East Tank Farm). The primary soil contaminant is No. 2 fuel oil that was used in the construction of the above-ground storage tanks. The tanks were constructed on top of an oil-impregnated sand cushion comprised of a mixture of No. 2 fuel oil and sand. The secondary soil contaminant within the basins is residual fuel oil No. 6 from previous spill cleanups during operation of the EPS (SR 2008h, Appendix 2H).

The applicant has agreed to enter into the Voluntary Assistance Program administered by the San Diego County Department of Environmental Health's (SDCDEH) Site Assessment and Mitigation Division for the demolition of Tanks 5, 6, and 7 and for any associated contaminated soil remediation. Under this program, SDCDEH would manage the development and implementation of the remediation work plan. The identification and removal of contaminated soil is specifically discussed in the **WASTE MANAGEMENT** section of this FSA (SR 2008h, section 5.14.2.1).

SURFACE WATER HYDROLOGY

The CECP site is located within the Carlsbad Hydrologic Unit between the San Luis Rey River to the north and San Marcos Creek to the south. The site is situated within the Agua Hedionda Lagoon watershed, which has a total drainage area of approximately 29 square miles. Agua Hedionda Creek is the primary stream within the watershed and flows in a southwestward direction to the Agua Hedionda Lagoon and the Pacific Ocean (SR 2008c, Section 300.10.3).

Coastal waters in the vicinity of the CECP site include the Pacific Ocean, Agua Hedionda Lagoon, and Buena Vista Lagoon. The Agua Hedionda Lagoon and the Pacific Ocean are both listed on the current Clean Water Act section 303(d) list as impaired water bodies. The Agua Hedionda Lagoon is listed as impaired for indicator bacteria and sedimentation/siltation, and the Pacific Ocean at Carlsbad Beach is listed as impaired for indicator bacteria (SR 2008c, sections 300.10.7 & 700.1.2).

Project Water Supply

The applicant has proposed two sources of industrial water supply: tertiary treated recycled water from the City of Carlsbad (City) and desalinated ocean water produced on-site. Potential impacts to soil and water resources from the production, transmission, and use of these water sources are addressed in the impacts section of this assessment. The two sources of industrial water supply are described below.

Recycled Water

As proposed in the AFC, recycled water provided by the City would be used for CECP industrial processes, evaporative air inlet cooling, and miscellaneous plant uses including landscape irrigation. The proposed 12-inch recycled water pipeline would extend approximately 3,700 feet to the City's recycled water line located at Avenida Encinas and Cannon Road (CECP 2007a, section5.15.3.5.1).

The CECP would require approximately 517 acre-feet per year (AFY) of recycled water based on continuous operation for 116.8 days (40 percent capacity factor).The applicant estimates that 19 AFY of potable water would be required for domestic purposes and fire protection (CECP 2007a, section 5.15.3.5.1). The estimated average and maximum consumption of potable and recycled water for CECP operation is shown in **Soil and Water Table 2**.

Soil and Water Table 2
Potable and Recycled Water Consumption

Water Source	Average Consumption	Maximum Consumption	Annual Consumption
Potable Water	12 gpm	12 gpm	19 AFY
Ocean Water	320 gpm	945 gpm	517 AFY

Source: CECP 2007a, Table 5.15-3
gpm: gallons per minute; AFY: acre-feet per year

Desalinated Ocean Water

In the Project Enhancements and Refinements (PEAR) document – the July, 2008 amendment to the AFC – the applicant proposes to use desalinated ocean water as an alternative source of industrial water, versus the potential use of recycled water. In this instance, the applicant proposes to construct an on-site ocean-water purification system that would use reverse osmosis (RO) and ion exchange to produce a high-quality industrial water supply (SR 2008h, sections 1.0 & 2.3.2).

The intake for the ocean-water purification system would be from the existing EPS once-through cooling sea water discharge channel. Maximum intake of ocean water for purification purposes would range between 420 gallons per minute (gpm) without power augmentation and 848 gpm with power augmentation operating eight hours per day, plus additional ocean water for mixing at the outfall. The maximum intake of ocean water for CECP operation and outfall dilution would be 3,000 gpm or approximately 4.32 million gallons/day (mgd) or 1,900 AFY (SR 2008h, sections 2.3.2 & 5.15.2.1).

As presented in the PEAR document, the estimated average and maximum potable and ocean water consumption for CECP operation is shown in **Soil and Water Table 3**.

Soil and Water Table 3
Potable and Ocean Water Consumption

Water Source	Average Consumption	Maximum Consumption	Annual Consumption
Potable Water	12 gpm	12 gpm	19 AFY
Ocean Water	420 gpm	848 gpm	271 AFY

Source: SR 2008h, Table 5.15-1
gpm: gallons per minute; AFY: acre-feet per year

Potable water would be supplied by the City through the existing EPS water supply infrastructure. The applicant proposes to use potable water for domestic and fire protection purposes.

Recycled and Industrial Wastewater

The applicant proposes separate industrial wastewater discharge methods for recycled wastewater and desalinated wastewater. Recycled wastewater would be discharge to the City's sanitary sewer system and desalinated wastewater would be discharged through the existing EPS Pacific Ocean outfall. Both discharge methods are described below.

Other wastewater streams from miscellaneous plant drains, evaporative coolers, and HRSG blowdown would be recycled to the raw water storage tank for reuse. Prior to reuse, this wastewater would be treated by filtration and oil/water separation. In the case of emergencies, the applicant proposes to discharge these wastewater streams to the City's sanitary sewer system in accordance with the Encina Wastewater Authority (EWA) discharge regulations (CECP 2007a, section 5.15.3.6).

Recycled Wastewater

The applicant proposes to pretreat the recycled water to reduce biological and physical constituents that would interfere with the reverse osmosis (RO) and demineralization process. During this process, the RO units would produce a reject stream consisting of highly concentrated recycled water constituents and water treatment chemicals.

The pretreatment and RO reject streams would be discharged to the City's sanitary sewer system. The applicant estimates the peak discharge rate for recycled wastewater to be 290 gpm with an annual volume of 187 AFY discharged to the City's sanitary sewer system. This wastewater stream would be monitored prior to discharge and treated if necessary for compliance with the EWA discharge limits (CECP 2007a, section 5.15.8 and Table 5.15-4).

Desalinated Wastewater

The wastewater discharged from the proposed desalination process would consist of the first-stage RO reject stream containing high concentrations of dissolved solids. Under normal operating conditions (8-hours of power augmentation), approximately 505 gpm of desalinated wastewater would be mixed with the tail water from EPS Units 4 and 5 for a combined discharge rate of 2,657 gpm. The combined wastewater stream would be discharged to the Pacific Ocean through the existing EPS discharge channel (SR 2008h, section 5.15.3.3).

Sanitary Wastewater

The applicant proposes to operate CECP remotely from the Control Building located within the existing EPS. Sanitary wastewater from restrooms, eye wash stations, safety showers, and drinking water fountains would be discharged to the City's sanitary sewer system. Sanitary wastewater generated at the CECP site is estimated to average 12 gpm. The applicant considers this flow to be a *de minimus* increase that would be well within the treatment, conveyance, and disposal capacities of the City and EWA systems (CECP 2007a, section 5.15.3.6.2).

Storm Water

The CECP site is located on the existing EPS within the impoundment basins of tanks number 5, 6, and 7. The existing storm water collection system would be used during development of the CECP. The existing storm water system collects runoff and pumps the runoff through existing pipelines for eventual discharge to the Agua Hedionda Lagoon. The applicant proposes to modify the drainage system as necessary to accommodate the plant layout and to meet the requirements of federal Clean Water Act National Pollutant Discharge Elimination System (NPDES No. CAS0108758) permit requirements (CH2M HILL 2007a, section 5.15.4.1 and SR 2008c, section 300.1.2).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

The proposed CECP was evaluated to determine whether the construction or operation

of the project would contribute to erosion, sedimentation, flooding, and degradation of water quality or water supply, and whether the project would comply with all applicable LORS. Compliance with the comprehensive regulatory procedures that have been adopted, absent unusual circumstances, should ensure that all residual impacts associated with the project are mitigated to a level of less than significant. Regulatory procedures typically offer a suite of options for addressing 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 the significance of potential impacts for this assessment. The following LORS and state and local policies 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.

- The Resource Conservation Recovery Act of 1976 seeks to prevent surface and groundwater contamination.

- 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 is prohibited.

- California Water Code, section 13260 establishes waste discharge requirements for any discharge that could affect the water quality of the state.

- California Water Code, Section 13523 requires the San Diego Regional Water Quality Control Board (SDRWQRB) to prescribe water reuse requirements for water that is to be used as recycled water after consultation with the California Department of Public Health (DPH).

- California Water Code, Section 13550 requires the use of recycled water for industrial purposes if recycled water is available.

- The City of Carlsbad Municipal Code Chapters 13.04, 13.10, and 13.16 requires new sources of domestic and industrial wastewater to obtain discharge permits from the City.

- The City of Carlsbad Municipal Code Chapter 14.08 establishes procedures and requirements for connection to the City's potable water system.

- The City of Carlsbad Municipal Code Chapter 15.12 authorizes the City to implement its municipal Storm Water Management and Discharge Control provisions in accordance with the requirements of the SDRWQCB Order No. R9-2007-0001.

- The California Energy Commission's *Integrated Energy Policy Report* allows the use of fresh water for cooling purposes by power plants it licenses only when 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, staff will propose mitigation to reduce or eliminate the impact.

DIRECT AND INDIRECT IMPACTS AND MITIGATION

A discussion of direct and indirect impacts associated with the construction and operation of the proposed CECP is presented below. Potential construction-related impacts to soil, storm water, and water quality, including the applicant's proposed mitigation measures and staff's determination of the adequacy, are discussed below. If necessary, staff will propose additional mitigation measures and refer to specific conditions of certification.

Construction Impacts and Mitigation

Construction of the proposed CECP would include demolition of the East Tank Farm, soil excavation and remediation, grading, building construction, and installation of utility connections. Water quality could be impacted through the discharge of sediment laden runoff, the migration of existing on-site pollutants, and the release of hazardous materials during construction.

Water and Wind Erosion

The proposed CECP site is currently in use as a tank farm and has an existing storm water collection system. In preparation for construction of the CECP, tanks 5, 6, and 7 would be demolished and the lateral berms removed before site grading and perimeter berm construction begins (SR 2008c, section 300.6.2).

Within the impoundment area of the East Tank Farm, drainage is collected for discharge to the Agua Hedionda Lagoon. Because of berm removal and power block construction, the applicant proposes to modify the existing drainage system to direct runoff within the CECP impoundment area to new drain inlets. Runoff within the CECP impoundment area would continue to be collected and pumped to an above-ground mobile oil/water separator and sand media filter for pretreatment prior to discharge to the Agua Hedionda Lagoon. The applicant also proposes additional erosion and sediment control Best Management Practices (BMPs) in its draft Stormwater Management and Pollution Prevention Plan (SWMPPP). The proposed BMPs would provide soil erosion and treatment control methods for trapping eroded sediments during construction. The proposed BMPs include soil binders, straw mulch, dust suppression, storm drain inlet protection, check dams, velocity dissipation, an infiltration trench, and contaminated soil management (SR 2008c, sections 300.10.6 & 500.2).

The Agua Hedionda Lagoon is listed as an impaired water body for indicator bacteria and sedimentation. Sampling and testing of storm water discharge from construction sites for sedimentation is required when there is a direct discharge to a receiving water body listed as impaired due to sedimentation. Within the SWMPPP, the applicant has

included a Sampling and Analysis Plan to determine whether the BMPs used during construction are effective in controlling potential construction-related pollutants from coming in contact with storm water. The applicant proposes to sample storm water runoff at the Agua Hedionda Lagoon outfall and 300 feet downstream from the outfall. The applicant would sample runoff for all pollutants that would cause or contribute to an exceedance of water quality objectives in the Agua Hedionda Lagoon (SR 2008c, sections 300.10.7 & 700.1.2).

In January 2007, the SDRWQCB approved a new San Diego County Municipal Storm Water Permit (Order R9-2007-0001, NPDES No CAS0108758). The Municipal Permit requires the implementation of storm water regulations addressing storm water pollution issues in development planning and construction associated with public and private projects. Specifically, such projects are required to include storm water BMPs during construction and as part of a project's permanent design to reduce pollutants discharged from the project site to the maximum extent practicable (COC 2008p, section 2.1.2).

The City's has revised its Standard Urban Stormwater Management Plan (SUSMP) and Storm Water Standards Manual (manual) to meet the 2007 Municipal Permit requirements. The revised manual incorporates the requirements of the General Construction Permit (WQO-99-08-DWQ) and the General Industrial Activity Permit (WQO-97-03-DWQ). Additionally, the City's Storm Water Management and Discharge Ordinance (Municipal Code Title 15, Chapter 15.12) requires that all new development and redevelopment projects reduce pollutants in storm water discharges in order to achieve applicable water quality objectives pursuant to the Clean Water Act and the Municipal Permit (COC 2008p, sections 1, 2.2.1, & 3.1.1).

The applicant has determined that the CECP would be classified as a Tier 3 project based on criteria contained in the manual. As a Tier 3 project, the CECP represents the highest threat to water quality, and the project owner would be required to prepare a Tier 3 Construction Storm Water Pollution Prevent Plan (SWPPP). A Tier 3 Construction SWPPP is required to be prepared in accordance with the provisions of the General Construction Permit and the standards contained in the 2008 revision of the Storm Water Standards Manual. The applicant has prepared a draft Construction Stormwater Management and Pollution Prevention Plan in accordance with the City's standards and is aware of all federal, state, and municipal storm water discharge requirements promulgated by the CWA (SR 2008c, section 300 and COC 2008p, sections 3.2.1 & 3.2.6).

Staff agrees that the proper selection and implementation of BMPs can reduce the impact of water and wind erosion to soil and water resources to a level that is less than significant. Adherence to the procedures in an approved Tier 3 Construction SWPPP that complies with the City's 2008 storm water standards would limit soil erosion and the potential migration of sediment and other contaminants from entering the Agua Hedionda Lagoon. Staff proposes that a Tier 3 Construction SWPPP be prepared and implemented in accordance with the City's municipal permit (Order R9-2007-0001) and Title 15,Chapter 15.12 of the Municipal Code in Condition of Certification **SOIL&WATER-1**. Through the preparation and implementation of the Tier 3

Construction SWPPP that meets the City's revised Storm Water Standards Manual, staff believes soil loss from erosion and the migration of soil-borne pollutants during construction of the CECP would be mitigated to a level of less than significant.

Construction Water Supply

The applicant proposes to use potable water from the City as the source of water during construction. The applicant proposes to use potable water for dust control, equipment washing, soil compaction, and other short-term uses. The applicant estimates the volume of water used for dust control to be about 87 acre-feet and the volume of water for equipment washing to be 0.10 acre-feet. Prior to plant start-up, additional water (estimated to be about 0.4 acre-feet) would be used for hydrostatic testing (CH2M HILL 2007a, section 5.15.3.5.3).

The use of potable water for construction activities when a water source of lower quality is available is a violation of the California Constitution, Article X, section 2, which states in part: " … that the water resources of the State be put to beneficial use to the fullest extent of which they are capable, and that the waste or unreasonable use or unreasonable method of use be prevented, and that the conservation of such waters is to be exercised with a view to the reasonable and beneficial use thereof in the interest of the people and for the public welfare." Staff has proposed Condition of Certification **SOIL&WATER-2**, which prohibits the use of potable water for any construction activity that is suitable for non-potable water use. The use of recycled water or other water of a lesser quality is feasible and must be used during construction of the CECP.

Surface and Groundwater Quality

Surface waters in the vicinity of the CECP site are the Pacific Ocean and Agua Hedionda Lagoon. Through the preparation and implementation of a Tier 3 Construction SWPPP as required by Condition of Certification **SOIL&WATER-1**, impact to these water bodies from CECP construction activities are expected to be less than significant.

The elevation of the CECP within the impoundment basin would be approximately 30 feet above mean sea level. Groundwater has been encountered on the EPS site at depths between 20.8 and 28.9 feet below ground surface. The applicant does not propose to use groundwater, and groundwater would not be encountered during construction due to its depth.

Water Quality Order 99-08-DWQ requires that dewatering BMPs be included in the General Construction SWPPP. As a Tier 3 project, the provisions of the General Construction SWPPP would be incorporated into the Tier 3 Construction SWPPP. The preparation of a Tier 3 Construction SWPPP is required in Condition of Certification **SOIL&WATER-1**. Staff agrees the likelihood of encountering groundwater during construction is remote, although its use as a construction water supply may be feasible. If used as a construction water supply, impacts from its use would be less than significant.

Contaminated Soil Remediation

The applicant entered into the Voluntary Assistance Program (VAP) on November 26, 2007, with the SDCDEH for the demolition of Fuel Oil Tanks 5, 6, and 7 (CH2M HILL 2007d). The SDCDEH will review the post-demolition soil corrective action plan and provide confirmation of the sampling plan and closure report. SDCDEH would issue a closure letter demonstrating satisfactory implementation of the corrective action plan and associated clean-up objectives (SR 2008a, Data Response 112).

Contaminated soil would be characterized, excavated, properly manifested, and transported off site for disposal and/or recycling. The results of the sampling and analysis would be used to establish cleanup levels. Based on those levels, a Soil Remediation Plan would be developed pursuant to the requirements of the SDCDEH as acting lead agency. To mitigate potential impacts, Condition of Certification **WASTE-1** has been proposed in the **WASTE MANAGEMENT** section of this FSA. The project owner would not be allowed to start construction before verifying that the site has been adequately remediated (SR 2008h, section 2.3.3 and SR 2008c, section 300.6.2).

Operation Impacts and Mitigation

Operation of the CECP project could lead to potential impacts to soil, water supply, and surface or groundwater quality. Soils may be impacted through erosion or the 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 the discharge of eroded sediments from the site, the discharge of hazardous materials released during operation, or the migration of existing hazardous materials present in the subsurface soils. Potential impacts to soil, water quality, water supply, and wastewater related to the operation of the proposed CECP, including the applicant's proposed mitigation measures and staff's proposed mitigation measures, are discussed below.

Water and Wind Erosion

The proposed 23-acre CECP site is presently in use as a tank farm and for other industrial activities associated with the EPS. After construction of the CECP, the applicant anticipates that the amount of overall impervious surface area would decrease, resulting in a reduction in storm water runoff from pre-construction levels. The overall reduction in impervious surface area would be accomplished by reducing the paved area of the tank farm impoundment basin by approximately one acre. The applicant proposes not to pave this area, but to stabilize the area with pervious materials that would allow for storm water infiltration. Routine vehicular access to the site during operation would be limited to existing roads, and standard operating activities would involve soil disturbing activities (SR 2008c, section 800.2.3).

During CECP operation, soil impacts and the potential for soil erosion would not be significant. The applicant proposes to implement an Industrial SWPPP in accordance with the City's municipal permit (Order R9-2007-0001) and Title 15, Chapter 15.12 of the Municipal Code. The Industrial SWPPP for plant operation would be developed to meet the performance and monitoring requirements of the City's revised Storm Water

Standards Manual and would provide effective storm water pollution identification and mitigation.

Staff has proposed that an Industrial SWPPP be prepared and implemented per the requirements of the City's revised Storm Water Standards Manual as Condition of Certification **SOIL&WATER-4** (PSA Condition of Certification **SOIL&WATER-3**). Through the preparation and implementation of the Industrial SWPPP, no significant impacts to soil and water resources from plant operation are expected.

Flooding Potential

The Encina Power Station and the CECP site are not located within a 100-year floodplain (Zone A) as defined by the Federal Emergency Management Agency (FEMA 1997). The CECP site is located in a non-shaded Zone X area (areas determined to be outside the 500-year floodplain) as shown in Figure 5.15-3 (CH2M HILL 2007a, section 5.15.3.2.2).

The general region is flat and there are no significant dams or levees in the project vicinity. The site grading and drainage would be designed to comply with applicable federal, state, and local regulations. The general site grading would establish a working surface for plant operation and would provide positive drainage from buildings and structures. A backup power feed would be provided to the power block area drainage sump pumps to maintain operability of the drainage pumps and properly limit the potential for flooding the CECP site (CH2M HILL 2007a, section 5.15.4.6).

Tsunami and Seiche

Tsunamis are waves typically generated offshore or within large bodies of water during a subaqueous fault rupture or subaqueous landslide event. Seiches are waves generated within a large body of water caused by the horizontal movement of an earthquake. The proposed CECP is located approximately 1,600 feet from the Pacific Ocean and about 750 feet south of Agua Hedionda Lagoon and has the potential to be inundated by a tsunami or seiche.

Tsunami

A tsunami is a seismic sea wave caused by sea-bottom deformations that are associated with earthquakes, landslides, or volcanic activity beneath the ocean floor. Local tsunamis can be caused by significant vertical displacement along offshore faults or coastal and submarine landslides and are always largest closest to the source region. Because Southern California is oriented obliquely with major tsunami zones and the continental shelf extends a significant distance offshore, there is a low potential for catastrophic damage to the San Diego County coastline. The California Seismic Safety Commission reported in 2005 that tsunami run up heights are estimated between 0.3 feet to slightly over 3 feet, well below the CECP finished grade of 35 feet above mean sea level (CH2M HILL 2007a, section 5.15.3.3.2).

Seiche

Seiches occur in enclosed water bodies as a result of ground shaking primarily due to earthquakes. According to the City of Carlsbad South Coastal Redevelopment Plan

(2000), seiches are not expected to affect areas 5 to 10 feet above the mean water level in the Agua Hedionda Lagoon, well below the CECP finished grade of 35 feet above mean sea level (CH2M HILL 2007a, section 5.15.3.3.1).

Recycled Water Supply

In the AFC, the applicant proposes to use recycled water provided by the City of Carlsbad's Water Recycling Facility (CWRF) for CECP industrial processes, evaporative air inlet cooling, equipment wash water, and landscape irrigation. The CWRF is located on Avenida Encinas, south of Cannon Road. The applicant proposes to construct a 12-inch recycled water pipeline adjacent to the existing rail line that would connect to the City's recycled water line located at Avenida Encinas and Cannon Road. Once on-site, the recycled water would be stored in a 360,000-gallon raw water storage tank (CECP 2007a, sections 2.1 & 5.15.3.5.1).

In a letter dated July 6, 2007, the applicant requested a "Will Serve" letter from the City for the supply of recycled water to CECP and that the City commit to providing a long-term supply of recycled water to the CECP (CECP 2007a, Appendix 5.15.A). The City did not provide the applicant with a "Will-Serve" or commit to the long-term supply of recycled water for CECP industrial uses. Rather, the City's Planning Department, by letter dated October 24, 2007 raised concerns over the City's ability to provide a reliable recycled water supply to the CECP. Within the letter, the Planning Department states that the City does not have adequate recycled water production capacity to satisfy the process water demands of the CECP in the peak summer months (COC 2007a, Issue 47).

In a February 2008 letter to staff, the City clarified its position and stated that projected peak demand for recycled water would begin to exceed supply by 2009. The City further stated that demand is projected to grow through 2014 and will result in the City being unable to meet its full recycled water delivery obligations during peak months (May-September) with its existing supply and storage infrastructure (COC 2008c). Tertiary treated recycled water is the applicant's preferred source of industrial water supply. The applicant believes that sufficient recycled water supply is available from other producers and that it would be available as a long-term supply of industrial water for CECP operation.

Regardless of the recycled water producer, its delivery would be through the City's recycled water infrastructure and would require agreements with the City for the delivery and discharge of recycled water. Based on the "yet to be determined" recycled water producer and the need for a delivery agreement with the City, staff has recommended Condition of Certification **SOIL&WATER-8** (PSA Condition of Certification **SOIL&WATER-7**). Condition of Certification **SOIL&WATER-8** would require the project owner to enter into a long-term (30 to 35 years) recycled water supply agreement with the producer and the City for the delivery of recycled water to the CECP. With this agreement, the recycled water producer would commit to a long-term recycled water supply that would be delivered by the City.

The production and use of recycled water is regulated under federal and state law. The State Water Resources Control Board (SWRCB) shares jurisdiction with the Regional

Water Quality Control Boards (RWQCB) and with the Department of Public Health (DPH) over the use of recycled water. The SWRCB exercises general oversight over recycled water projects, while DPH is charged with the protection of public health and drinking water supplies through the development of uniform water recycling criteria. Under California Water Code, sections 13522.5, 13523, and 13523.1, any person who proposes to produce or use recycled water must file a report and obtain water reclamation requirements or a master reclamation permit from the appropriate RWQCB.

One of the primary conditions for the use of recycled water is protection of public health. The current Water Recycling Criteria (Title 22, California Code of Regulations, sections 60301 through 60355) require the submission of an engineering report to the RWQCB and DPH before recycled water projects are implemented. For existing recycled water projects, the report must be amended prior to any modifications or expansion.

In addition, Title 17, California Code of Regulations addresses the health and safety requirements of backflow prevention and cross connection of potable and non-potable water lines. Through the approval of the engineering report by DPH, that includes the backflow prevention and cross connection provisions of Title 17, the health and safety requirements of Title 17 and Title 22 would be met. To ensure compliance with federal and state laws, Condition of Certification **SOIL&WATER-8** also includes the requirement that the project owner submit a copy of an approved engineering report and any other DPH or SDRWQCB requirements to the Compliance Project Manager (CPM) prior to the delivery of recycled water to the CECP.

Compliance with Condition of Certification **SOIL&WATER-8** would ensure that a long-term recycled water supply is available for CECP operation and that recycled water production and use complies with the Clean Water Act, the California Water Code, and the California Code of Regulations. Through compliance with federal and state law, impacts to soil or water resources from the production and use of recycled water at the CECP would be less than significant.

Desalinated Water Supply

In the PEAR document, the applicant proposed to construct an on-site ocean-water purification system as an alternative source of water supply (AFC initially proposed a recycled water supply). An alternative industrial wastewater discharge path through the existing EPS ocean outfall would be used in addition to the City's sanitary sewer system (SR 2008h, section 1.0).

The ocean-water purification system would consist of an ultrafiltration system installed upstream of a two-stage RO system. The first-stage RO treated water (desalinated water) would pass through a second-stage RO system. The second-stage RO permeate would be further demineralized through the use of an ion exchange process to produce purified industrial water suitable for injection to the heat recovery steam generators (HRSGs). The proposed CECP would include an ocean-water storage tank to permit continuous plant operation regardless of industrial water source (SR 2008h, section 2.3.2).

The EPS has a SDRWQCB Waste Discharge Requirements (WDR) Order (R9-2006-0043) for the intake and discharge of up to 857 million gallons per day (mgd) of seawater for use as once-through cooling of Units 1 through 5. The proposed ocean-water purification system would draw ocean water from the existing EPS once-through cooling water discharge channel upstream of any process wastewater discharge to the EPS discharge channel. Maximum intake of ocean water for purification purposes would range between 420 gpm without power augmentation and 848 gpm with power augmentation operating eight hours per day, plus additional ocean water for mixing at the outfall. The maximum intake of ocean water for CECP operation and outfall dilution would be 3,000 gpm or 4.32 mgd (SR 2008h, sections 2.3.2 & 5.15.2.1).

The applicant has submitted a Report of Waste Discharge NPDES Application to the SDRWQCB for operation of the ocean-water purification system and subsequent discharge of 2,855 gpm to the Pacific Ocean (SR 2008j2). Approval by the SDRWQCB is required prior to operation of the CECP ocean-water purification system. The applicant has proposed submitting a copy of the approved WDR Order for discharges to the Pacific Ocean to the CPM two weeks prior to operation of the ocean-water purification system. Staff agrees that the WDR Order is required prior to CECP operation and has conditioned its submittal in Condition of Certification **SOIL&WATER -4** (PSA Condition of Certification **SOIL&WATER-3**).

Industrial Water Supply Reliability

The applicant believes that short interruptions to the recycled or desalinated water supply can be managed by drawing down storage in on-site tanks (SR 2009a). If the duration of the interruption exceeds the capacity of on-site storage, that applicant proposes to cease operating the CECP. Staff believes that a forced interruption of CECP generation due to a lack of industrial water may be a reliability issue. Operational reliability of the CECP is discussed and evaluated in the **POWER PLANT RELIABILITY** section of this FSA.

Potable Water Supply Reliability

The applicant proposes to take delivery of potable water through an existing 10-inch pipeline located adjacent to the west side of the site. The potable water would be supplied by the City and would be used for domestic purposes and fire protection. The applicant no longer proposes to use potable water as an emergency backup supply for CECP operation (SR 2009a).

Staff has recommended Condition of Certification **SOIL&WATER-5** (PSA Condition of Certification **SOIL&WATER-4**), that requires the project owner to obtain service from the City for the hook-up and delivery of potable water in accordance with the City's Municipal Code, Title 14, Chapter 14.08. Staff also recommends Condition of Certification **SOIL&WATER-6** (PSA Condition of Certification **SOIL&WATER-5**), that requires the project owner to install metering devices on all water supply sources (recycled, desalinated, and potable) prior to the use of those water sources for CECP operation. Data from the metering devices would be used to prepare an annual water use summary that would be submitted to the CPM in the annual compliance report.

Sanitary and Industrial Wastewater

If recycled water is used for CECP industrial purposes, sanitary and recycled wastewater would be discharged to the EWA's Encina Water Pollution Control Facility (EWPCF) via a new hookup to the City's sanitary sewer system. The EWPCF provides wastewater treatment and disposal for the City (EWA 2001). Desalinated ocean wastewater would be discharged to the existing EPS Pacific Ocean outfall, and sanitary wastewater to the City's sanitary sewer system. The applicant proposes to operate the CECP remotely from the Control Building located within the EPS. The sanitary wastewater stream from the Control Building would come from restrooms, eye wash stations, safety showers, and drinking water fountains (CECP 2007a, section 5.15.4.4 and SR 2008h, section 5.15.2.1).

The City has not provided the applicant with a "Will Serve" letter for the acceptance of the CECP sanitary wastewater. In the event that the City does not accept sanitary wastewater from the CECP, the applicant proposes to dispose of sanitary wastewater through self-contained mobile units. The mobile units would be transported to the EPS for disposal to the existing sanitary sewer system that is connected to the EWA treatment plant, or through a licensed domestic waste hauler for disposal at a permitted domestic wastewater disposal site (SR 200 2008h, section 5.15.2.1).

Sanitary and Recycled Wastewater

The applicant proposes to discharge approximately 187 AFY of recycled wastewater to the City's sanitary sewer system. The recycled wastewater stream would consist of the recycled water constituents at three times the initial concentration, residues of the chemicals added to control scaling and biofouling, and wastewater from miscellaneous plant drains. The applicant would comply with the City's wastewater quality and quantity requirements for industrial wastewater discharges to the City's sanitary sewer system and would obtain an Industrial Wastewater Discharge Permit (permit) from the City. Adherence to the industrial discharge limitations specified in the permit would be protective of soil and water resources, and the potential impacts to the wastewater system would be less than significant (CECP 2007a, section 5.15.4.4).

For sanitary and recycled wastewater discharge to the City's sanitary sewer system, staff has recommended Condition of Certification **SOIL&WATER-7** (PSA Condition of Certification **SOIL&WATER-6**). Condition of Certification **SOIL&WATER-7** requires the project owner to provide the CPM with a copy of all discharge and sewer hookup permits required by the City and/or EWA in accordance with the City's Municipal Code, Title 13, Chapters 13.10 and 13.16.

Desalinated Wastewater

The ocean-water purification system would generate waste streams associated with the ultrafiltration and first-stage RO reject processes. Ultrafiltration would produce an aqueous waste stream containing high concentrations of suspended and settled solids. The applicant proposes a dewatering system that would recycle various wastewater streams back to the ocean water storage tank and produce a filtered solids cake that would be suitable for disposal as a solid waste at a Class III or Class II landfill (SR 2008h, section 5.14.4.4).

The applicant proposes to discharge wastewater from the first-stage RO processes to the existing EPS discharge channel. The wastewater stream from miscellaneous plant uses, evaporative coolers, and HRSG blowdown would be treated by filtration and oil/water separation prior to recycling to the ocean water storage tank for reuse. (SR 2008h, sections 5.15.2.1 & 5.15.3.3).

There would be no on-site preparation, regeneration, or disposal of the CECP's ion exchange system's spent resin. The applicant proposes to use a completely contained mobile demineralization system provided and maintained by a third-party vendor for the ion exchange system (SR 2008h, sections 5.15.1).

The discharge of process wastewater to the Pacific Ocean would be permitted by the SDRWQCB in accordance with the requirements of Condition of Certification **SOIL&WATER-4**. Through compliance with Conditions of Certification **SOIL&WATER-4 and -7**, the discharge of sanitary and industrial wastewater would not contribute to or result in a significant impact to soil or water resources.

CUMULATIVE IMPACTS AND MITIGATION

Cumulative effects to water resources could occur through the use of recycled water or ocean water, through dewatering activities, and the discharge of wastewater and storm water run-off. For these categories of water use and disposal, no expected significant cumulative effects to area water resources would occur. The water uses are discussed below.

Recycled Water Supply

The use of tertiary treated recycled water would provide an alternative industrial water source to ocean water or potable water. Although the applicant does not have a commitment from the City for the supply of recycled water, the applicant believes sufficient recycled water supply is available from other producers, and that it would be available as a long-term supply of industrial water. Since the source is unknown the cumulative impacts on the supply of recycled water is unknown. Staff believes that with the projected increase in northern San Diego County population a reliable supply of recycled water will be available prior to the operation of the CECP. With the growth in population and new recycled water infrastructure, the impact on recycled water supply would be cumulatively insignificant.

Desalinated Water Supply

The Carlsbad Seawater Desalination Project (CSDP), would be located on property leased from Cabrillo Power I LLC, directly west across the railroad tracks from the EPS site location proposed for the CECP. CSDP is permitted to use the same, existing EPS water discharge stream as that proposed by the CECP. Despite their physical proximity and sharing the same feedwater source, the CSDP and the CECP are two separate projects, and each shall obtain all required permits for construction and operation accordingly. The discharge from the operation of the CECP ocean-water purification system would be less concentrated and approximately 1 to 2 percent of the total volume of CSDP discharges (304 mgd). The CECP is a dry-cooled plant that would provide a benefit to the marine environment by reducing the thermal load of the once-through

cooling discharge (up to 225 mgd) when EPS Units 1-3 cease operations. The cumulative effects for the CECP and the CSDP would not be significant, given their combined discharge represents half of EPS traditional annual consumption of ocean water, and nearly one third of its permitted level (R9-2006-0043, Jenkins, Scott & Wasyl. Joseph. 2008).

Surface Water

Cumulatively significant impacts to the water quality of Agua Hedionda Lagoon or the Pacific Ocean would be mitigated through the preparation and implementation of various construction and operation plans. Use and discharge permits would be required prior to the use of recycled and ocean water, and their use individually or in combination would be mitigated to a less than significant level.

Groundwater

The applicant proposes no direct use of groundwater resources, and groundwater is not expected to be encountered during construction or operation of the CECP. If groundwater is encountered or used as a construction water supply, a sampling and dewatering plan would be implemented and its potential to affect surface water quality would be mitigated.

Wastewater

The CECP would generate up to 62 million gallons per year of sanitary and recycled wastewater that would be discharged to the City's sanitary sewer system. The quality and quantity of the recycled wastewater discharged to the City's sanitary sewer system would be permitted under an Industrial Wastewater Discharge permit and would be required to meet all City and EWA pretreatment standards. The cumulative effect from this additional wastewater stream on the City's sewer system would not be cumulatively significant (CECP 2007a, sections 5.15.4.4 & 5.15.8 and Tables 5.15-4 & -5).

Storm Water

Construction and operation of CECP would not cause a significant impact to the quality of storm water discharge from the 23-acre CECP site. The on-site storm water detention areas have been sized to retain storm water from a 25-year rainfall event for gradual release into the storm drain system and eventual discharge to the Agua Hedionda Lagoon. Through compliance with Conditions of Certification **SOIL&WATER-1 and -3**, adverse effects to Agua Hedionda Lagoon or the Pacific Ocean from storm water runoff would not be cumulatively significant

COMPLIANCE WITH LORS

CLEAN WATER ACT

Staff has determined that the CECP would satisfy the requirements of the NPDES permits with the adoption of Conditions of Certification **SOIL&WATER-1 and -3**. These conditions require the development and implementation of a Tier 3 Construction SWPPP (**SOIL&WATER-1**) and an Industrial SWPPP (**SOIL&WATER-3**) in accordance with the City's Storm Water Standards Manual.

THE RESOURCE CONSERVATION AND RECOVERY ACT

By proper remediation of on-site soil contamination in accordance with Conditions of Certification **WASTE -1 and -4** and the implementation of the SWPPPs that are required in Conditions of Certification **SOIL&WATER-1 and -3**, contamination of surface and groundwater would be prevented.

CALIFORNIA CONSTITUTION, ARTICLE X, SECTION 2

The 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. Through compliance with Conditions of Certification **SOIL&WATER-5**, the use of potable water for any construction or operation activity that is suitable for non-potable water use would be disallowed.

CALIFORNIA WATER CODE, SECTION 13260

Through the establishment of waste discharge requirements by the SDRWQCB, Pacific Ocean water quality is maintained. To comply with the water quality standards established by the SDRWQCB, the applicant has submitted a Report of Waste Discharge and a National Pollutant Discharge Elimination System (NPDES) permit application to the SDRWQCB. Operation of the ocean-water purification system and its wastewater discharge to the Pacific Ocean cannot occur without the approval of the SDRWQCB.

CALIFORNIA WATER CODE, SECTION 13523

Through compliance with Conditions of Certification **SOIL&WATER-8,** the SDRWQCB, after consulting with and receiving the recommendations from DPH, would prescribe water reclamation requirements for the production and use of recycled water for industrial purposes at the CECP.

CALIFORNIA WATER CODE, SECTION 13550

Section 13550 of the California Water Code requires the use of recycled water for industrial purposes if recycled water is available. Through the proposed use of recycled water for operation of the CECP, the applicant will be fully compliant with this section of the water code.

TITILE 17 AND TITLE 22 CALIFORNIA CODE OF REGULATIONS

Through compliance with Conditions of Certification **SOIL&WATER-8**, the DPH would review and approve an engineering report for the transmission and use of recycled water.

THE CITY OF CARLSBAD MUNICIPAL CODE

Compliance with Chapters 13, 14, and 15 of the City's Municipal Code as proposed by the applicant would ensure that a reliable potable water and sanitary sewer service is supplied by the City and that the City's Tier 3 requirements for storm water discharge are met.

CALIFORNIA ENERGY COMMISSION INTEGRATED ENERGY POLICY REPORT: WATER USE AND WASTEWATER DISCHARGE POLICY

The California Energy Commission, under legislative mandate specified in the *2003 Integrated Energy Policy Report*, will approve the use of fresh water for cooling purposes by power plants it licenses only where alternative water supply sources and alternative cooling technologies are shown to be environmentally undesirable or economically unsound. Through the use of recycled water exclusively or in conjunction with ocean water, the CECP would comply with this policy.

RESPONSE TO INTERVENOR AND APPLICANT COMMENTS

CALIFORNIA UNIONS FOR RELIABLE ENERGY (CURE)

By letter dated January 30, 2009, CURE requested that a revised Preliminary Staff Assessment (PSA) be prepared and circulated for public review and comment. The basis for CURE's request is that the AFC contained insufficient data and the PSA failed to address all potential impacts (CURE 2009a). As intervenors, CURE and Power of Vision submitted responses to the CECP Committee in support of the City's Motion for a Staff Revised PSA and Project Schedule Relief (Motion). By Order dated February 9, 2009, the Motion for a revised PSA was denied (CURE 2009a and CEC 2009a).

In its decision to deny the Motion, the Committee agrees with staff's position that further refined analysis would be presented in the FSA. Within this section and the **WASTE MANAGEMENT** section of the FSA, CURE's concern that the PSA failed to analyze potential impacts to Agua Hedionda Lagoon is fully addressed and Conditions of Certification **SOIL&WATER-1 and -3** and **WASTE -1, -2, and -4** are proposed to address storm water runoff and the demolition of the East Tank Farm and the remediation of contaminated soil.

CITY OF CARLSBAD (CITY)

The following are staff's responses to the City's Soil and Water Resources comments submitted by letter dated January 30, 2009 (COC 2009a). The City's comments are paraphrased.

City-1 The City contends that the proposed ocean-water purification system (reverse osmosis) would result in withdrawal of approximately 4 million gallons per day (mgd) of seawater. The Clean Water Act (CWA) requires avoidance and minimization of impact from new facilities withdrawing over 2 mgd. The proposed project's water supply would result in withdrawal of twice that quantity (4 mgd), and yet no efforts to avoid or minimize these effects are identified in the PSA.

Response: As proposed by the applicant, the ocean-water purification system would draw ocean water from the existing EPS once-through cooling water discharge channel. The EPS has received a Waste Discharge Order (R9-2006-0043) from the SDRWQCB for the intake and discharge of up to 857 mgd of ocean water for use as once-through cooling for EPS Units 1 through 5. The CECP would use a fraction (4.32 mgd) of this

permitted ocean water discharge, and the CECP would not be considered a new user of ocean water as defined in the Phase I regulations of Section 316(b) of the CWA.

City-2 The City requests that the AFC be revised to include a new hydraulic/hydrologic study (study) that analyzes the pre- and post-development storm flows of the project and that the revised AFC include the construction of any proposed storm drain infrastructure identified in the report.

Response: The AFC is the applicant's document and staff does not contribute to its preparation or revision. The City has the authority under its Municipal Storm Water Permit (Order R9-2007-0001) and Municipal Code, Title 15, Chapter 15.12 to require the project owner to abide by the City's Storm Water Management and Discharge Control provisions as prescribed in its Storm Water Standards Manual. The project owner would submit a Tier 3 Construction SWPPP to the City prior to construction. The Tier 3 Construction SWPPP would be based on the CECP final design and prepared in accordance with the City's pre- and post-development storm flow standards. A new study prior to CECP final design would be conceptual and unnecessary.

City-3 The City is willing to provide potable water for domestic and sanitary purposes only. The potable water will be delivered without a long-term agreement similar to all potable water customers and cannot guarantee a firm delivery rate.

Response: Staff agrees with the City that potable water should only be used for its highest beneficial purpose, which is for domestic and sanitary uses. The use of potable water for construction and industrial purposes when other water sources are available is a violation of the California Constitution, Article X, section 2. Staff has proposed that potable water use for any construction or operation activity that is suitable for non-potable water use be disallowed in Condition of Certification **SOIL&WATER-5** (PSA Condition of Certification **SOIL&WATER-4**). To assist in compliance monitoring, staff has proposed a new Condition of Certification **SOIL&WATER-2** that prohibits the use of potable water for any construction activity that is suitable for non-potable water use.

Staff also agrees with the City that a long-term agreement for the delivery of potable water to the CECP is not required. Staff included the provision for a long-term potable water supply agreement in PSA Condition of Certification **SOIL&WATER-4** based on the applicant's proposed use of potable water as an emergency backup supply for CECP operation. In its PSA comments (SR 2009a, Pg 21), the applicant believes that an emergency backup water supply is unnecessary and that short interruptions of the industrial water supply can be managed by drawing down storage in on-site tanks. Therefore, the requirement that the project owner enter into a long-term potable water supply agreement with the City is unnecessary and has been removed from Condition of Certification **SOIL&WATER-4** (FSA Condition of Certification **SOIL&WATER-5**).

City-4 The City recommends that the project owner be required to obtain a new SDRWQCB permit to continue operating the ocean-water purification system after the EPS is deactivated.

Response: Staff believes that the City is referring to the permit requirements of the Clean Water Act, section 316(b) Phase I regulations for power plant facilities that use cooling water intake structures. Staff believes that conditioning a 316(b) Phase I permit prior to the retirement of all EPS units is unnecessary. Future CECP operation that is dependent on using the EPS once-through cooling water infrastructure after the retirement of EPS Units 4 and 5 would represent a project change to the CECP certification, and would require that the project owner – if and when this scenario were to occur – to submit an amendment petition to the Energy Commission. Based on the petition's proposed change in CECP operation, staff would at that time evaluate the proposal for compliance with current LORS.

City-5 The City believes it is important to verify the ability of the project owner to use desalinated water prior to construction, and requests that Condition of Certification **SOIL&WATER-3** require the project owner to provide proof of the SDRWQCB permit.

Response: Condition of Certification **SOIL&WATER-3** (FSA Condition of Certification **SOIL&WATER-4**) requires the project owner to submit to the CPM a copy of an approved Waste Discharge Requirement Order (discharge order) issued by the SDRWQCB prior to operation of the ocean-water purification system. Water quality degradation is regulated by the National Pollutant Discharge Elimination System (NPDES) program under the Federal Clean Water Act (CWA). The SDRWQCB is responsible for the administration of the CWA in San Diego County and does not require the issuance of a discharge order prior to the start of construction. In recognition of the SDRWQCB authority to issue the discharge order, Condition of Certification **SOIL&WATER-3** (FSA Condition of Certification **SOIL&WATER-4**) requires that the project owner be in possession of the discharge order prior to operation of the ocean-water purification system and subsequent wastewater discharge to the Pacific Ocean.

City-6 Wastewater (non-industrial) amount seems high (62 million gallons per year as identified on pg 4.9-14 of the PSA). Please clarify this amount.

Response: The 62 million gallons per year (mgy) is the combined sanitary (6.3 mgy) and recycled wastewater (56 mgy) volume that the applicant expects to discharge to the City's sewer system if recycled water is used exclusively as the CECP industrial water source (CECP 2007a, Table 5.15-4).

City-7 Please clarify if the CECP would need to amend their lease with the State Lands Commission, and if so, how this process will be coordinated.

Response: State Lands Commission staff will review any pertinent, germane lease amendment application regarding the CECP and its use of EPS facilities following Energy Commission certification.

City-8 Please change Condition of Certification **SOIL&WATER-4** to reflect the City's commitment to provide potable water for domestic and sanitary purposes in the amount of approximately 2 AFY, with no long-term contract.

Response: Staff has specified that the project owner comply with Municipal Code Title 14, Chapter14.08 for the supply and use of potable water in Condition of Certification **SOIL&WATER-5** (PSA Condition of Certification **SOIL&WATER-4**). As a municipal utility, the City is required to delivery potable water to all municipal and industrial customers under arrangements similar for all customers. Municipal Code Title 14, Chapter14.08 provides the City the authority to meter the use of potable water at the CECP and to enforce its Water Conservation Program in accordance with City Ordinance No. 35. To specify a limit (2 AFY) on CECP potable water consumption in Condition of Certification **SOIL&WATER-5** is unnecessary. The provision for a long-term contract has been removed from the condition.

City 9 Please require independent monitoring of waste streams for the CECP and the Poseidon Desalination Plant.

Response: As a requirement of its WDR Order, both the CECP and the Poseidon Desalination Plant would have to submit monthly, semiannual, and annual monitoring reports to the SDRWQCB. Monitoring would be conducted according to guidelines established under the CWA. Staff believes that those monitoring guidelines to be protective of soil and water resources, and the need for independent monitoring of CECP waste streams to be duplicative and unnecessary.

APPLICANT (CECP)

The following are staff's responses to the Carlsbad Energy Center LLC's (applicant) Soil and Water Resources comments submitted by letter dated January 30, 2009 (SR 2009a). The applicant's comments are paraphrased.

Applicant-1 The FSA should include an analysis of both recycled and ocean-water purification water sources for the CECP.

Response: The proposed use of recycled and desalinated water and their corresponding discharge streams is evaluated in this final assessment.

Applicant-2 There is an inaccurate statement under the "Wastewater' heading that "CECP would generate approximately 62 million gallons per day (mgd) of sanitary wastewater.

Response: Staff has corrected this error in the Desalinated and Sanitary Wastewater section of this assessment. As proposed by the applicant, the CECP would generate approximately 12 gallons per minute of sanitary wastewater (CECP 2007a, Table 5.15-4 and SR2008h, Revised Figures 2.2-6a & b).

Applicant-3 Proposed Conditions of Certification **SOIL&WATER-1 and -2** require that the Construction SWPPP and Industrial SWPPP be reviewed by the City of Carlsbad. Applicant proposes minor revisions to proposed Conditions of Certification **SOIL&WATER-1 and -2** as follows:

SOIL&WATER-1: The project owner shall comply with the requirements of the National Pollutant Discharge Elimination System (NPDES) Permit for Discharges of Storm Water Associated with Construction Activity. The project owner shall develop and implement a Storm Water Pollution Prevention Plan (construction SWPPP) for the construction of the CECP site, laydown and parking areas, and all linear facilities. The construction SWPPP shall be **provided to the City of Carlsbad for review** ~~reviewed and approved by the City of Carlsbad (City)~~ and shall include a Storm Water Management Plan (SWMP) per the requirements of San Diego Regional Water Quality Control Board (SDRWQCB) Order No. R9-2007-0001 and the City's Municipal Code Title 15, Chapter 15.12.

SOIL&WATER-2: The project owner shall comply with the requirements of the NPDES Permit for Discharges of Storm Water Associated with Industrial Activity. The project owner shall develop and implement a Storm Water Pollution Prevention Plan (industrial SWPPP) for the operation of CECP. The industrial SWPPP shall be **provided to the City of Carlsbad for review** ~~reviewed and approved by the City of Carlsbad (City)~~ and shall include a Storm Water Management Plan (SWMP) in accordance with the requirements of San Diego Regional Water Quality Control Board (SDRWQCB) Order No. R9-2007-0001 and the City's Municipal Code Title 15, Chapter 15.12.

Response: As a Co-Permittee of Order No. R9-2007-0001, the City must comply with waste discharge requirements promulgated by Section 402(p) of the Clean Water Act. The Energy Commission cannot override federal law and the City's legal authority to implement and enforce the provisions of Order No. R9-2007-0001 and the requirements of its Storm Water Standards Manual. Therefore, the requested changes to Conditions of Certification **SOIL&WATER-1 and -2** cannot be made. (Condition of Certification **SOIL&WATER-2** has been renumbered as **SOIL&WATER-3**).

In order to add clarity to Condition of Certification **SOIL&WATER-1**, staff has specified that a Tier 3 Construction SWPPP be prepared per the requirements of the City's 2008 Storm Water Standards Manual. The 2008 manual was revised to meet the provisions of Order No. R9-2007-0001 and the City's responsibilities for enforcing its local storm water management and discharge ordinance. Staff has also revised Condition of Certification **SOIL&WATER-2** (FSA Condition of Certification **SOIL&WATER-3**) and has removed the requirement that a Storm Water Management Plan (SWMP) be submitted with the Industrial SWPPP. The City requires a SWMP to be submitted prior to construction. Therefore, its submittal after CECP construction is completed is unnecessary.

Applicant-4 Proposed Condition of Certification **SOIL&WATER-4** discusses potable water as an emergency backup supply in the event of an ocean water supply interruption. The applicant does not agree that this requirement is necessary or appropriate because the CECP would have a connection to the Encina Power Station's potable water system. However, a small interruption in water supply can be managed by drawing down storage in on-site tanks, and if the duration of an interruption exceeds the capacity of the on-site storage system, CECP would not operate. If the water supply

system and backup storage water from the system become unavailable, there is no reliability or safety issue involved.
Hence, a backup water supply in not a critical component of the system. For this reason, Applicant requests that the emergency backup provisions of Condition of Certification **SOIL&WATER-4** be deleted.

Response: The requirement that the project owner enter into a long-term potable water supply agreement in order to meet CECP's operational requirements in the event on an ocean water supply interruption has been removed from Condition of Certification **SOIL&WATER-4** (FSA Condition of Certification **SOIL&WATER-5**). Staff considers the lack of a proposed backup water supply a reliability issue, which is evaluated in the **POWER PLANT RELIABILITY** section of this FSA.

Applicant-5 Proposed Condition of Certification **SOIL&WATER-4** also includes a requirement that potable water not be used for any construction or operation activity that is suitable for non-potable water use. Applicant requests that this requirement be amended, and that potable water be allowed for construction purposes as proposed unless recycled water is available at the site. In the event recycled water is available during construction, Applicant will use it if feasible.

Response: The applicant has not provided a discussion of the feasibility of using other on-site water sources for construction activities (seawater or groundwater). In its Data Adequacy Response 2 (CH2MHILL 2007, section 5.14 response 2), the applicant suggests that it is possible that water trucks could drive to a nearby recycled water connection point for filling. Staff believes that alternative construction water sources have not been sufficiently evaluated to justify the use of potable water for those construction activities that do not require potable water.

As stated in this assessment, the use of potable water for construction activities when water of lesser quality is available is a violation of Article X of the State Constitution. The CECP would be constructed in an area of limited potable water supply, and its use as a construction water source is a violation of state law and is incompatible with the City's water conservation ordinance (Ordinance No. 35). For these reasons, staff requires the use of a non-potable water source for those construction activities that do not require potable water. To assist in compliance monitoring, staff has removed this requirement for a non-potable construction water supply from Condition of Certification **SOIL&WATER-4** (FSA Condition of Certification **SOIL&WATER-5**) and included this requirement as the new and separate Condition of Certification **SOIL&WATER-2**.

CONCLUSIONS

Staff has not identified any immitigable significant impacts to soil and water resources provided all proposed conditions of certification are met. By complying with the conditions, the impact to soil and water resources from CECP construction and operation would be less than significant and would comply with all applicable soil and water resources LORS. Potentially significant impacts would be mitigated through the preparation and implementation of various construction and operation plans, which, if not implemented, could result in soil erosion, contamination to surface and groundwater, or non-compliance with wastewater treatment and discharge requirements.

Existing soil contamination at the CECP site represents the most significant potential threat to soil and water resources from construction of the proposed CECP. At this time, the full extent of soil contamination is unknown, but contaminated soil remediation would be completed prior to the start of construction activities as required by Condition of Certification **WASTE-1**. Staff believes that the development and implementation of the Tier 3 Construction Storm Water Pollution Prevention Plan would prevent the off-site migration of any remaining contaminants by wind or water transport. Condition of Certification **SOIL&WATER-1** would serve to mitigate potentially significant impacts to soil and water resources from the off-site migration of pollutants.

Upon the successful commercial operations of the new CECP generating units, the existing steam boiler Units 1, 2, and 3 at the EPS would be retired. The retirements would create substantial environmental benefits from the elimination of the 225 million gallons per day of cooling water (seawater) intake for Units 1 through 3 and the resulting decrease in impingement and entrainment of marine organisms. The cessation of wastewater discharge to the Pacific Ocean from Units 1 through 3 would also be beneficial to the marine environment.

PROPOSED CONDITIONS OF CERTIFICATION

SOIL&WATER-1: The project owner shall comply with the requirements of the San Diego County Municipal Storm Water Permit (Order R9-2007-0001, NPDES No CAS0108758) and City of Carlsbad (City) Municipal Code Title 15, Chapter 15.12. The project owner shall develop and implement a Tier 3 Construction Storm Water Pollution Prevention Plan (Construction SWPPP) for the construction of the CECP site, laydown and parking areas, and all linear facilities. The Tier 3 Construction SWPPP shall be reviewed and approved by the City and shall contain all of the elements required by the General Permit for Construction Activities (WQO-99-08-DQM), the Municipal Permit (Order R9-2007-0001), and the City's current Storm Water Standards Manual.

Verification: Prior to site mobilization, the project owner shall submit to the Compliance Project Manager (CPM) a copy of the Tier 3 Construction SWPPP that has been reviewed and approved by the City and retain a copy on site.

The project owner shall submit to the CPM all copies of correspondence between the project owner and the City regarding the Tier 3 Construction SWPPP within 10 days of its receipt or submittal. This information shall include copies of the Notice of Intent and Notice of Termination submitted to the State Water Resources Control Board for enrollment under the NPDES General Permit for Construction Activities.

SOIL&WATER-2: Potable water shall not be used for any construction activity that is suitable for non-potable water use. Prior to the use of non-potable water for construction, the project owner shall submit to the CPM a Non-Potable Construction Water Use Plan (plan) for the supply and use of non-potable water.

Verification: Prior to site mobilization, the project owner shall submit to the CPM for review and approval a plan for the procurement or on-site development of a non-potable construction water supply. Within the plan, the project owner shall specify those construction activities that would use non-potable water and those construction activities that would use potable water.

Within the Monthly Compliance Report, the project owner shall report the volume of potable and non-potable water used and the construction activities it was used.

SOIL&WATER-3: The project owner shall comply with the requirements of the San Diego County Municipal Storm Water Permit (Order R9-2007-0001, NPDES No CAS0108758) and City of Carlsbad (City) Municipal Code Title 15, Chapter 15.12. The project owner shall develop and implement a Storm Water Pollution Prevention Plan (Industrial SWPPP) for the operation of CECP. The industrial SWPPP shall be reviewed and approved by the City and shall be prepared in accordance with the requirements of the NPDES General Permit for Industrial Activities (WQO-97-03-DQM) and the City's Storm Water Standards Manual.

Verification: Prior to commercial operation, the project owner shall submit to the CPM a copy of the Industrial SWPPP and retain a copy on site.

The project owner shall submit to the CPM all copies of all correspondence between the project owner and the City regarding the Industrial SWPPP within 10 days of its receipt or submittal. This information shall include a copy of the Notice of Intent submitted to the State Water Resources Control Board for enrollment under the NPDES General Permit for Industrial Activity.

SOIL&WATER-4: The project owner shall submit to the San Diego Regional Water Quality Control Board (SDRWQCB) all information required by the SDRWQCB to obtain a Waste Discharge Requirements (WDR) Order for the discharge of CECP industrial wastewater to the Pacific Ocean. The project owner shall submit to the CPM all copies of correspondence between the project owner and the SDRWQCB regarding the WDR Order within 10 days of its receipt or submittal.

Verification: At least two weeks prior to the operation of the CECP ocean-water purification system, the project owner shall submit to the CPM a copy of the approved WDR Order for the discharge of CECP industrial wastewater to the Pacific Ocean.

The project owner shall submit to the CPM the annual water quality monitoring report required by the SDRWQCB in the annual compliance report. The project owner shall notify the CPM of all WDR Order violations, the actions taken or planned to bring the project back into compliance with the WDR Order, and the date compliance was reestablished.

SOIL&WATER-5: Prior to the use of potable water from the City of Carlsbad (City) for any purpose related to the construction or operation of the CECP, the project owner shall provide the CPM with copies of all permit(s) for the delivery and hookup of potable water. The project owner shall comply with the City's Municipal Code Title 14, Chapter14.08 for the supply and use of potable water. Potable water shall not be used for any construction or operation activity that is suitable for non-potable water use.

Verification: No later than 30 days prior to the connection to the City's potable water system, the project owner shall provide the CPM with copies of all permits for the delivery and hookup of potable water.

The project owner shall submit to the CPM any water quality monitoring reports required by the City in the annual compliance report. The project owner shall notify the CPM of any violations of the permit(s) and conditions, the actions taken or planned to bring the project back into compliance with the permit(s), and the date compliance was reestablished.

SOIL&WATER-6: Prior to the use of potable, recycled, or ocean water during the operation of the CECP, 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 all water sources used by the CECP. The metering devices shall be operational for the life of the project, and an annual summary of daily water use by the CECP, differentiating between potable, recycled, and ocean 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 CECP operation, the project owner shall submit to the CPM evidence that metering devices have been installed and are operational on all water supply 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, recycled, and ocean water. The report shall include calculated monthly range, monthly average, and annual use by the project in both gallons per minute and acre-feet. After the first year and for subsequent

years, this information shall also include the yearly range and yearly average potable and ocean water used by the project.

SOIL&WATER-7: Prior to connection to the City of Carlsbad's (City) sanitary sewer system, the project owner shall submit to the City all information and documentation required to satisfy City of Carlsbad Municipal Code Title 13, Chapters13.04, 13.10, and 13.16 for the discharge of recycled and sanitary wastewater to the City's sewer system. During CECP operation, any monitoring reports provided to the City 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 Municipal Code Title 13, Chapters13.04, 13.10, and 13.16 and provide the CPM a copy of the City permits for the discharge of recycled and sanitary wastewater to the City's sewer system.

During operations, the project owner shall submit to the CPM any wastewater quality monitoring reports required by the City in the annual compliance report. The project owner shall submit any notices of violation from the City to the CPM within 10 days of receipt and fully explain the corrective actions taken in the annual compliance report.

SOIL&WATER-8: The project owner shall provide the CPM two copies of the executed Recycled Water Purchase Agreement (agreement) with the recycled water producer and the City of Carlsbad (City) for the long-term supply (30 – 35 years) and delivery of tertiary treated recycled water to the CECP. The CECP shall not connect to the City's recycled water pipeline without the final agreement in place. 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 180 days prior to the connection to the City's recycled water pipeline, the project owner shall submit two copies of the executed agreement for the long-term supply and delivery of tertiary treated recycled water to the CECP. The agreement shall specify a maximum delivery rate of 840 gpm and shall specify all terms and costs for the delivery and use of recycled water by the CECP.

No later than 60 days prior to connection to the City's recycled water pipeline, 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 and all water reuse requirements issued by the San Diego Regional Water Quality Control Board.

REFERENCES

EWA 2001 – Encina Wastewater Authority. *Encina Wastewater Authority Source Control Program Permit Guidance Manual*, August 2001.

CEC 2009a – California Energy Commission/P. Kramer (tn: 50026). Committee Order Denying City of Carlsbad Motion for Staff Revised PSA, February 9, 2009.

CECP 2007a – Carlsbad Energy Center Project/T. Hemig (tn: 42299). Application for Certification for the Carlsbad Energy Center Project, September 11, 2007.

CH2MHILL 2007 – CH2MHILL/R. Mason (tn: 42984). CECP Data Adequacy Supplement A, October 24, 2007.

CH2MHILL 2007b – CH2M HILL/R. Mason (tn: 43837). Complete 437 page Data Response Set 1, #1-73, December 20, 2007.

COC 2007a – City of Carlsbad / Planning Department/C. DeCarlo (tn:43085). Letter re: Issues of Concern, October 24, 2007.

COC 2008p – City of Carlsbad. Engineering Standards, Volume 4, *Storm Water Standards Manual 2008 Edition*.

COC 2009a – City of Carlsbad/J. Garuba. City of Carlsbad Comments on Preliminary Staff Assessment of Carlsbad Energy Center Project, January 30, 2009.

CURE 2009a – California Unions for Reliable Energy/G.D. Smith. Comments on the Preliminary Staff Assessment for the Carlsbad Energy Center Project, January 30, 2009.

SR 2008c – Stoel Rives/M. Foster (tn: 46070). Site Preparation and Construction Stormwater Management and Pollution Prevention Plan, April 29, 2008.

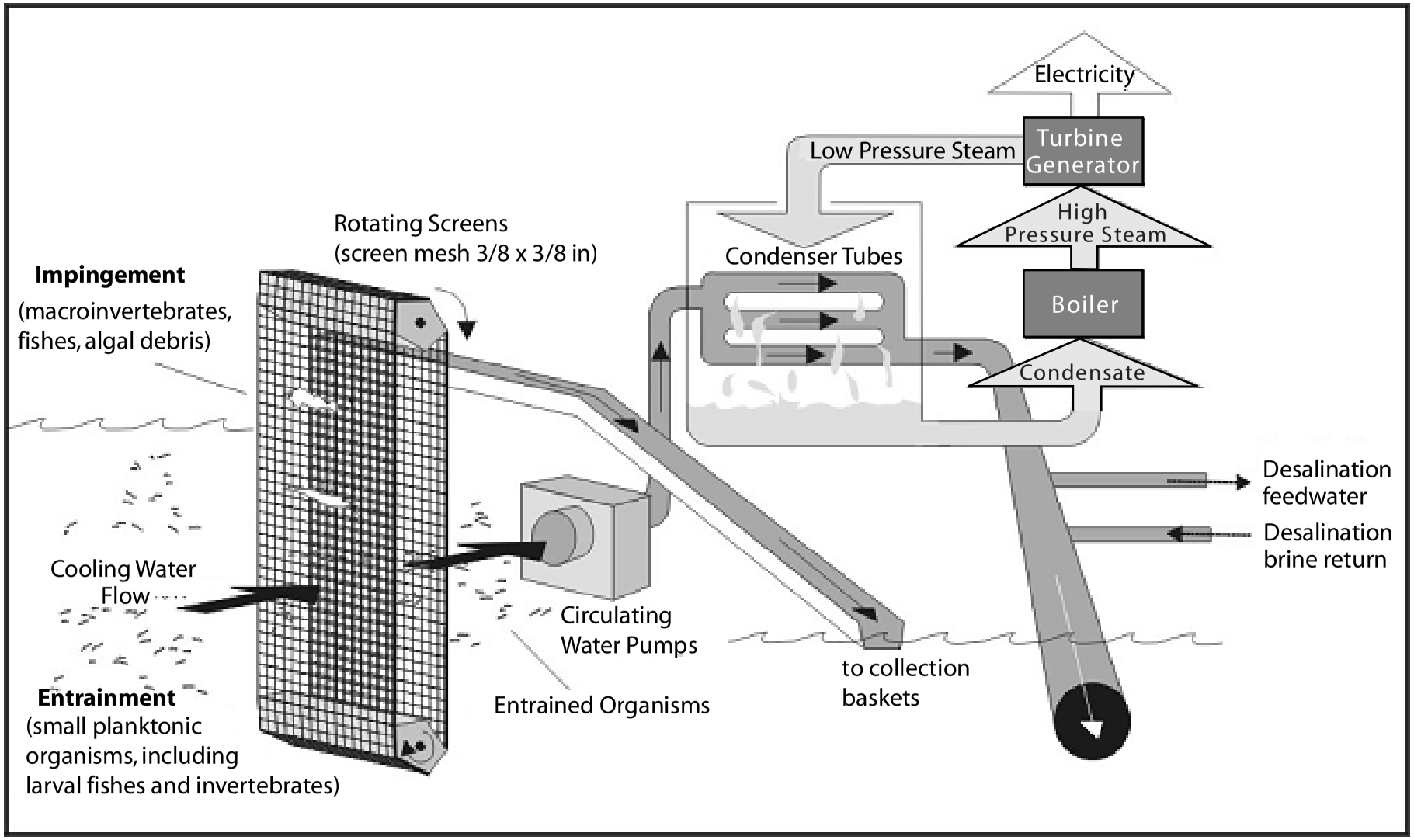
SR 2008h – Stoel Rives/J McKinsey (tn: 47257). Project Enhancement and Refinement Document (12 copies); Effects on Bio Resources of Agua Hedionda Lagoon (4 copies); Revised AQ Modeling Files (6 CDs); California Independent System Operator Study Report, July 25, 2008.

SR 2008j2 – Stoel Rives/K Hellwig (tn: 47586). National Pollutant Discharge Elimination System Permit Application submitted to the San Diego Regional Water Quality Control Board, August 15, 2008.

SR 2009a– Stoel Rives/J. McKenzie. Applicant's Comments to Preliminary Staff Assessment, January 30, 2009.

SOIL AND WATER - FIGURE AA

Carlsbad Energy Center Project - Generating Station's once-through circulating water system with desalination feedwater supply and return



SOURCE: 2009 Carlsbad Desalination Project Figure ES-1

TRAFFIC AND TRANSPORTATION

Testimony of Scott Debauche

SUMMARY OF CONCLUSIONS

Staff has analyzed the traffic-related information provided in the Application for Certification (AFC) and other sources to determine the potential for the Carlsbad Energy Center Project (CECP) to have significant adverse traffic- and transportation-related impacts. Staff has also assessed the availability of mitigation measures that could reduce or eliminate the significance of these impacts.

Construction of the CECP will add traffic to local roadways during the construction period. This increase in traffic could impact existing traffic load and capacity of the street system. In addition, construction activities could result in impacts to emergency access and parking capacity, encroachment on public transportation and pedestrian facilities, and introduce oversize and overweight vehicles on the local street system. Once the CECP is operational, traffic volumes generated from it would be minimal and insignificant on the local transportation network; however, project exhaust turbines and air cooler plumes could pose aviation hazards to low-flying aircraft using McClellan-Palomar Airport. If the California Energy Commission elects to grant certification for this project, staff is proposing six conditions of certification. These conditions of certification are recommended to prevent significant adverse traffic and transportation-related impacts from CECP construction and operation and to ensure that the project would result in less-than-significant impacts and would comply with all applicable laws, ordinances, regulations, and standards (LORS) pertaining to traffic and transportation. Energy Commission staff concludes that with implementation of proposed Conditions of Certification **TRANS-1** through **TRANS-6,** the CECP would not generate a significant impact under the California Environmental Quality Act (CEQA) guidelines with respect to CEQA Appendix G issues, “Transportation and Traffic.”

INTRODUCTION

In the **Traffic and Transportation** section, staff addresses the extent to which the proposed CECP may affect the traffic and transportation system within the vicinity of the project site. This analysis focuses on whether construction and operation of the CECP would cause traffic and transportation impact(s) under CEQA and whether the project complies with the applicable LORS.

LAWS, ORDINANCES, REGULATION, AND STANDARDS

Traffic and Transportation Table 1 provides a general description of adopted federal, state, and local LORS pertaining to traffic and transportation relevant to the proposed project.

Traffic and Transportation Table 1
Laws, Ordinances, Regulations, and Standards

Applicable Law	Description
Federal	
Aeronautics and Space Title 14 Code of Federal Regulations (CFR), part 77 Objects Affecting Navigable Airspace (14 CFR 77)	Establishes standards for determining physical obstructions to navigable airspace; sets noticing and hearing requirements; and provides for aeronautical studies to determine the effect of physical obstructions on the safe and efficient use of airspace.
49 CFR, Subtitle B	Includes procedures and regulations pertaining to interstate and intrastate transport (including hazardous materials program procedures) and provides safety measures for motor carriers and motor vehicles that operate on public highways.
State	
California Vehicle Code (CVC), 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	
San Diego County Department of Public Works	Requires a permit for moving any extra-legal load which is overweight and/or oversize.
City of Carlsbad Municipal Code	Requires a permit to transport oversize/overweight loads on city roads.

SETTING

The proposed CECP site is located at the north and eastern end of the existing Encina Power Station (EPS) in the city of Carlsbad. The approximately 23-acre CECP site would be located to the east of the existing railroad tracks that bisect the EPS. The site address is 4600 Carlsbad Boulevard. Within the existing Encina Power Station, approximately three acres would be used for construction parking, and approximately seven acres would be used for construction laydown. The CECP site is surrounded to the north by the Agua Hedionda Lagoon, to the east by Interstate 5 (I-5), to the south by the San Diego Gas & Electric (SDG&E) Cannon Substation, and to the west by the north/south transept of the Atchison, Topeka and Santa Fe (AT&SF) Railway/North County Transit District (NCTD) Rail Corridor.

The Encina Power Station has been in operation as a power generation station since 1954 with no material change in the land use of the site (CECP 2007, p. 5.6-1). Surrounding land uses include open space, agriculture, Pacific Ocean public beaches, residential communities and transportation corridors. To the north of the proposed site within Agua Hedionda Lagoon is the Carlsbad Aqua Farm, adjacent to the lagoon's southern shore. This area also houses the Hubbs Sea World Research Institute and fish hatchery (CECP 2007, p. 5.6-2).

CRITICAL ROADS AND FREEWAYS

The CECP site is located north of the intersection of Carlsbad Boulevard and Cannon Road. Primary site access for construction workers and operations employees would be from Cannon Road to Carlsbad Boulevard and through the Encina Power Station's front gate. Primary project-related construction truck deliveries would be from Avenida Encinas at Cannon Road to avoid crossing adjacent rail lines. The project site is bordered by Carlsbad Boulevard to the west, Cannon Road to the south, and I-5 to the east. The area to the north of the Encina Power Station and the CECP site is Agua Hedionda lagoon. South of Cannon Road is the Terramar residential community.

Existing Regional and Local Transportation Facilities

The surrounding regional and local roadway networks are shown in **Traffic and Transportation Figures 1** and **2**, respectively. The location of the project site is shown on both figures. Regional access to the CECP site is provided from the south and the north via I-5. Both Cannon Road and Carlsbad Boulevard provide local access to the project site. The following describes the roadways that would be used for the proposed CECP.

Interstate 5

I-5 is a major north-south freeway that extends from the Mexican Border to the Canadian border, going through California, Oregon, and Washington states. Access to the CECP site from I-5 is provided via the Cannon Road exit. In the vicinity of the CECP site, I-5 has four lanes in each direction. According to the most recently published traffic counts published by the California Department of Transportation (Caltrans) for the I-5 segment adjacent the CECP site, I-5 carried approximately 206,000 average daily vehicle trips in 2006 (CECP 2007, p. 5.12-7). Truck traffic accounts for approximately 4.8 percent of all trips on I-5 in the vicinity of Cannon Road (CECP 2007, p. 5.12-7).

Cannon Road

Cannon Road is an east-west roadway that connects the CECP site to I-5. It is an undivided arterial that has two lanes in each direction. Cannon Road is directly south of the CECP site and it provides access to the proposed site for drivers from I-5. According to the city of Carlsbad General Plan, Cannon Road is classified as a major arterial. As described in the city of Carlsbad's General Plan, major arterials typically limit access to adjacent properties and enable circulation within the city, as well as provide connection to regional roadways and freeways.

Carlsbad Boulevard

Carlsbad Boulevard is a north-south roadway that connects the CECP site to Cannon Road to the south and Tamarack Avenue to the north. Carlsbad Boulevard is a divided arterial that has two lanes in each direction. According to the city of Carlsbad General Plan, Carlsbad Boulevard is considered a major arterial.

Current Roadway Conditions

The roadways discussion below is based on information contained in the Traffic and Transportation section of the AFC, as well as traffic data from the California Department of Transportation (Caltrans).

Level of Service

To quantify the existing baseline traffic conditions, the study area roadways and intersections were analyzed in the AFC to determine their operating conditions. Based on the traffic volumes, the turning movement counts, and the existing number of lanes at each intersection, the volume/capacity (V/C) ratios and levels of service (LOS) have been determined for each intersection.

LOS is a qualitative measure describing operational conditions within a traffic stream. It 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 Caltrans *Highway Capacity Manual* (HCM) defines six levels of service for roadways or intersections ranging from LOS A, which represents the best operating conditions, to LOS F, which represents the worst.

The city of Carlsbad uses the LOS criteria, as defined by the 2000 HCM, to assess the performance of its street and highway system and the capacity of roadways. The requirements are specified in the Citywide Facilities and Improvements Plan. No roadways in the project study area may fall below a level D during peak hours (6:30 a.m. – 8:30 a.m. and 3:30 p.m. to 5:30 p.m.) and LOS C during off-peak hours. **Traffic and Transportation Table 2** summarizes the city of Carlsbad LOS levels for V/C ratio determinations for roadways.

Traffic and Transportation Table 2
Level of Service Criteria for Roadways

Level of Service	Volume/Capacity	Description
A	0.00 – 0.60	Free flow; insignificant delays
B	0.61 – 0.70	Stable operation; minimal delays
C	0.71 – 0.80	Stable operation; acceptable delays
D	0.81 – 0.90	Approaching unstable flow; queues develop rapidly but no excessive delays
E	0.91 – 1.00	Unstable operation; significant delays
F	> 1.00	Forced flow; jammed conditions

Source: CECP 2007, p. 5.12-8

For city of Carlsbad intersections, LOS C during off-peak hours (delays of 20 to 35 seconds) is considered to be the limit of acceptable delay. LOS F represents the worst condition with gridlock and is typically unacceptable. **Traffic and Transportation Table 3** summarizes the city of Carlsbad LOS levels determinations for intersections based on delay times.

Traffic and Transportation Table 3
Level of Service Criteria for Intersections

Level of Service	Signalized Intersection Delay Per Vehicle (in Seconds)
A	≤ 10.0
B	>10.0 and ≤ 20.0
C	> 20.0 and ≤ 35.0
D	> 35.0 and ≤ 55.0
E	> 55.0 and ≤ 80.0
F	> 80.0

Source: CECP 2007, p. 5.12-10

Existing Conditions — Roadways

This analysis focuses on the following study area roadway segments during a typical weekday.

- Cannon Road between I-5 southbound ramps and Avenida Encinas
- Cannon Road between Avenida Encinas and Carlsbad Boulevard

Carlsbad Boulevard between Cannon Road and the project site **Traffic and Transportation Table 4** summarizes the existing (2007) daily traffic volumes and V/C ratios for the area roadway segments. For purposes of this analysis, the daily capacity for LOS E was utilized to determine the LOS along these roadway segments. As shown in **Traffic and Transportation Table 4**, the study area roadway segments currently operate at LOS C or better.

Traffic and Transportation Table 4
Current (2007) Daily Traffic Volumes and Volume/Capacity Ratios for Roadway Segments

Roadway Segment	Street Classification	Lanes	Capacity (LOS E)	Volume (2007 Estimates)	V/C	LOS
Cannon Rd (I-5 SB Ramps & Avenida Encinas)	Major Arterial	4	30,000	13,600	0.45	A
Cannon Rd (Avenida Encinas & Carlsbad Blvd)	Major Arterial	4	30,000	7,950	0.27	A
Carlsbad Blvd (Cannon Rd & CECP)	Major Arterial	4	30,000	23,600	0.79	C

Source: CECP 2007, p. 5.12-9
LOS: level of service; V/C: volume/capacity.

Current Conditions — Intersections

The study area analyzed in this report includes the following signalized intersections:

- • I-5 northbound ramps/Cannon Road
- • I-5 southbound ramps/Cannon Road
- • Avenida Encinas/Cannon Road
- • Carlsbad Boulevard/Cannon Road

No intersections east of I-5 were analyzed since it is assumed that project construction- and operation- related traffic would only access the project site using Cannon Road from I-5 northbound and southbound ramps to Avenida Encinas or Carlsbad Boulevard. Figure 5.12-4 of the AFC (CECP 2007, p. 5.6-30) presents the existing morning and afternoon peak hours' turning movement counts for the intersections within the study corridor. **Traffic and Transportation Table 5** summarizes the results of the existing morning and afternoon peak-hour LOS analysis for the study area intersections. All study area intersections currently operate at LOS C or better in the morning and afternoon peak hour.

Traffic and Transportation Table 5
Existing (2007) Intersection Level of Service Summary

Intersection	AM Peak Hour		PM Peak Hour	
	Delay (sec)	LOS	Delay (sec)	LOS
I-5 northbound ramps/Cannon Rd	10.6	B	11.2	B
I-5 southbound ramps/Cannon Rd	16.7	B	13.8	B
Avenida Encinas/Cannon Rd	15.3	B*	14.7	B*
Carlsbad Blvd/Cannon Rd	16.6	B	27.8	C

Source: CECP 2007, p. 5.12-11

* Analysis scenario without accounting for trains. The NCTD rail lines run north-south, just west of Avenida Encinas. With trains clearing the rail crossing within a few seconds (average speed of 60 mph) and the guard gates going up to their initial position within less than a minute, the delays at the Avenida Encinas and Cannon Road intersection are not anticipated to be significant.

RAILWAYS

The San Diego Northern Railway (SDNR), a subsidiary of NCTD, owns the train tracks to the west of the CECP site, running north/south just west of Avenida Encinas. Amtrak, Coaster, and Burlington Northern Santa Fe (BNSF) use these tracks. Amtrak runs the Pacific Surfliner (previously the San Diegan) from San Luis Obispo to San Diego. The Los Angeles to San Diego portion of this line is the second busiest rail route in the Amtrak system. Amtrak runs approximately one train per hour per day (12 daily roundtrips) on this line. BNSF runs freight trains along this rail line. Most of the freight traffic takes place at night.

In addition to these uses, Transit America operates the Coaster, a regional commuter train service, primarily during weekday peak periods. However, the Coaster has limited service in the middle of the day during the weekdays, on Friday evenings, and on Saturdays. In addition, the Coaster runs special evening service when the San Diego Padres baseball team plays evening home games Monday through Thursday.

BUS TRANSPORTATION

In addition to the Coaster commuter rail line described above, NCTD provides bus service in the city of Carlsbad. Bus routes serving Carlsbad include Route 301 (from Oceanside to San Diego University Towne, running on Carlsbad Boulevard near the project site), Express Route 310 (from Plaza Camino Real to northern San Diego, running on I-5 in the vicinity of the CECP site), Route 321 (from Poinsettia station along I-5 to Carlsbad Village), and Route 344 (from South Carlsbad to San Marcos, running on Carlsbad Boulevard and Cannon Road near the CECP site) (CECP 2007, pp. 5.12-12 & 13).- In addition, the Carlsbad Unified School District (CUSD) Jefferson Elementary School is located approximately one mile from the CECP site. Due to the proximity of this school to the CECP project site and the overall residential nature of the project area, school bus service could have stops along CECP project area streets.

BICYCLES AND PEDESTRIANS

The CECP site is located in a high pedestrian use area. The CUSD Jefferson Elementary School is located approximately one mile from the CECP site. Students walking to Jefferson Elementary School frequently use public sidewalks in the CECP site vicinity. In addition, a public beach is to the west of the CECP site, across Carlsbad Boulevard. There is high pedestrian traffic in this area, especially during the summer months. Additionally, both bike lanes and sidewalks exist along Cannon Road and Carlsbad Boulevard. Also, a regional coastal rail trail and sea wall path are planned for the future for Avenida Encinas, and a planned unpaved open space trail will be located near the CECP site.

AIRPORTS

The closest airport to the CECP site is the McClellan-Palomar Airport located approximately 2.5 miles to the east. The McClellan-Palomar Airport is a general aviation airport with one runway. This airport is closed to air carrier operations with more than nine passenger seats between 10:30 p.m. and 6:00 a.m. except by prior permission. For the one-year time frame ending December 31, 2006, the McClellan-Palomar Airport handled approximately 554 operations a day (AirNav 2008a). Types of aircraft that use the airport include single and multi-engine aircraft such as Cessnas, Cherokees, jets, and helicopters (CEC 2008). Both departures and landings from the McClellan Palomar Airport observe a *right-turn* flight path to avoid residential receptors located to the southwest of the airport as part of the existing airport noise abatement regulations (Aspen 2008a). The right-turn flight path of arriving and departing aircraft using the McClellan-Palomar Airport includes direct overflights of the existing Encina Power Plant and the proposed CECP site (Aspen 2008a).

For the McClellan-Palomar Airport, the normal recommended takeoff heading is 250 degrees (Aspen 2008b). This heading sends both departing and arriving aircraft over the existing Encina Power Plant and the proposed CECP site (CEC 2008). The recommended pattern altitude for small aircraft is 1,500 feet above ground level (AGL) and 2,000 feet AGL for large aircraft (CEC 2008). Airspace above the existing Encina Power Plant and proposed CECP site is located within a Visual Flight Rule (VFR) Flyway Zone, which parallels the Pacific Ocean coastline from the cities of Oceanside to Del Mar (Aspen 2008b). The published altitude within this Flyway Zone is 6,500 feet and

below (Aspen 2008b). In addition to airport departure and arrival traffic over the existing Encina Power Plant and proposed CECP site, small aircraft pulling banner ads along coastline beaches and aircraft patrolling traffic conditions along Interstate I-5 regularly fly within the coastline Flyway Zone at altitudes below 1,500 feet AGL and regularly fly directly over the existing Encina Power Plant and proposed CECP site (Aspen 2008a).

The FAA provided data including the number of overflights within the airspace above the proposed CECP site for the month of June 2008. During the time period of June 1 through June 30, 2008, the FAA recorded 126 overflights and 49 near overflights of the proposed CECP site (FAA 2008b).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

To determine whether there is a potentially significant impact generated by a project, California Energy Commission (Energy Commission) staff reviews the project using the criteria found in the CEQA Guidelines Appendix G Environmental Checklist and applicable LORS utilized by other governmental agencies. Specifically, staff analyzed whether the proposed project would do the following:

- cause an increase in traffic that would be substantial in relation to the existing traffic load and capacity of the street system (i.e., would result in a substantial increase in either the number of vehicle trips, the volume-to-capacity ratio on roads, or congestion at intersections);
- exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways;
- result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks;
- substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment);
- result in inadequate emergency access;
- result in inadequate parking capacity, and;
- conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks).

DIRECT/INDIRECT IMPACTS AND MITIGATION

Roadway and Intersection Levels of Service

Construction Impacts and Mitigation

Based on the construction data provided within the AFC, over the full 15 months of construction required for the CECP, the number of daily construction workers in an average month (Month 7) and in a peak month (Month 13) would be approximately 291 and 357, respectively. The number of average and peak daily truck deliveries are approximately 16 and 28, respectively. Month 13 would be the critical construction

period when the highest total number of daily trips is anticipated. Therefore, estimated daily construction trips during Month 13 were used to determine potential impacts, as this would represent the worst-case construction traffic scenario. For purposes of this analysis, both the construction vehicle delivery and worker trips were converted to passenger car equivalent (PCE) trips consistent with the *Highway Capacity Manual* guidelines. A detailed breakdown of this determination and methodology is provided in the AFC (CECP 2007, pp. 5.6-15 and 16). **Traffic and Transportation Table 6** lists the estimate of total construction vehicle trip for the CECP that would be generated during the peak construction period.

Traffic and Transportation Table 6
Estimated Average and Peak Hour Trip Generation – Peak Construction Period

	Average Daily Trips	A.M. Peak Hour			P.M. Peak Hour		
		In	Out	Total	In	Out	Total
Total Construction Traffic in PCE	**695**[1]	**333**	**8**	**341**	**0**	**325**	**325**

Source: CECP 2007 p.5.12-16
[1]Total Average Daily Trips includes off-peak construction related trips

Based on the construction vehicle trip calculations presented in **Traffic and Transportation Table 6**, an analysis was conducted in the AFC to determine the impacts of these construction vehicle trips on current levels of service for study area roadways and intersections. **Traffic and Transportation Table 7** summarizes the current V/C ratios and LOS for roadway segments in the project vicinity that may be affected by the project during construction and compares them to V/C ratios and LOS anticipated with CECP construction vehicle traffic. As shown, the Carlsbad Boulevard segment near the proposed CECP site, Cannon Road and CECP, currently operates at LOS C and would be diminished to an LOS D with the addition of construction vehicle trips associated with the CECP. All other intersections near the CECP currently operate and would continue to operate at an LOS A.

Traffic and Transportation Table 7
Current Roadway Levels of Service and Levels Anticipated with Project

Roadway Segment	Capacity (veh/day)	Current			Construction Traffic	With Project		
		Volume	V/C	LOS		Volume	V/C	LOS
Cannon Rd (I-5 SB ramps & Avenida Encinas)	30,000	13,600	0.45	A	Construction workers: 650 (roundtrip) Truck Deliveries: 46 (roundtrip) PCE= 2.5	14,296	0.48	A
Cannon Rd (Avenida Encinas & Carlsbad Blvd)	30,000	7,950	0.27	A	Construction workers: 650 (roundtrip)	8,600	0.28	A
Carlsbad Blvd (Cannon Rd & CECP)	30,000	23,600	0.79	C	Construction workers: 650 (roundtrip)	24,250	0.81	**D**

Source: CECP 2007, p. 5.12-17
V/C: volume/capacity; LOS: levels of service.

Traffic and Transportation Table 8 identifies the current levels of service and the LOS anticipated with CECP construction vehicle traffic for critical intersections in the vicinity of the project, as well as the functioning characteristics of each intersection as presented by the applicant in the AFC (CECP 2007, p. 5.12-17). As shown, while construction vehicle trips would increase delay time, all intersections near the CECP would continue to operate at current LOS even with the addition of proposed CECP construction vehicle traffic.

Traffic and Transportation Table 8
Current Intersection Levels of Service and Levels Anticipated with Project

Intersection	Current				With Project			
	AM		PM		AM		PM	
	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
I-5 northbound ramps/Cannon Rd	10.6	B	11.2	B	14.1	B	14.7	B
I-5 southbound ramps/Cannon Rd	16.7	B	13.8	B	16.8	B	10.1	B
Avenida Encinas/Cannon Rd	15.3	B*	14.7	B*	14.0	B*	19.7	B*
Carlsbad Blvd/Cannon Rd	16.6	B	27.8	C	16.7	B	34.0	C

Source: CECP 2007, p. 5.12-17
*Analysis scenario without accounting for trains.

As shown in **Traffic and Transportation Tables 7** and **8**, construction traffic would not reduce the level of service of any study area intersections. Furthermore, construction traffic would not impact LOS on most of the project roadways. However, the LOS C would be reduced to an LOS D on Carlsbad Boulevard between Cannon Road and the CECP site. Therefore, staff is proposing Condition of Certification **TRANS-1,** which would require the applicant to prepare a Traffic Control Plan prior to construction in order to reduce the impact of a decreased LOS along this project roadway segment.

Operation Impacts and Mitigation

CECP operations would require on average 12 truck trips and a maximum of 32 truck trips per month to provide chemicals for the reverse osmosis water treatment facility (CECP 2007, p. 5.12-21). Therefore, the operations-related and maintenance-related traffic associated with the project is minimal and insignificant when added to major movements on freeways and local roadways. Therefore, staff finds that CECP project operations would have no impact on study area roadways or intersection LOS. Consequently, no operations-related mitigation measures are required.

San Diego County Congestion Management Plan

California State Proposition 111, passed by voters in 1990, established a requirement that urbanized areas prepare and regularly update a Congestion Management Program (CMP). The purpose of the CMP is to monitor the performance of the countywide transportation system, develop programs to address near-term and long-term congestion, and better integrate transportation and land use planning. The San Diego Association of Governments (SANDAG), as the designated Congestion Management

Agency for the San Diego region, must develop, adopt, and regularly update the CMP. As required by state legislation, the original CMP roadway system was defined in 1991, and consisted of freeways, state highways, and principal arterials. Since 1991, there have been a number of additions to the system, primarily new highways as they were opened.

The 2006 CMP roadway system consists of 704 route miles (measured from center-line), including 323 route miles of state freeways, 283 route miles of state highways, and 98 miles of CMP principal arterial roadways. A thorough review of the current CMP system was conducted for this analysis. The 2006 CMP update does not identify any of the roadways potentially affected by construction or operation of the CECP project as congestion management plan roadways (SANDAG 2006, CHP Exhibit 2-1, chapter 2, page 12). Therefore, no impacts to the CMP would occur from construction- or operational-related CECP project traffic. Consequently, no mitigation measures are required.

Airports

The closest airport to the CECP site is the McClellan-Palomar Airport located approximately 2.5 miles to the east. As described above in the environmental setting discussion of airports, aircraft using the existing flight pattern for the McClellan-Palomar Airport regularly fly over the CECP project site (Aspen 2008a, CEC 2008). The area above or near the existing Encina Power Station and proposed CECP site is a potentially hazardous area because of conflicts between aircraft entering downwind from the northwest and those departing to the west, northwest and turning right (crossing to the downwind leg) to enter downwind or leave the pattern (CEC 2008). There is also a concern that when the cloud or marine layer sinks and aircraft fly at lower and higher altitudes to avoid the marine layer, the visibility is reduced and aircraft collisions are more likely. The marine layer was a major factor in the Duchess/Mooney plane collision in the airspace near the existing Encina Power Station and proposed CECP site (CEC 2008).

Operations within the McClellan-Palomar Airport are expected to increase as aviation fuel prices fall, and given the current recommended traffic pattern for arriving and departing aircraft, air traffic will continue to fly directly over the existing Encina Power Station and proposed CECP (CEC 2008). In addition, small aircraft pulling banner ads along coastline beaches and aircraft patrolling road traffic conditions along Interstate I-5 regularly fly within the coastline Flyway Zone at altitudes below 1,500 feet above ground level and directly over the existing Encina Power Plant and proposed CECP site (Aspen 2008a).

The proposed CECP gas turbines/heat recovery steam generator (HRSG) and air coolers cooling tower exhaust stacks would result in upward air plume velocities that could result in turbulence with the potential to affect aircraft maneuverability above the CECP site. A plume velocity analysis was conducted for the CECP and is presented in detail as **APPENDIX TT-1** of this Final Staff Assessment. This analysis assumed worst-case meteorological conditions (cool temperatures and calm winds), whereupon the maximum upward plume velocity would be generated. The worst-case airspace conditions used in the velocity calculations are a natural occurrence and would

presumably occur during the life of the power plant and potentially when small aircraft fly above the CECP site. **Traffic and Transportation Table 9** lists the average plume velocity speed in meters per second (m/s) for both the CECP gas turbine and air cooler plumes above ground level (AGL).

Traffic and Transportation Table 9
Plume Average Velocity
Engine and Radiator Predicted Plume Velocities

	Gas Turbine Average Plume Velocity (m/s)	Air Cooler Average Plume Velocity (m/s)
Height (ft) AGL	**61°F**	**59°F**
300	8.16	6.49
400	6.71	6.29
500	5.96	5.97
600	5.47	5.67
700	5.11	5.41
800	4.83	5.18
900	4.60	4.99
1,000	4.42	4.82
1,100	4.26	4.67
1,200	4.12	4.54
1,300	3.99	4.42
1,400	3.88	4.31
1,500	3.79	4.22
1,600	3.70	4.13
1,700	3.62	4.04
1,800	3.54	3.97
1,900	3.47	3.90
2,000	3.41	3.83

Source: APPENDIX TT-1.

For purposes of this analysis, a vertical velocity of 4.3 m/s plume average velocity has been determined as the critical velocity of concern to light aircraft. The gas turbine plume velocity drops below 4.3 m/s at approximately 1,070 feet AGL, at which height the gas turbine plume diameter is calculated to be 299 feet. The proposed CECP air cooler average plume velocity drops below 4.3 m/s at approximately 1,410 feet AGL, and the plume diameter is calculated to be over 1,500 feet at 1,410 feet AGL. Therefore, potentially adverse impacts could occur to low-flying aircraft using the airspace above the CECP exhaust and air cooler stacks. The plume velocities from the CECP could cause moderate to severe turbulence. It should be noted that the plume velocity speed presented is average m/s of the entire plume diameter. Plume velocity speeds would be lower at the plume diameter edge and greater at the plume center point.

Proposed Condition of Certification **TRANS-2** would ensure that the CECP applicant complies with FAA regulations (FAA Form 7460 completion), which includes the FAA's determination that physical objects are not hazards to navigable airspace. However, as thermal plumes are not physical structures, they are not subject to the FAA Form 7460 requirements. Therefore, to ensure that plumes associated with CECP operation do not impact aviation activities within the navigable airspace above the site, staff proposes that Condition of Certification **TRANS-3** be implemented**.** It would require the applicant to work with the FAA to notify all pilots using the McClellan-Palomar Airport and to

update all applicable airspace charts to indicate that project plume hazards could exist and that pilots should avoid direct overflight of the airspace above the CECP site.

As discussed earlier in this section, the McClellan-Palomar Airport recommended pattern altitude for small aircraft is 1,500 feet AGL and 2,000 feet AGL for large aircraft. Therefore, aircraft observing the recommended pattern altitude during airport arrivals and departures will avoid most of the potential plume impact from flying over the CECP. Furthermore, the traffic pattern over the CECP site is not congested and the surrounding airspace does not contain any restricted areas. Pilots should not have problems avoiding overflight of the CECP site. Therefore, staff believes this mitigation is adequate to reduce any potential aviation impacts to a less than significant level.

Hazards and Public Safety

Construction-related traffic is not expected to cause safety impacts to the general public because it would not be routed through residential areas. The primary access apron (driveway) for construction workers and operations employees to the CECP would be on Carlsbad Boulevard at the Encina Power Station's front gate. The posted speed along this segment of Carlsbad Boulevard is 35 miles per hour. The apron would be located approximately 415 feet from an active railroad crossing that is signalized and has safety crossing arms. The driveway location is not visually obstructed for at least 1,000 feet to the south along Cannon Road (absent any train) and to the west along Carlsbad Boulevard. Staff concluded that hazards to construction-related traffic to the site would be less-than-significant because of the existing visually unobstructed distance from the CECP site, the operating signalized and safety crossing arms, the posted speed limit, and the current curb-to-curb street diameter at this location.

Proposed Condition of Certification **TRANS-1**, calling for the preparation of a construction traffic control plan that includes use of flagging and covering open trenches, would minimize hazards due to possible backup as construction workers enter and exit the plant when their shifts begin and end.

One road feature with potential as a safety hazard is at-grade railroad crossings. Two at-grade crossings are located in the project vicinity: the first one is on Cannon Road, and the second one is on Tamarack Avenue. However, both are protected and do not represent a danger to the public. At the Encina Power Station itself, an internal road crosses the rail line between the main part of the Encina Power Station and the eastern part of the site. This private crossing is protected by a drop guard and flashing cross buck to ensure safe crossing by vehicles, construction workers, and employees. Construction delivery trucks and heavy and oversize delivery trucks unloaded at the existing on-site rail spur would have to cross the internal road and rail crossing. In addition, some vehicles, such as construction management or construction support fleet vehicles, would be parked on the west portion of the Encina Power Station. The drop guards and flashing cross buck ensure safe crossing by passenger vehicles only, but do not provide safe pedestrian crossing or accommodate oversize construction vehicles crossing the internal rail line. As rail crossings are inherent hazards and this internal crossing could present a safety impact to site pedestrians, construction workers, and oversize construction vehicles, staff is proposing Condition of Certification **TRANS-4,** which would require the applicant or construction contractor to develop a crossing

safety plan for all phases of project construction to address foot traffic as well as construction-related vehicle crossing and the transport of heavy/oversize loads over the internal rail crossing.

There is also a potential for unexpected damage to roads by vehicles and equipment within the project area. Therefore, staff is proposing Condition of Certification **TRANS-5,** which would require that any road damaged by project construction be repaired to its original condition. This will ensure that any damage to local roadways will not be a safety hazard to motorists.

The use of oversize vehicles during construction can create a hazard to the public by limiting motorist views on roadways and by the obstruction of space. Therefore, staff is proposing Condition of Certification **TRANS-6,** which would require that all oversize vehicles used on public roadways during construction comply with Caltrans limitations on vehicle sizes and weights, as well as those limitations of other relevant jurisdictions.

Another anticipated increase in traffic during project construction and operation would be truck trips, including delivery of hazardous materials and removal of wastes. For a discussion of the potential impacts related to the transport of hazardous materials please see the **Hazardous Materials Management** section in this Final Staff Assessment.

Emergency Access

In the event of an emergency at the CECP site during construction, emergency vehicles would use Cannon Road and then Avenida Encinas to access the project site. To maintain temporary access for emergency vehicles and allow for adequate access into the facility, proposed Condition of Certification **TRANS-1** requires the preparation of a construction traffic control plan which includes the assurance of access and movement of emergency vehicles. Once the plant becomes operational, there would be adequate room for emergency vehicles to turn around within the facility boundaries as internal circulation would remain identical to that currently at the Encina Power Station. For additional discussion of emergency services serving the facility, refer to the **Worker Safety and Fire Protection** section in this Final Staff Assessment.

Parking

Construction worker parking would be located on up to three acres of the existing Encina Power Station west of the railroad tracks. All CECP construction workers parking will be located within the existing Encina Power Station site. Up to seven acres on the Encina Power Station would be used for construction staging and parking. No off-site construction worker parking is anticipated for the construction of the CECP (CECP 2007, p. 2-2). However, to ensure that no potential impacts to available public parking supply could occur during construction, staff is proposing Condition of Certification **TRANS-7,** which would require the development of a parking and staging plan for all phases of project construction to enforce a policy that all project-related parking occurs on site or in designated off-site parking areas.

Alternative Transportation

To ensure that construction of the proposed CECP would not impact public sidewalks, bus stops, or local bus routes, staff recommends Condition of Certification **TRANS-8**, which requires the applicant or its construction contractor to comply with Caltrans and other relevant jurisdictional limitations for any encroachment into public rights-of-way during construction and requires that all necessary encroachment permits be obtained from Caltrans and all relevant jurisdictions. Furthermore, as CECP construction would require construction vehicle crossing of rail lines containing commuter train activity, staff is proposing Condition of Certification **TRANS-4,** which would require the applicant or construction contractor to develop a crossing safety plan for all phases of project construction to address foot traffic as well as construction related vehicle crossing and the transport of heavy/oversize loads over the internal rail crossing to ensure no impacts would occur to existing rail line use.

CUMULATIVE IMPACTS AND MITIGATION

A project may result in a significant adverse cumulative impact where its effects are cumulatively considerable. *Cumulatively considerable* means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects (Title 14, California Code Regulation, section 15130).

Based on all current information available at this time, the following information outlines the status of major cumulative project development within the CECP site area.

- Flower Fields Project - The city of Carlsbad has not assessed yet the use of the Flower Fields. A planning document is expected within the year 2008.
- I-5 Widening Project - Improvements along I-5 North Coast Corridor are still under preliminary study, and no accurate information is available as to specific project construction phasing/traffic handling. The I-5 project is expected to end in 2015.

  Carlsbad Seawater Desalination Plant Project - The Carlsbad Seawater Desalination Plant has received final approval from the required state regulatory and permitting agencies, including the California Coastal Commission, State Lands Commission and San Diego Regional Water Quality Control Board. Construction is expected to begin by the first quarter of 2010.
- City of Carlsbad Capital Improvement Program - Construction of projects tied to the City of Carlsbad Capital Improvement Program spans from 2006 to 2009. The Vista/Carlsbad Interceptor Sewer and Agua Hedionda Lift Station Projects currently have no filed or definitive construction schedules at this time.
- Los Angeles to San Diego (LOSSAN) Double-Tracking Project - Improvements along the San Diego coastal portion of the LOSSAN corridor include double-tracking of main line and bridges, curve realignment and the addition of crossovers to increase capacity and enhance reliability of the railroad corridor for freight rail service (SANDAG 2008). Only 28 miles of the corridor within San Diego County consists of double track. The BNSF operates freight service on the San Diego

segment of the corridor, in addition to Amtrak's daily commuter operation. The *"CP Carl to CP Double Track"* portion of the project would add 1.9 miles of double track and replace a single-track bridge with a double-track bridge, resulting in 3.1 miles of continuous double track in the city of Carlsbad. These projects are in various stages of development from preliminary engineering and environmental review to pre-final design. All projects would be under construction by December 31, 2013, if funded. The Final Programmatic EIR/EIS for the project has been published, but the Record of Decision has not been issued.

- **Coastal Rail Trail** – The goal of the Coastal Rail Trail (CRT) is to provide a multi-modal transportation route that is separated from the roadway. The CRT was envisioned to be 44 miles within the railroad right-of-way from Oceanside to the train depot in downtown San Diego. Sections of the CRT have been completed, including in the City of Carlsbad. The North County Transit District (NCTD) has indicated that it would not support a trail in the railroad right-of-way, possibly due to liability and plans to install an additional track. The City of Carlsbad has considered alignments through the Encina Power Station, but outside of the NCTD right-of-way. In addition, the City has considered alignments avoiding the Encina Power Station site. The CRT route location has not been finalized in the area of the Encina Power Station.

Continued development of the city of Carlsbad and San Diego County areas has contributed to congestion on area roadways that would be crossed by the routes of the CECP related traffic. The approved or pending projects identified above would also result in an increase of traffic to the CECP area, primarily in the form of construction-related traffic. In the event construction of the proposed project and the other listed projects were to occur simultaneously, cumulative impacts resulting in temporary lane closures and disruption of traffic flows could occur. Traffic associated with future residential and commercial developments within the area would further contribute to congestion on these affected roadways. Therefore, temporary roadway congestion resulting from the CECP could combine with other construction projects within the area, and congestion resulting from future development could create a temporary cumulative significant impact. Projects listed that have not been approved (i.e., the I-5 widening and the LOSSAN Double-Tracking Project) have the potential to create cumulative transportation and traffic impacts within the CECP project area. However, in order for these projects to be approved, they would need to conduct both project specific and cumulative transportation and traffic impact analysis and analyze conformance with applicable plans, policies, and regulations.

Construction-related traffic and activities associated with the CECP could have the potential to combine with these projects and result in cumulative impacts to intersection and street segment LOS, emergency vehicle access; parking; disruption of public transportation, pedestrian, bicycle, or rail travel; and cumulative damage to local transportation facilities. However, CECP Conditions of Certification **TRANS-1** through **TRANS-8** are proposed to ensure that potentially significant impacts associated with short-term transportation and traffic impacts resulting from CECP construction are reduced to less-than-significant levels. Therefore, the CECP cumulative contribution to this impact is considered reduced to a less-than-significant level.

Furthermore, it is assumed that all cumulative projects identified above would include mitigation similar to that for the proposed CECP (i.e. the development of a construction

traffic control plan) and would require approval from the city of Carlsbad, Caltrans, and all affected jurisdictions and agencies. This mitigation and approval would reduce not only project level transportation and traffic impacts of these projects, but reduce project-specific transportation and traffic impacts of cumulative projects as well. As agency approval of projects is gained, jurisdictional staggering of project construction and timing may occur to further reduce any potential cumulative transportation and traffic impacts. Therefore, the CECP would not have a considerable cumulative contribution to transportation and traffic impacts within the area. In addition, the proposed CECP would not require encroachment onto lands outside of the existing Encina Power Station, therefore not encroaching on proposed I-5 widening or LOSSAN Double-Tracking transportation improvement projects.

The CECP construction workforce traffic, construction truck traffic, and operational truck traffic would not travel through areas with an identified high percentage of minority or low-income population. In addition, staff has determined that all significant direct or cumulative impacts specific to traffic and transportation resulting from the construction or operation of the project would either be less than significant or be reduced to a less-than-significant level. Therefore, the proposed project does not introduce traffic and transportation-related environmental justice issues.

RESPONSE TO COMMENTS

Comments were provided in writing on the contents of the Preliminary Staff Assessment (PSA) from agencies, organizations and members of the public. Comments related to issues presented in the **Transportation and Traffic** section of the PSA are summarized below. Comments on the Transportation and Traffic section of the PSA are limited to two public agencies: Caltrans and the City of Carlsbad. Each comment is followed by a response.

CALTRANS COMMENTS ON THE PSA

Caltrans was the only State agency that provided comments on the **Transportation and Traffic** section of the PSA. The comments and responses are presented in this section.

Comment 1: Caltrans (02/05/09). As the CECG is adjacent to the LOSSAN corridor, we would recommend that the project be coordinated with SANDAG, the agency responsible for planning and developing the LOSSAN double-tracking project.

Response: Additional analysis has been provided in the Cumulative Impacts and Mitigation section to specifically address the LOOSAN project. As the proposed CECP would not require encroachment onto lands outside of the existing Encina Power Station, therefore not encroaching on the LOSSAN project ROW, staff conclusion that the CECP would not have a considerable cumulative contribution to transportation and traffic impacts within the area remains unchanged.

CITY OF CARLSBAD COMMENTS ON THE PSA

The city of Carlsbad was the second public agency that provided comments on the **Transportation and Traffic** section of the PSA. The comments and responses are presented in this section.

Comment 1: City of Carlsbad (01/30/09). Please identify cumulative impacts of CECP and widened I-5 freeway, including potential queuing along Cannon Road.

Response: The Cumulative Impacts and Mitigation section provides detailed information (as applicable to the proposed project) and provides detailed reasoning for the conclusions that the CECP would not have a considerable cumulative contribution to transportation and traffic impacts within the area, including study area intersections and roadway segments of Cannon Road. Additional text has been provided in the Cumulative Impacts and Mitigation section to specifically address the I-5 widening project.

Comment 2: City of Carlsbad (01/30/09). The City is uncertain about project traffic impacts. Please provide the complete traffic analysis prepared by the traffic consultant.

Response: As stated in the Summary of Conclusions section of the PSA, staff analyzed the traffic-related information provided in the Application for Certification (AFC)

and other sources to determine the potential proposed project transportation and traffic impacts. Proposed project construction and operational trip generation numbers presented in the PSA and FSA are identical to those presented in the proposed CECP AFC.

Comment 3: City of Carlsbad (01/30/09). Please identify if the CECP needs permission from North County Transit District for use of railway/easements.

Response: Additional analysis has been provided in the Cumulative Impacts and Mitigation section to specifically address the CRT project (North County Transit District). As stated, the proposed CECP would not require encroachment onto lands outside of the existing Encina Power Station, therefore not encroaching on the CRT project ROW. Currently, the CRT route location has not been finalized in the area of the Encina Power Station.

Comment 4: City of Carlsbad (01/30/09). Due to the CEC's requirement that the CECP incorporate the widening of I-5, emergency access routes for the proposed CECP are unknown at this time (see City comments in Worker Safety). Please amend the analysis to reflect this uncertainty.

Response: The Cumulative Impacts and Mitigation section provides detailed information (as applicable to the proposed project) and provides detailed reasoning for the conclusions that the CECP would not have a considerable cumulative contribution to transportation and traffic impacts within the area, including emergency access. Additional text has been provided in the Cumulative Impacts and Mitigation section to specifically address the I-5 widening project

Comment 5: City of Carlsbad (01/30/09). Please amend worker parking to preclude use of land associated with the improved Carlsbad-Vista Sewer Interceptor (including sewer lift station) and the Coastal Rail Trail.

Response: Additional analysis has been provided in the Parking impacts and Mitigation section to specifically address this comment. As stated, all CECP construction worker parking will be located within the existing Encina Power Station site.

Comment 6: City of Carlsbad (01/30/09). Please clarify if staff analyzed future trip generation and its impacts after the project is completed.

Response: The Operation Impacts and Mitigation section of the PSA provided detailed information on future trip generation associated with the proposed CECP. As stated, CECP operations would require on average 12 truck trips and a maximum of 32 truck trips per month. Operations-related and maintenance-related traffic associated with the project is considered insignificant when added to major movements on study area freeways and local roadways.

COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Traffic and Transportation Table 10 provides a general description of applicable statutes, regulations, and standards adopted by the federal government, the State of California, San Diego County, and the city of Carlsbad pertaining to traffic and transportation with which the project is required to comply. Conditions of certification have been proposed to ensure project consistency with a law, ordinance, regulation, or standard where it was not already mandated by federal or state regulations.

NOTEWORTHY PUBLIC BENEFITS

Neither the applicant nor staff has identified any traffic-related benefits associated with the CECP.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Staff has not received any agency or public comments related to traffic and transportation.

Traffic and Transportation Table 10
Project Compliance with Adopted Traffic and Transportation Laws, Ordinances, Regulations, and Standards

Applicable Law	LORS Description and Project Compliance Assessment
Federal	
Title 14, CFR, section 77 (14 CFR 77)	Includes standards for determining physical obstructions to navigable airspace. Sets forth requirements for notice to the Federal Aviation Administration of certain proposed construction or alterations. Also provides for aeronautical studies of obstructions to air navigation to determine their effect on the safe and efficient use of airspace (including temporary flight restrictions).
	Staff's proposed Condition of Certification **TRANS-2** would require a determination by the FAA that the CECP stacks are not a hazard to the navigable airspace at McClellan-Palomar Airport. **TRANS-2** would also require that the stacks have all lighting and marking required by the FAA. With the implementation of **TRANS-2**, the project would be consistent with this regulation.
CFR, Title 49, Subtitle B	Includes procedures and regulations pertaining to interstate and intrastate transport (includes hazardous materials program procedures) and specifies safety measures for motor carriers and motor vehicles that operate on public highways.
	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., San Diego County Department of Public Works permits). For a discussion of the potential impacts related to the transport of hazardous materials, please see the **Hazardous Materials Management** section in this FSA.
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.
	Enforcement is provided by state and local law enforcement agencies and through ministerial state agency licensing and permitting and/or local agency permitting. The use of oversize vehicles during construction can create a hazard to the public by limiting motorist views on roadways and by the obstruction of space by the oversize vehicle. Therefore, staff is proposing Condition of Certification **TRANS-6,** which would require that all oversize vehicles used on public roadways during construction comply with Caltrans limitations on vehicle sizes and weights.
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.
	Enforcement is provided by state and local law enforcement and through ministerial state agency licensing and permitting and/or local agency permitting. There is also a potential for unexpected damage to roads by vehicles and equipment within the project area. Therefore, staff is proposing Condition of Certification **TRANS-5,** which would require that any road damaged by project construction be repaired to its original condition.
Local	
San Diego County Department of Public Works	Requires a moving permit for moving any extra-legal load which is overweight and/or oversize.
	The use of oversize vehicles during construction can create a hazard to the public by limiting motorist views on roadways and by the obstruction of space by the oversize vehicle. Therefore, staff is proposing Condition of Certification **TRANS-6,** which would require that all oversize vehicles used on public roadways during construction comply with San Diego County limitations on vehicle sizes and weights.
City of Carlsbad Engineering Department	Requires a transportation permit for the transportation of oversize and overweight loads through the city of Carlsbad
	The use of oversize vehicles during construction can create a hazard to the public by limiting motorist views on roadways and by the obstruction of space by the oversize vehicle. Therefore, staff is proposing Condition of Certification **TRANS-6,** which would require that all oversize vehicles used on public roadways during construction comply with city of Carlsbad limitations on vehicle sizes and weights.

CONCLUSIONS

Staff has analyzed potential construction and operational impacts related to the regional and local traffic and transportation system by the proposed project, and concludes the following:

- Condition of Certification **TRANS-1** should be implemented to ensure that all construction-related traffic and construction-related activities would not impact transportation facilities and existing traffic levels within the project area.
- During operation, workforce and truck traffic to and from the facility would not result in a substantial increase in congestion, deterioration of the existing LOS, or creation of a traffic hazard during any time in the daily traffic cycle and would have a less-than-significant adverse impact along the routes or roadway intersections that would be used to access the CECP site.
- Condition of Certification **TRANS-2** should be implemented to ensure the project owner submits to the FAA Form 7460-1, Notice of Proposed Construction or Alteration, regarding the CECP stack and secures a Determination of No Hazard to Navigable Airspace. The project owner shall also ensure that all CECP stacks would have all the lighting and marking required by the FAA so that the stacks do not create a hazard to air navigation.
- Condition of Certification **TRANS-3** should be implemented to ensure the applicant works with the FAA to notify all pilots using the McClellan-Palomar Airport and updates all airspace charts that include the CECP site to announce that invisible air plume hazards could exist and pilots should avoid direct overflight.
- Condition of Certification **TRANS-4** should be implemented to ensure the applicant or construction contractor develops a crossing safety plan for all phases of project construction to address foot traffic as well as construction-related vehicle crossing and the transport of heavy/oversize loads over the internal rail crossing.
- Condition of Certification **TRANS-5** should be implemented to ensure that any road damaged by project construction be repaired to its original condition.
- Condition of Certification **TRANS-6** should be implemented to ensure that all oversize vehicles used on public roadways during construction comply with limitations on vehicle sizes and weights imposed by Caltrans and other relevant jurisdictions.
- Condition of Certification **TRANS-7** should be implemented to ensure the development of a parking and staging plan for all phases of project construction to enforce a policy that all project-related parking occurs on site or in designated off-site parking areas.
- Condition of Certification **TRANS-8** should be implemented to ensure that the applicant or its construction contractor complies with the limitations imposed by Caltrans and other relevant jurisdictional for any encroachment into public rights-of-way during construction and requires that all necessary encroachment permits be obtained from Caltrans and all relevant jurisdictions regarding impact to public sidewalks, bus stops, or local bus routes.

The construction and operation of the CECP as proposed with the effective implementation of staff's recommended Conditions of Certification **TRANS-1** through **TRANS-8,** would ensure that the project's direct adverse traffic and transportation impacts are reduced to a less than significant level and would ensure that the project complies with applicable LORS regarding traffic and transportation. Therefore, should the California Energy Commission (Energy Commission) certify the project, staff recommends that the Energy Commission adopt the following conditions of certification.

PROPOSED CONDITIONS OF CERTIFICATION

TRANS-1—The project owner shall consult with the city of Carlsbad and prepare and submit to the Compliance Project Manager (CPM) for approval a construction traffic control plan and implementation program which addresses the following issues:

- timing of heavy equipment and building materials deliveries
- redirecting construction traffic with a flag person
- signing, lighting, and traffic control device placement if required
- need for construction work hours and arrival/departure times outside peak traffic periods
- ensurance of access for emergency vehicles to the project site
- temporary closure of travel lanes
- access to adjacent residential and commercial property during the construction of all pipelines
- specification of construction-related haul routes
- identification of safety procedures for exiting and entering the site access gate

Verification: At least 30 days prior to site mobilization, the applicant or contractor shall provide to the CPM a copy of the referenced documents.

TRANS-2—The project owner shall submit to the FAA Form 7460-1, Notice of Proposed Construction or Alteration, regarding the Carlsbad Energy Center Project (CECP) stack and shall secure a Determination of No Hazard to Navigable Airspace. The stacks shall have all lighting and marking required by the FAA so that the stacks do not create a hazard to air navigation.

Verification: At least 30 days prior to the start of construction, the Project Owner or contractor shall provide copies of the FAA Form 7460-1 and copies of the FAA Determination of No Hazard to Navigable Airspace to the CPM and the city of Carlsbad Planning Department. The project owner shall also provide pictures of the CECP stack after the lighting and marking have been completed.

TRANS-3—Prior to start-up and testing activities of the plant and all related facilities, the project owner shall work with the FAA to notify all pilots using the McClellan-Palomar Airport and airspace above the CECP of potential air hazards. These activities would include, but not be limited to, the applicant's working with the FAA in issuing a notice to airmen (NOTAM) of the identified air hazard and updating the Terminal Area Chart and all other FAA-approved

airspace charts used by pilots that include the CECP site to indicate that pilots should avoid direct overflight.

Verification: At least 60 days prior to start of project operation, the project owner shall submit to the CPM for review and approval a letter from the FAA showing compliance with these measures.

TRANS-4—Prior to construction of the plant and all related facilities, the project owner shall develop a crossing safety plan for all phases of project construction to address foot traffic as well as construction-related vehicle crossing and the transport of heavy/oversize loads over the internal rail crossing.

Verification: At least 60 days prior to start of site mobilization, the project owner shall submit the plan to the CPM for review and approval.

TRANS-5—Following completion of project construction, the project owner shall repair any damage to roadways affected by construction activity along with the primary roadways identified in the traffic control plan for construction traffic to the road's pre-project construction condition. Prior to the start of construction, the project owner shall photograph, videotape, or digitally record images of the roadways that will be affected by pipeline construction and heavy construction traffic. The project owner shall provide the CPM and the city of Carlsbad with a copy of the images for the roadway segments under its jurisdiction. Also prior to start of construction, the project owner shall notify the city about the schedule for project construction. The purpose of this notification is to postpone any planned roadway resurfacing and/or improvement projects until after the project construction has taken place and to coordinate construction-related activities associated with other projects.

Verification: Within 30 days after completion of the redevelopment project, the project owner shall meet with the CPM and the city of Carlsbad to determine and receive approval for the actions necessary and schedule to complete the repair of identified sections of public roadways to original or as near-original condition as possible. Following completion of any regional road improvements, the project owner shall provide to the CPM a letter from the city of Carlsbad if work occurred within its jurisdictional public right-of-way stating its satisfaction with the road improvements.

OVERWEIGHT AND OVERSIZE VEHICLES

TRANS-6—The project owner shall comply with Caltrans and other relevant jurisdictions limitations on vehicle sizes and weights. In addition, the project owner shall obtain necessary transportation permits from Caltrans and all relevant jurisdictions for roadway use.

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

TRANS-7—During construction of the plant and all related facilities, the project owner shall develop a parking and staging plan for all phases of project construction to enforce a policy that all project-related parking occurs on site or in designated off-site parking areas.

Verification: At least 60 days prior to start of site mobilization, the project owner shall submit the plan to the city of Carlsbad and other jurisdictions affected by site selection, such as the city and/or county of San Diego, for review and comment and to the CPM for review and approval.

ENCROACHMENT PERMITS

TRANS-8—The project owner shall comply with limitations for encroachment into public rights-of-way imposed by Caltrans and other relevant jurisdictions and shall obtain necessary encroachment permits from Caltrans and all relevant jurisdictions.

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

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APPENDIX TT-1: PLUME VELOCITY ANALYSIS

William Walters

INTRODUCTION

The following provides the assessment of the Carlsbad Energy Center Project (CECP) gas turbines/heat recovery steam generator (HRSG) and air coolers cooling tower exhaust stack plume velocities. Staff completed calculations to determine the worst-case vertical plume velocities at different heights above the stacks using the applicant's proposed gas turbine/HRSG and air cooler designs.

PROJECT DESCRIPTION

The proposed project would utilize two Siemens Rapid Response Combined-Cycle (R2C2) gas turbines/HRSGs and two fin-fanned air coolers.

PLUME VELOCITY CALCULATION METHOD

Staff selected a calculation approach from a technical paper (Best 2003) to estimate the worst-case plume vertical velocities for the CECP exhausts. The calculation approach, which is also known as the "Spillane approach," used by staff is limited to calm wind conditions, which are the worst-case wind conditions. The Spillane approach uses the following equations to determine vertical velocity for single stacks during dead-calm wind conditions (i.e. wind speed = 0):

(1) $(V*a)^3 = (V*a)_o^3 + 0.12*F_o*[(z-z_v)^2-(6.25D-z_v)^2]$

(2) $(V*a)_o = V_{exit}*D/2*(T_a/T_s)^{0.5}$

(3) $F_o = g*V_{exit}*D^2*(1-T_a/T_s)/4$

(4) $Z_v = 6.25D*[1-(T_a/T_s)^{0.5}]$

Where: V = vertical velocity (m/s), plume-average velocity

a = plume top-hat radius (m, increases at a linear rate of $a = 0.16*(z- z_v)$

F_o= initial stack buoyancy flux m^4/s^3

z = height above ground (m)

z_v= virtual source height (m)

V_{exit}= initial stack velocity (m/s)

D = stack diameter (m)

T_a= ambient temperature (K)

T_s= stack temperature (K)

g = acceleration of gravity (9.8 m/s^2)

Equation (1) is solved for V at any given height above ground that is above the momentum rise stage for single stacks (where z > 6.25D) and at the end of the plume

merged stage for multiple plumes. This solution provides the plume-average velocity for the area of the plume at a given height above ground; the peak plume velocity at the plume centerline, based on a standard Gaussian profile (bell curve), would be about two times higher than the plume-average velocity. As can be seen, the stack buoyancy flux is a prominent part of Equation (1). The calm condition calculation basis clearly represents the worst-case conditions, and the vertical velocity will decrease substantially as wind speed increases.

For multiple stack plumes, where the stacks are equivalent, the multiple stack plume velocity during calm winds was calculated by staff in a simplified fashion, presented in the Best paper as follows:

(5) $V_m = V_{sp} * N^{0.25}$

Where: V_m = multiple stack combined plume vertical velocity (m/s)

V_{sp} = single plume vertical velocity (m/s), calculated using Equation (1)

N = number of stacks

Staff noted that this simplified multiple stack plume velocity calculation method predicts somewhat lower velocity values than the full Spillane approach methodology as given in data results presented in the Best paper (Best 2003). However, the Best paper does not present the multiple stack calculations in a manner that allowed staff to determine the exact methodology and duplicate the results shown in the paper. Staff also assumed less-than-complete conservation of energy, due to the geometry of multiple stacks, which would be represented by $N^{0.33}$ for ideal energy conservation and plume convergence.

VERTICAL PLUME VELOCITY ANALYSIS

The vertical plume velocities were calculated for reasonable worst-case conditions for the gas turbines and cooling tower. The ambient and exhaust conditions for the gas turbines and cooling tower, operating at full load, are provided below in **PLUME VELOCITY Table 1**.

Plume Velocity Table 1
Gas Turbine and Air Cooler Parameters

Case	Gas Turbines	Air Coolers
	61°F	86°F
Stack Height ft (m)	139 (42.37) [a]	26 (7.92) [a]
Stack Diameter ft (m)	21.3 (6.49)	34.3 (10.5) – 12 equivalent per cooler
Stack Velocity ft/s (m/s)	66.48 (20.26)	17.8 (5.42) [a]
Exhaust Temperature F (K)	363 (457)	125.7 (325) [a]

Source: Carlsbad 2007. Carlsbad 2008.
a – Stack height is adjusted thirty feed lower than this value due to the proposed site being in a 30 foot deep pit.

The gas turbines have a separation that is approximately 62 meters. Modeling determined that the gas turbines' plumes would not merge until after the velocity has slowed to less than 4.3 meters per second (m/s); therefore, the gas turbine velocities are based on a single gas turbine exhaust.

The air coolers were modeled using 12 equivalent stacks to approximate the structure of the air coolers shown on the site plan. It is assumed that these equivalent stacks will have merged for each air cooler, but the two air cooler plumes were not assumed to have fully merged.

Using the Spillane approach, the plume velocity at different heights above ground was determined. Staff's calculated plume average velocity values are provided in **Plume Velocity Table 2.**

Plume Average Velocity Table 2
Engine and Radiator Predicted Plume Velocities

	Gas Turbine Plume Velocity (m/s)	Air Cooler Plume Velocity (m/s)
Height (ft)	**61°F**	**59°F**
300	8.16	6.49
400	6.71	6.29
500	5.96	5.97
600	5.47	5.67
700	5.11	5.41
800	4.83	5.18
900	4.60	4.99
1,000	4.42	4.82
1,100	4.26	4.67
1,200	4.12	4.54
1,300	3.99	4.42
1,400	3.88	4.31
1,500	3.79	4.22
1,600	3.70	4.13
1,700	3.62	4.04
1,800	3.54	3.97
1,900	3.47	3.90
2,000	3.41	3.83

Source: Staff calculations.

As explained in the **Transportation and Traffic** section, a vertical velocity of 4.3 m/s (plume average velocity) has been determined as the critical velocity of concern to light aircraft. The gas turbine height at which the plume velocity drops below 4.3 m/s is calculated to be approximately 1,070 feet. At this height the plume diameter is calculated to be 299 feet.

The air cooler plume velocity drops below 4.3 m/s at approximately 1,410 feet. At this height the plume diameter is calculated to be over 1,500 feet.

Merging of the two air cooler exhausts and/or merging one or more of the air cooler exhausts with the two gas turbine exhausts could give the resultant merged plumes higher velocities than shown above. The velocities shown above are plume average velocities. The peak velocity, by Gaussian distribution principle, is two times the plume average velocity.

WIND SPEED STATISTICS

The Camp Pendleton monitoring station is located approximately 6.3 miles north-northwest of the project site. The applicant provided three years of meteorological data from this monitoring site, which indicates that an average hourly wind speed of zero occurred only 0.8 percent of the hours. However, an average wind speed of less than 1 m/s occurred over 16 percent of the hours, and an average wind speed of less than 2 m/s occurred over 45 percent of the hours. Hours with low average wind speeds are likely to have shorter periods of calm winds. Therefore, calm conditions/low wind speeds appear to be fairly common at the site.

CONCLUSIONS

The calculated calm wind condition vertical plume-average velocities from the CECP gas turbines/HRSGs and air coolers are predicted to be greater than 4.3 m/s at 500 feet above ground. The worst-case ambient conditions used in the velocity calculations will occur, potentially frequently, during the plant's life when small aircraft could fly above the CECP exhausts. Therefore, the air traffic pattern should be evaluated and appropriate mitigation measures recommended for this potential air safety impact.

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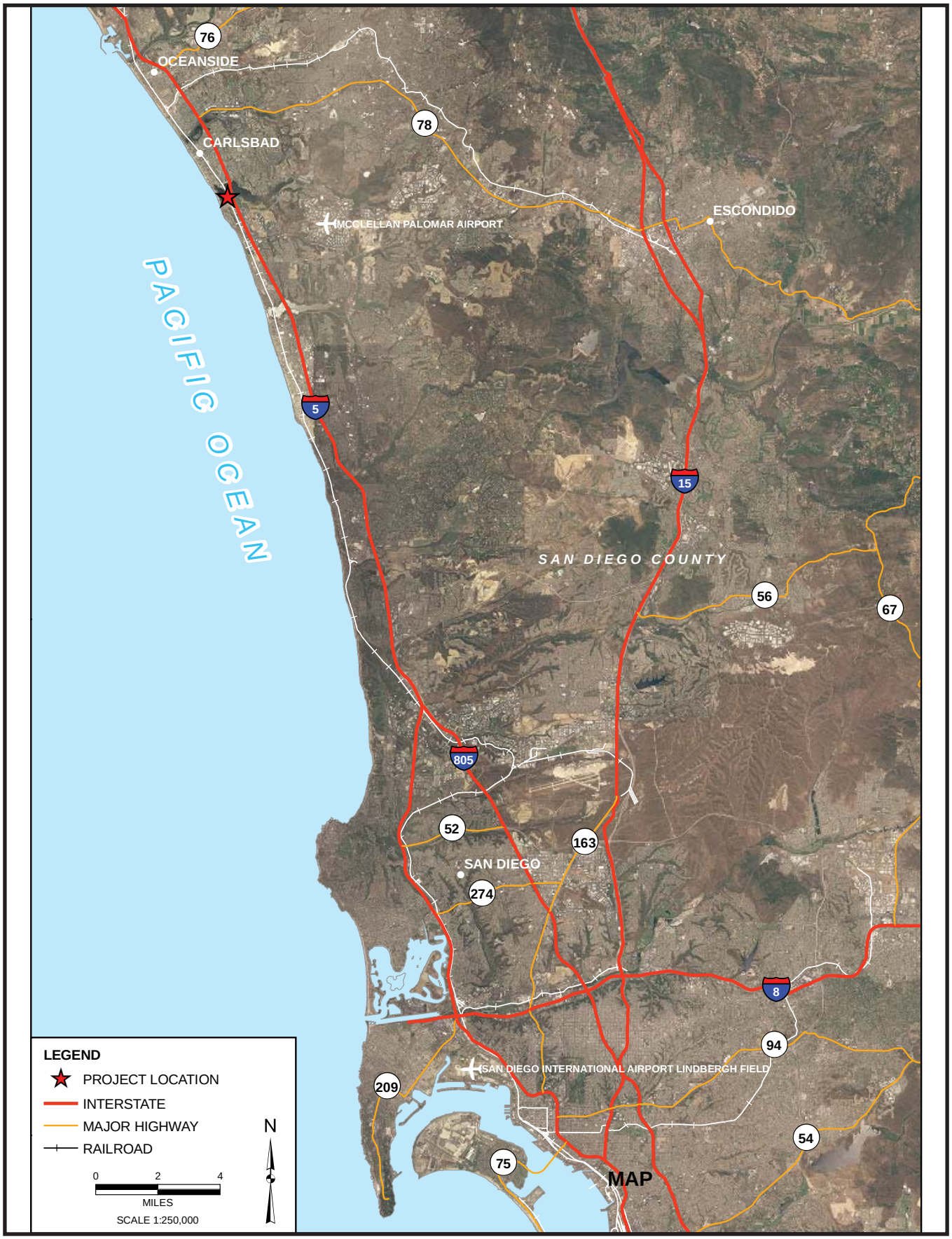
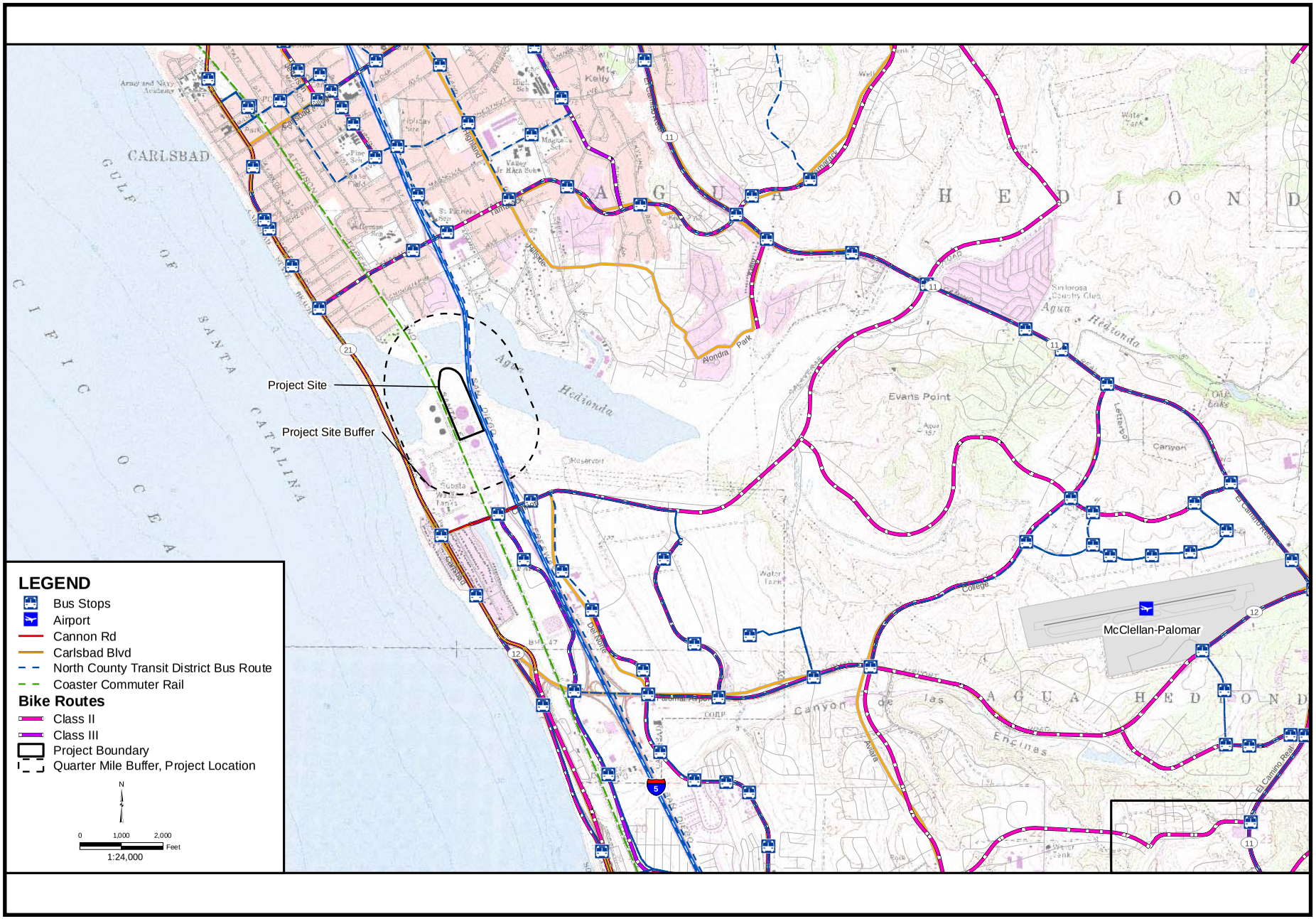
TRAFFIC & TRANSPORTATION - FIGURE 1
Carlsbad Energy Center Project - Regional Transportation



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, NOVEMBER 2009
SOURCE: AFC Fig. 5.12-2

TRAFFIC & TRANSPORTATION - FIGURE 2

Carlsbad Energy Center Project - Local Transportation



SOURCE: AFC Figure 5.12-3

TRANSMISSION LINE SAFETY AND NUISANCE

Testimony of Obed Odoemelam, Ph.D.

SUMMARY OF CONCLUSIONS

The applicant, Carlsbad Energy center, LLC proposes to transmit the power from the proposed Carlsbad Energy Center Project (CECP) to the San Diego Gas and Electric (SDG&E) transmission grid using 138-kilovolt (kV) and 230-kV lines. Unit 6 of the proposed facility would be connected through the existing 138-kV Encina switchyard using an overhead 138- kV line while Unit 7 would be connected through a new SDG&E switchyard directly south of the SDG&E Cannon Substation using an overhead 230-kV line for the first section and an underground 230-kV line for the rest. Since the proposed line would be located away from area residences, there would be no potential for residential electric and magnetic field exposures that have raised concern about human health effects in recent years. The proposed lines would be operated in the PG&E service area and therefore, their design, erection, and maintenance plan would be according to standard PG&E practices, which conform to applicable laws, ordinances, regulations and standards (LORS). With the five proposed conditions of certification, any line-related safety and nuisance impacts would be less than significant.

INTRODUCTION

The purpose of this analysis is to assess the proposed Carlsbad Energy Center Project's (CECP's) transmission lines' design and operational plan to determine whether the related field and non-field impacts would constitute a significant environmental hazard in the area around the routes. All related health and safety laws, ordinances, regulations, and standards are currently aimed at minimizing such hazards. 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 non-field 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 Carlsbad General Plan - Noise Element	Discourages new noise-sensitive land uses in areas above specified noise limits.
City of Carlsbad's Municipal Code Chapter 8.48.	Establishes limitations on the hours of construction within 1000 feet of residential buildings.
Hazardous and Nuisance Shocks	
State	
CPUC GO-95, "Rules for Overhead Electric Line Construction"	Governs clearance requirements to prevent hazardous shocks, grounding techniques to minimize nuisance shocks, and maintenance and inspection requirements.
GO-128, CPUC, "Rules for Construction of Underground Electric Supply and Communication Systems".	Establishes requirements and minimum standards to be used for underground installation of AC power and communication circuits.
Title 8, California Code of Regulations (CCR) section 2700 et seq. "High Voltage Safety Orders"	Specifies requirements and minimum standards for safely installing, operating, working around, and maintaining electrical installations and equipment.

Applicable LORS	Description
National Electrical Safety Code	Specifies grounding procedures to limit nuisance shocks. Also specifies minimum conductor ground clearances.
Industry Standards	
Institute of Electrical and Electronics Engineers (IEEE) 1119, "IEEE Guide for Fence Safety Clearances in Electric-Supply Stations"	Specifies the guidelines for grounding-related practices within the right-of-way and substations.
Electric and Magnetic Fields	
State	
CPUC GO-131-D, "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 CECP is a 23-acre parcel within the 95-acre site of the existing Encina Power Station in an industrial area in the city of Carlsbad in San Diego County. This power station consists of five operating units (Units 1-5) where Units 1-3 (of 107 MW, 104 MW, and 110 MW, respectively) together, Unit 4 (of 306 MW), and simple cycle combustion turbine generator EGT-1 (of 17 MW), are connected to San Diego Gas & Electric's existing 138-kilovolt (kV) Encina switchyard with 138-kV transmission lines. Unit 5 is connected by itself to the existing SDG&E 230-kV switchyard with a 230-kV line. Three other 230-kV overhead lines are also connected to this 230-kV switchyard after running through existing SDG&E corridors. All five Encina Power Station-related lines are located within the facility's property boundaries away from the general public or area residences (CECP 2007a, AFC September 11, 2007).

The present proposal is to build two new generating units (Units 6 and 7) and connect Unit 6 to the existing 138-kV Encina switchyard with a 2,059-foot overhead line while connecting Unit 7 to a new, 230-kV SDG&E switchyard directly south of the SDG&E Cannon Substation. This connection would be made by first using a 1,800-foot overhead line to connect CECP to

an overhead/underground transition point at the CECP south property line from which the final connection would be made using an underground line. All these lines and the new SDG&E Switchyard would reside within existing EPS and SDG&E property lines. Using the new SDG&E Switchyard would prevent connecting CECP to the existing SDG&E 230-kV switchyard west of the railroad tracks (Stoel Rives 2008h, SR 2008h, Project Enhancements and Refinement, Supplement July 25, 2008, pp 2-1 and 2-9).

PROJECT DESCRIPTION

The proposed project's lines would consist of the following segments:

- The 2,059-foot overhead 138-kV line connecting the proposed Unit 6 to the existing 138-kV SDG&E Encina switchyard to the south;
- The 1,800-foot overhead 230-kV line as the main segment of the connection between the proposed Unit 7 and the new SDG&E 230- kV switchyard directly south of the SDG&E 230-kV Canon Substation; and
- The underground 230-kV section of the connection between CECP and the new 230-kV SDG&E switchyard.
- Project-related modifications at SDG&E's 138-kV Encina switchyard.

The interconnection to the California Independent System Operator (CAISO) grid would be through the existing 138-kV transmission line and 230-kV transmission lines from SDG&E's existing Encina 138-kV switchyard and the new SDG&E 230-kV switchyard.

The proposed project lines would be owned, operated, and maintained by the applicant, Carlsbad Energy Center LLC, in keeping with SDG&E guidelines that ensure line safety and efficiency together with reliability and maintainability. The applicant has provided the design and structural dimensions of the proposed line structures as related to safety, reliability, and field reduction efficiency (CECP 2007a, pp. 3-4 through 3-10, and Figures 3.2-2 through 3.2-5). SDG&E would build and maintain the new 230-kV switchyard as part of its system improvement program (SR 2008h). The conductors in the underground section of the proposed connection to the new SDG&E 230-kV switchyard would be located in duct-bank trenches according to standard SDG&E design and construction practices. Because such underground cables are located more closely together in their encasements than when overhead, they produce (through field cancellation effects), fields of the lowest intensity possible without affecting safety, safety, maintainability and reliability.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHODS AND THRESHOLDS FOR DETERMINING SIGNIFICANCE

The potential magnitude of the line impacts of concern in this staff analysis depends on compliance with the listed design-related LORS and industry practices. These LORS and practices have been established to maintain 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. The related requirements in **TLSN Table 1** establish the standards for assessing the potential for obstruction hazards within the navigable space and establish the criteria for determining when to notify the FAA about such hazards. As noted by the applicant (CECP 2007a, p.3-9), these regulations require FAA notification in cases of structures over 200 feet from the ground. Notification is also required if the structure is to be below 200 feet in height but would be located within the restricted airspace in the approaches to public or military airports. For airports with runways longer than 3,200 feet, the restricted space is defined by the FAA as an area extending 20,000 feet (3.98 miles) from the runway, with no obstructing structures for whom the ratio of distance from runway to height is greater than 100:1. For airports with runways of 3,200 feet or less, the restricted airspace would be an area that extends 10,000 feet from this runway. For heliports, the restricted space is an area extending 5,000 feet.

As noted by the applicant, the nearest public airport to the CECP site is McClellan Palomar Airport which is about 14,300 feet away at its nearest point from the proposed project lines. According to FAA requirements, the maximum height of any line support structure at this distance will have to be 143 feet or less to ensure the required maximum ratio of 100:1 (between the distance from the runway and height of the potentially obstructing structure) that does not require FAA notification. The applicant intends to comply with this height limitation by ensuring a design height of less than 143 feet for the proposed line structures (CECP 2007a). There is no heliport located within 5000 feet of the project lines and related facilities leading staff to conclude that the two proposed lines would not pose an aviation hazard to both area helicopters and fixed-wing aircraft.

Interference with Radio-Frequency Communication

Transmission line-related radio-frequency interference is one of the indirect effects of line operation and is produced by the physical interactions of line electric fields. Such interference is due to the radio noise produced by the action of the electric fields on the surface of the energized conductor. The process involved is known as “corona discharge,” but is referred to as “spark gap electric discharge” when it occurs within gaps between the conductor and insulators or metal fittings. When generated, such noise manifests itself as perceivable interference with radio or television signal reception or interference with other forms of radio communication. Since the level of interference depends on factors such as line voltage, distance from the line to the receiving device, orientation of the antenna, signal level, line configuration, and weather conditions, maximum interference levels are not specified as design criteria for modern transmission lines. The level of any such interference usually depends on the magnitude of the electric fields involved and the distance from the line. The potential for such impacts and related complaints is therefore minimized by reducing the line electric fields and locating the line away from inhabited areas. Since (a) electric fields are unable to penetrate the soil and other materials, and (b) the radio-frequency-related effects are produced by the electric fields, communication interference and other field effects are not encountered above underground lines and would therefore, not occur in the underground section of the proposed 230-kV line. Only the magnetic field would be encountered above this segment.

The proposed lines would be built and maintained according to SDG&E practices that minimize surface irregularities and discontinuities. Moreover, the potential for such corona-related interference is usually of concern for overhead lines of 345 kV and above, and not the 138-kV line and overhead section of the 230-kV line proposed. The proposed low-corona designs are used for all overhead SDG&E lines of similar voltage rating to reduce surface-field strengths and the related potential for corona effects. Moreover, the lines would be located away from area residences making it unlikely that there would be complaints from radio-frequency interference. Staff does not recommend any related condition of certification.

Audible Noise

The noise-reducing designs for low-intensity electric field intensity are not specifically mandated by federal or state regulations for overhead lines in terms of specific noise limits. As with radio noise, audible noise is not encountered above underground lines and is limited for overhead lines through design, construction, or maintenance practices established from industry research and experience as effective without significant impacts on line safety, efficiency, maintainability, and reliability. When it occurs, 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 proposed for CECP. Research by the Electric Power Research Institute (EPRI 1982) has validated this by showing the fair-weather audible noise from modern transmission lines to be generally indistinguishable from background noise at the edge of a right-of-way of 100 feet or more. Since the low-corona designs for overhead lines are also aimed at minimizing field strengths, and undergrounding eliminates such noise, staff does not expect the proposed line operation to add significantly to current background noise levels in the project area. For an assessment of the noise from the proposed line and related facilities, please refer to staff's analysis in the **Noise and Vibration** section.

Fire Hazards

The fire hazards addressed through the related LORS in **TLSN Table 1** are those caused by sparks from conductors of overhead lines, or that result from direct contact between the line and nearby trees and other combustible objects.

Standard fire prevention and suppression measures for similar SDG&E lines would be implemented for the proposed project lines (CECP 2007a, pp.3-10 and 3-11). The applicant's intention to ensure compliance with the clearance-related aspects of GO-95 for the overhead lines and GO-128 in the underground section would be an important part of this mitigation approach. Condition of Certification **TLSN-3** is recommended to ensure compliance with important aspects of the fire prevention measures.

Hazardous Shocks

Hazardous shocks are those that could result from direct or indirect contact between an individual and the energized line, whether overhead or underground. Such shocks are

capable of serious physiological harm or death and remain a driving force in the design and operation of transmission and other high-voltage lines.

No design-specific federal regulations have been established to prevent hazardous shocks from overhead power lines. Safety is assured within the industry from compliance with the requirements specifying the minimum national safe operating clearances applicable in areas where the line might be accessible to the public.

The applicant's stated intention to implement the GO-95-and GO-128-related measures against direct contact with the energized line (CECP 2007a, pp. 3-8 and 3-10) would serve to minimize the risk of hazardous shocks. Staff's recommended Condition of Certification **TLSN-1** would be adequate to ensure implementation of the necessary mitigation measures.

Nuisance Shocks

Nuisance shocks are caused by current flow at levels generally incapable of causing significant physiological harm. They result mostly from direct contact with metal objects electrically charged by fields from the energized line. Such electric charges are induced in different ways by the line's electric and magnetic fields.

There are no design-specific federal or state regulations to limit nuisance shocks in the transmission line environment. For modern high-voltage lines, such shocks are effectively minimized through grounding procedures specified in the National Electrical Safety Code (NESC) and the joint guidelines of the American National Standards Institute (ANSI) and the Institute of Electrical and Electronics Engineers (IEEE). For the proposed project lines, the project owner will be responsible in all cases for ensuring compliance with these grounding-related practices within the rights-of-way.

The potential for nuisance shocks around the proposed lines would be minimized through standard industry grounding practices (CECP 2007a, p. 3-8). Staff recommends Condition of Certification **TLSN-4** to ensure such grounding for CECP.

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 available evidence as evaluated by the CPUC, other regulatory agencies, and staff has not established that such fields pose a significant health hazard to exposed humans. There are no health-based federal regulations or industry codes specifying environmental limits on the strengths of fields from power lines. Most regulatory agencies believe, as staff does, that health-based limits are inappropriate at this time. They also believe that the present knowledge of the issue does not justify any retrofit of existing lines.

Staff considers it important, as does the CPUC, to note that while such a hazard has not been established from the available evidence, the same evidence does not serve as proof of a definite lack of a hazard. Staff, therefore, considers it appropriate in light of present uncertainty, to recommend 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 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 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 and required by staff for all permitted lines. 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, their fields are required under this CPUC policy to be similar to fields from similar lines in that

service area. Designing the proposed project lines according to existing SDG&E 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 findings did not identify a need for significant changes to existing field management policies. Since there are no residences in the immediate vicinity of the proposed project lines, 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 lines. These types of exposures are short term and well understood as not significantly related to the health concern.

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 to 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 is 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 SDG&E lines, specific field strength-reducing measures would be incorporated into 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 publicly inaccessible routes of the proposed project line have no nearby residences, thereby eliminating the potential for the residential field exposures at the root of the health concern of recent years. The strengths of the lines' fields along the route would depend on the effectiveness of the field-reducing measures incorporated into their designs. These fields should be of the same intensity as SDG&E lines of the same voltage and current-carrying

capacity. The requirements in Condition of Certification **TLSN-2** for field strength measurements are intended to validate the applicant's assumed minimization efficiency.

CUMULATIVE IMPACTS AND MITIGATION

When field intensities are measured or calculated 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 lines would be designed and erected according to applicable field-reducing SDG&E guidelines as currently required by the CPUC for effective field management, any contribution to cumulative area exposures should be at levels expected for SDG&E 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 138-kV and 230-kV line designs would be assessed from the results of the field strength measurements specified in Condition of Certification **TLSN-2**.

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 SDG&E. Since the proposed project lines would be designed according to the respective requirements of the LORS listed in **TLSN Table 1**, and operated and maintained according to current SDG&E guidelines on line safety and field strength management, staff considers the proposed 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-2**.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Staff received no public or agency comments on the transmission line nuisance and safety aspects of the proposed CECP.

CONCLUSIONS

Since staff does not expect the proposed CECP transmission lines to pose an aviation hazard according to current FAA criteria, staff does not consider it necessary to recommend location changes on the basis of a potential hazard to area aviation.

The potential for nuisance shocks would be minimized through grounding and other field-reducing measures to be implemented in keeping with current SDG&E guidelines (reflecting standard industry practices). These field-reducing measures would maintain the generated fields within levels not associated with radio-frequency interference or audible noise.
The potential for hazardous shocks would be minimized through compliance with the height and clearance requirements of PUC's General Orders 95 and 128. Compliance with Title 14, California Code of Regulations, section 1250, would minimize fire hazards, while the use of

low-corona line designs, 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 route.

Since electric or magnetic field health effects have neither been established nor ruled out for the proposed CECP and similar transmission lines, the public health significance of any related field exposures cannot be characterized with certainty. The only conclusion to be reached with certainty is that the proposed line design and operational plan would be adequate to ensure that the generated electric and magnetic fields are managed to an extent the CPUC considers appropriate in light of the available health effects information. The long-term, mostly residential magnetic exposure of health concern in recent years would be insignificant for the proposed lines given the general absence of residences along the proposed route. On-site worker or public exposure would be short term and at levels expected for SDG&E lines of similar design and current-carrying capacity. Such exposure is well understood and has not been established as posing a significant human health hazard.

Since the proposed project line would be operated to minimize the health, safety, and nuisance impacts of concern to staff and would be located within the existing plant's property boundaries without nearby residences, staff considers the proposed design, maintenance, and construction plan as complying with the applicable laws. With the conditions of certification proposed below, any such impacts would be less than significant.

PROPOSED CONDITIONS OF CERTIFICATION

TLSN-1 The project owner shall ensure that the proposed 138-kV and 230-kV transmission lines and related switchyards are constructed according to the respective requirements of California Public Utility Commission's GO-95, GO-52, GO-131-D, GO-128, Title 8, and Group 2, High Voltage Electrical Safety Orders, sections 2700 through 2974 of the California Code of Regulations, and San Diego Gas & Electric's EMF-reduction guidelines.

Verification: At least 30 days before starting the upgrade 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 use a qualified individual to measure the strengths of the electric and magnetic fields from each line at the points of maximum intensity along its route. The measurements shall be made 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 post-energization measurements with the CPM within 60 days after completion of the measurements.

TLSN-3 The project owner shall ensure that the rights-of-way of the proposed transmission lines are kept free of combustible material, as required under the provisions of

section 4292 of the Public Resources Code and section 1250 of Title 14 of the California Code of Regulations.

Verification: During the first five years of plant operation, the project owner shall provide a summary of inspection results and any fire prevention activities carried out along the right-of-way of each line and provide such summaries in the Annual Compliance Report.

TLSN-4 The project owner shall ensure that all permanent metallic objects within the right-of-way of each of the two 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.

REFERENCES

CECP 2007a. Application for Certification for the Carlsbad Energy Center Submitted to the California Energy Commission on September 11, 2007.

(EPRI). Electric Power Research Institute. 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.

SR 2007h, Stoel Rives filed Project Enhancement and Refinement (PEAR) CECP AFC Supplement, July 25, 2008.

VISUAL RESOURCES

Testimony of William Kanemoto

SUMMARY OF CONCLUSIONS

Staff has analyzed visual resource related information pertaining to the proposed Carlsbad Energy Center Project, and found that the project, with staff-recommended conditions of certification, would not introduce an adverse “Aesthetic” impact under the California Environmental Quality Act and Guidelines, and would comply with applicable laws, ordinances, regulations, and standards pertaining to aesthetics or preservation and protection of sensitive visual resources.

A potentially significant cumulative visual impact may be created as a result of the combination of the proposed Carlsbad Energy Center Project and the North Coast Interstate 5 HOV/Managed Lanes Project being proposed by the California Department of Transportation (Caltrans) which affects U.S. Interstate 5 bordering the Carlsbad Energy Center Project site. Construction is scheduled to begin five to ten years from the time it releases its preferred alignment, or January 2015 at the earliest. Condition of Certification VIS-5 is proposed as a means to address these potential future cumulative impacts.

INTRODUCTION

Visual resources are the visible natural and man-made features of the environment. In this section, staff evaluates the proposed project’s construction and operation using the “Aesthetic” criteria of the California Environmental Quality Act (CEQA) Guidelines to determine if the project would introduce a significant impact under CEQA, and if the project would comply with applicable laws, ordinances, regulations, and standards (LORS) pertaining to aesthetics or preservation and protection of sensitive visual resources.

In order to provide a consistent framework for the analysis, a standard visual assessment methodology developed by CEC staff and applied to numerous siting cases in the past was employed in this study. A description of this methodology is provided in **Appendix VR-1.**

LAWS, ORDINANCES, REGULATION, AND STANDARDS

Visual Resources Table 1 provides a general description of identified adopted federal, state, and local LORS pertaining to aesthetics or preservation and protection of sensitive visual resources relevant to the proposed project.

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

Applicable LORS	Description
Federal	
	The project does not involve federal lands or any federal laws related to visual resources.
State	
California Coastal Act of 1976, Section 30251 – Scenic and Visual Qualities	The scenic and visual qualities of coastal areas shall be considered and protected as a resource of public importance. Permitted development shall be sited and designed to protect views to and along the ocean and scenic coastal areas, to minimize the alteration of natural land forms, to be visually compatible with the character of surrounding areas, and, where feasible, to restore and enhance visual quality in visually degraded areas. New development in highly scenic areas such as those designated in the California Coastline Preservation and Recreation Plan prepared by the state Department of Parks and Recreation and by local government shall be subordinate to the character of its setting.
California Streets and Highways Code, Sections 260 through 263 – Scenic Highways	Ensures the protection of highway corridors that reflect the State's natural scenic beauty.

Local	
City of Carlsbad General Plan, 1994 as amended	Encourages visual integration of projects of differing types or densities through the use of building setbacks, landscaped buffers, or other design features. Ensures that design reflects concerns about the preservation of viewsheds.
<u>Land Use Element</u> - Implementation Policy C.7	Provides specific site development criteria, includes size, height and location of buildings and the character amount of landscaping and screening, greenbelts and pathways. Requires screening of all storage, assembly, and equipment areas completely from view.
<u>Circulation/Scenic Highways Element</u> - Implementation Policy C.2	Provides the Carlsbad Scenic Corridor Guidelines, designated corridors and streets.
City of Carlsbad Specific Plan 144, adopted 2006	Provides development standards including landscaping and exterior lighting for the Agua Hedionda Lagoon and the Encina Power Station property.

Agua Hedionda Local Coastal Program - Land Use Plan, adopted 1982.	Identifies land uses and standards by which development will be evaluated within the Coastal Zone. Identifies uses and provides standards adopted by the city of Carlsbad and the California Coastal Act 1976. Although the Implementation Plan was adopted by the City in 1982, authority to issue coastal permits under the plan remains with the State Commission.
Encina Power Plant Precise Development Plan, adopted 2006	Provides specific development standards for the Encina Power Station property including architecture, building materials, landscaping and grading.

SETTING

The proposed Carlsbad Energy Center Project (CECP) would be built within the incorporated city of Carlsbad, California. The project site is situated within the Encina Power Station (EPS) property on the southern edge of the Agua Hedionda Lagoon, a highly scenic 400-acre lagoon that, with the adjoining Pacific Ocean, dominates the project viewshed and views in its vicinity.

The regional landscape setting is defined by the Pacific Ocean, situated less than 1/3-mile to the west. From there the beach and a narrow coastal plain give way to rolling low-elevation hills that rise eastward, dominated by residential development with a high proportion of tree canopy that provides an attractive and unifying visual element. Substantial areas of agricultural open space are also visible on these hills throughout the project viewshed. The Agua Hedionda Lagoon is one of three major tidal lagoons within the city of Carlsbad, which represent a highly distinctive and dominant feature of the city's landscape. Farther to the east, peaks and ridges of the San Marcos and Merriam Mountains rise to over 1,500 feet. In the far distance to the east, peaks of the Peninsular Range within the Cleveland National Forest define the horizon, reaching heights of 5,000 feet or more.

Land uses in the immediate vicinity of the project site are dominated by intensively-used, scenically-sensitive recreational destinations, including the adjacent lagoon and associated facilities, and Carlsbad State Beach. Highway I-5, an eligible State Scenic Highway, and Carlsbad Boulevard, a locally designated scenic corridor, bound the EPS site to the east and west respectively; and a rail line carrying Amtrak and Coaster regional commuter trains bounds the CECP site to the west. In addition, other designated local scenic roadways and adjoining residences have prominent views to the site over the lagoon.

In general scenic quality of the project viewshed is comparatively high, distinguished by views of the Agua Hedionda Lagoon, the Pacific Ocean, substantial areas of agricultural

open space, and predominantly residential development with a relatively high degree of visual intactness and unity.

PROJECT SITE

Visual Resources Figure 1 - view of the Project Site, depicts views from within the proposed Carlsbad Energy Center Project site (all figures referred to in the text may be found at the end of this section) (AFC Figure 5.13-4)(CECP 2007a).

The proposed CECP site comprises the northeastern portion of the present Encina Power Station (EPS) property, located immediately south of the Agua Hedionda middle and outer lagoons, east of the railroad line that bisects the EPS property, and west of U.S. Interstate 5 (I-5).

The proposed power plant would occupy the current site of three of four existing (unused) oil storage tanks which sit roughly 24 feet below surrounding grade. In addition, the proposed site is currently bordered to the north and east by an earthen berm roughly 10 to 15 feet above surrounding grade, which is planted with Eucalyptus and other screening vegetation reaching 45 feet or more in height on the north and east. This tall tree canopy is a prominent feature of the existing site, particularly in views from I-5, where it occupies the immediate visual foreground, and in views over the lagoon from the north. The visibility of the existing storage tanks on the proposed CECP site to public off-site viewers is thus virtually nonexistent. The tanks extend minimally above surrounding grade due to their below-grade siting, and are effectively screened by the surrounding earthen berm and landscaping.

The remainder of the existing EPS property consists of the EPS generation facility, whose 200-foot tall main building enclosure, and 400-foot-tall exhaust stack are the tallest structure in the City and a prominent regional landmark. Although the generation structure and stack are large and industrial in character, they present a relatively simple, uncluttered architectural form comparable to a large building, albeit marked by the 400-foot tall exhaust stack, which extends its visibility and accentuates its visual dominance over a wider area. A large switchyard (comprised of both 138-kV and 230-kV transmission facilities), located east of the main EPS building, is partly screened from off-site views by the EPS generation structure itself to the west; by an earthen berm and tree screening foliage at the edge of I-5 to the east; and by fencing, intervening structures, and a masonry wall and landscaping on Cannon Road to the south. The switchyard is briefly visible to southbound motorists and other viewers on Carlsbad Boulevard to the north, presenting a highly industrial but visually subordinate element to those views. Other major visual features on the EPS property include three fuel oil storage tanks (EPS west tank farm) located northeast of the EPS generation building. The west tank farm is comprised of EPS Tanks 1-3. The west tank farm is sited at grade and overlooks the outer lagoon shoreline. Its tanks are prominently visible to motorists and pedestrians using Carlsbad Boulevard. The area surrounding the two northernmost western tanks (EPS Tanks 1 and 2) will be used as the project's construction laydown sites "D" and "E" (AFC, Figure 2.2-10)(PEAR, Revised Figure 2.1-1)(SR2008h). The southernmost western tank (EPS Tank 3) is the site location for the proposed Carlsbad Seawater Desalination Plant (CSDP).

Four series of highly prominent 138 kV and 230 kV single-pole transmission towers and accompanying lines are visible east of the EPS generation building and cross I-5 from west to east, contributing an additional element of industrial character to the site that is especially dominant from the interstate.

VISUAL RESOURCES Table 2
Summary of Major Publicly Visible Structures

Proposed New Project Component	Number of Units	Length, Width, Diameter (approximately)	Height (approximately)
Exhaust Stacks	2		139 feet
HRSGs	2		88 feet
Transmission Poles	9		74-100 feet
Air Cooling Units	2		22 feet
Gas turbine inlets	2		76 feet
230 kV Switchyard	1		56 feet

Visual Resources Figure 2 depicts architectural elevations of the proposed power plant as revised in the Project Enhancement and Refinement, with 139-foot tall exhaust stacks(PEAR, Figure 2.2-2B)(SR 2008h).

Base elevation of the existing CECP site is roughly 31 feet. The proposed base elevation of the CECP would be approximately the same. Consequently, approximately 24 feet of the proposed power plant would be below surrounding grade, and up to 39 feet would be below the top of the existing earth berm adjoining I-5, leaving 100 feet of the plant stacks above the top of the existing earth berm (as seen from I-5), and 49 feet of the HRSGs exposed above the berm.

Transmission Lines - Nine new single-pole transmission towers, ranging in height from 74 to 100 feet (in addition to associated transmission lines and equipment) would be added to the CECP/EPS properties. Four 84-foot poles would be located near the edge of the railroad right-of-way, three of these near the top of the proposed spoil berms on the CECP site's western boundary (CH2Mhill 2007).

Natural Gas Pipeline – Natural gas would be provided from a connection to the existing Southern California Gas supply line on the EPS property (CECP 2007a, 2.2.6).

New 230 kV Switchyard – A new 230 kV switchyard with A-frames of up to 56 feet in height would be constructed directly south of the proposed CECP on the existing SDG&E Cannon substation property, adjacent to the southbound Cannon Road off-ramp of Highway I-5 near existing SDG&E transmission towers.

Construction Staging Area - Slightly less than 10 acres of the EPS property, including the area surrounding EPS Tanks 1 and 2, would be used as a construction lay-down and parking area for the proposed CECP (CECP 2007a, Figure 2.2-10).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

To determine whether there is a potentially significant visual resources impact generated by a project, Energy Commission staff reviews the project using the 2006 CEQA Guidelines Appendix G Environmental Checklist pertaining to "Aesthetics." The checklist questions include the following:

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 evaluates both the existing visible physical environmental setting, and the anticipated visual change introduced by the proposed project to the view, from representative, fixed vantage points (called "Key Observation Points" [KOPs]). KOPs are selected to be representative of the most characteristic and most critical viewing groups and locations from which the project would be seen. The likelihood of a visual impact exceeding Criterion C. of the CEQA Guidelines, above, is determined in this study by two fundamental factors: the susceptibility of the setting to impact as a result of its existing characteristics (reflected in its current level of visual quality, the potential visibility of the project, and the sensitivity to scenic values of its viewers); and the degree of visual change anticipated as a result of the project. These two factors are summarized respectively as *visual sensitivity* (of the setting), and *visual change* (due to the project) in the discussions below. Briefly, KOPs with high sensitivity (due to outstanding scenic quality, high levels of viewer concern, etc.) that experience high levels of visual change from a project, are more likely to experience adverse impacts. Staff also reviews federal, state, and local LORS and their policies or guidelines for aesthetics or preservation and protection of sensitive visual resources that may be applicable to the project site and surrounding area. These LORS include local government land use planning documents (e.g., General Plan, zoning ordinance).

Please refer to **Appendix VR-1** for a complete description of staff's visual resources evaluation criteria.

Visual Resources Figure 3 shows the locations of the nine KOPs used in this analysis:
- KOP 1 – view from Carlsbad Boulevard looking southeast;
- KOP 2 – view from Pannonia Trail at Capri Park;
- KOP 3 – view from end of Cove Drive;
- KOP 4 – view from end of Hoover Street;
- KOP 5 – view from end of Harbor Drive;

• KOP 6 – view from southbound U.S. Interstate 5 at Agua Hedionda Lagoon;
• KOP 7 – view from northbound U.S. Interstate 5 north of Cannon Road;
• KOP 8 – view from Carlsbad Blvd. looking east from Encina Power Station outfall;
• KOP 9 – view from the Burlington Northern Santa Fe rail corridor looking east;
• KOP 10 – view from EPS site, looking east to CECP site; and
• KOP 11 – view from railroad right of way, looking south to CECP site.

These KOPs are depicted in the context of the overall project viewshed or area of potential visual effect (the area within which the project could potentially be seen), mapped in red color. The computer-generated mapping was projected from the top of the proposed exhaust stacks, and was modified by in-the-field ground truthing to account for the screening effects of existing trees and buildings. In this instance, the potential viewshed as determined by topography alone is sharply limited in many areas by existing buildings, which block views from locations beyond them. Also shown are the ½-mile foreground distance zone, and a 1-mile radius near-middleground distance zone. Outside of this 1-mile zone the visible portions of the proposed project would be largely unnoticed by the casual observer.

Staff's analysis of the project's effect on each KOP is presented under Operation Impacts and Mitigation.

DIRECT/INDIRECT IMPACTS AND MITIGATION

The impact discussion is presented under the following four criteria from CEQA Guidelines Appendix G: scenic vistas, scenic resources, visual character or quality, and light or glare.

A. SCENIC VISTAS

"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 is valued for its high degree of scenic quality.
The City of Carlsbad's Agua Hedionda Local Coastal Program, Land Use Implementation Plan, designates several locations within the proposed project's foreground viewshed along the northern Agua Hedionda Lagoon shore as scenic vistas. These designated scenic vistas are included in this study as KOPs 2, 3, 4, and 5.

Highway I-5, Carlsbad Boulevard, and the BNSF (former ATSF) rail line -- all located in the immediate site visual foreground -- are locally designated scenic routes or corridors with high scenic quality views in the project vicinity. These are analyzed in this study as KOPs 1, 6, 7, 8 and 9.

The anticipated impact to each of these vistas is discussed by individual KOP under Visual Character or Quality, below.

B. SCENIC RESOURCES

"Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway corridor?"

A scenic resource for the purpose of this analysis includes a unique water feature (waterfall, transitional water, part of a stream or river, estuary); a unique physical geological terrain feature (rock masses, outcroppings, layers or spires); a tree having a unique visual/historical importance to a community (a tree linked to a famous event or person, an ancient old growth tree); historic building; or other scenically important physical features, particularly if located within a designated federal scenic byway or state scenic highway corridor.

The Agua Hedionda Lagoon is an intensively used recreational destination and a highly scenic landscape feature that defines the project viewshed. While the proposed project site is located on the edge of the lagoon, the project would not directly affect the lagoon or its scenic value. Other notable scenic features within the project viewshed include the Carlsbad State Beach to the west. The beach would not be affected by the proposed project. No other notable scenic resources were identified within the project viewshed.

U.S. Interstate 5 (I-5) is an eligible State Scenic Highway, although it has not been nominated or designated. I-5 is also a designated San Diego County 'third priority' scenic route, and a designated "Community Scenic Corridor" by the City of Carlsbad.

Carlsbad Boulevard is a designated "Community Theme Corridor" by the City of Carlsbad. The Burlington Northern Santa Fe (BNSF) rail line has also been identified as a "Scenic Corridor" by the City of Carlsbad.

C. VISUAL CHARACTER OR QUALITY

"Would the project substantially degrade the existing visual character or quality of the site and its surroundings?" The project aspects evaluated under this criterion are broken down into two categories: Construction Impacts and Operation Impacts.

Construction Impacts and Mitigation

Approximately 10 acres of the EPS property would be used as lay-down and parking areas for construction of the power plant and switchyard. The proposed main staging location, in the northernmost portion of the proposed CECP site, is currently well-screened by the surrounding earth berm and tall, dense tree plantings. According to the applicant's Data Response #64, these trees would be unaffected by proposed construction activities. If this were the case, impacts from that staging location would not be anticipated (Data Response Set 1) (CH2MHILL 2007b).

However, to address the potential impact caused by the presence of unsightly construction equipment around EPS storage Tanks 1 and 2 (which could be seen by viewers on and around Carlsbad Boulevard and Carlsbad State Beach), staff recommends Condition of Certification **VIS-3**, which provides for screening of

construction staging sites D and E in the northern portion of the EPS site near Tanks 1 and 2.

Trenching for cut-and-cover construction of a proposed 3,700 foot long reclaimed water line on Cannon Road from Avenida Encinas would create a temporary visual disturbance along Cannon Road. These disturbances would be phased, and would last for a period of three weeks (CECP 2007a, 2.2.7.1). Given the temporary short-term effect, the visual impact would be less than significant.

Gas lines would be constructed underground between the EPS property and the CECP site using the railroad right-of-way. No visual impacts would be anticipated.

Other major project construction activities would be largely screened from off-site viewpoints by the existing earth berms and landscape screening surrounding the CECP site. An exception to this would be along the railroad right-of-way, where equipment and material access, and construction of tall spoil berms would create prominent visual disruptions for the period of construction, as seen primarily by passenger train viewers. However, considering the moderate existing visual quality of this railroad track segment, the fleeting nature of views within it, the relatively limited number of affected viewers, and the temporary nature of impacts, these effects are considered to be less than significant.

Anticipated impacts from construction lighting are discussed under Light and Glare.

*Staff-Recommended Mitigation: T*o address the potential adverse impacts of construction and construction staging at staging sites D and E, staff recommends Condition of Certification **VIS-3** which would include, the following:

- planting of additional landscape screening, including tall tree and shrub plantings, on the northern and western boundaries of staging sites D and E (near fuel oil tanks #1 and #2) at the earliest feasible time, during early stages of project construction; and,
- temporary, dark-colored opaque fencing surrounding the staging areas to provide screening in the short term, as landscape screening matures.

Operation Impacts and Mitigation

As described above, Operation Impacts are discussed by representative Key Observation Points (KOPs). As also described previously, potential impacts are identified by two fundamental factors for each KOP: *visual sensitivity* (the susceptibility of the setting to impact as a result of its existing characteristics, including current level of visual quality, potential visibility of the project, and sensitivity to scenic values of viewers); and the degree of *visual change* anticipated as a result of the project.

KOP 1 – View from Carlsbad Boulevard Looking Southeast

Visual Resources Figure 4a and 4b depicts the view from Carlsbad Boulevard, looking southeast towards the project site (PEAR Figure 5.13-6)(SR 2008h).. This view is representative of a range of sensitive viewer groups, including recreational viewers on

Carlsbad State Beach, recreation-oriented pedestrians and bicyclists on the walkway west of Carlsbad Boulevard, and southbound motorists on Carlsbad Boulevard.

Visual Sensitivity

Motorists on Carlsbad Boulevard have spectacular views of the ocean and lagoon. Viewer exposure to the project site, which occupies the visual foreground of the roadway to the east, is moderate. The number of viewers, both motorists and beach visitors, is very high, but intervening terrain and vegetation of the EPS site, and the screening vegetation on the northern portion of the CECP site, strongly filter views of the site. Motorists' attention tends to be drawn most strongly to the ocean rather than eastward toward the project site, but scenic views eastward to the lagoon are also prominent and striking, drawing viewers' attention toward the site. Existing visual quality in the vicinity, characterized by highly scenic views of both the ocean and lagoon, is high. Viewer concern is also considered high due to the scenic designation of the road corridor. This roadway is designated scenic "Community Theme Corridor" in the City of Carlsbad General Plan Circulation Element.

Carlsbad State Beach is a very heavily used public beach located roughly ¼ mile west of the project site. Views on the beach are strongly drawn to the sea, and views of the proposed CECP site from the beach are filtered and partially screened by the higher intervening terrain of Carlsbad Boulevard and its adjoining seawall, which block views of the site as seen from the lower-elevation beach. In addition to beach visitors, however, very high numbers of pedestrians, joggers, and bicyclists utilize the public walkway adjoining the seawall separating Carlsbad Boulevard from the beach. Viewer exposure is thus moderately low from the beach, but high from the road and sidewalk. Given the high recreational value and use of this area, viewer concern is considered high. Visual quality is high.

Overall, sensitivity of the Carlsbad Boulevard/Carlsbad Beach viewshed is thus considered high.

Visual Change

As depicted in **Visual Resources Figure 4B**, the project would be clearly seen from this segment of the viewshed. From some viewpoints, such as this one, the project would be seen with minimal filtering by existing landscaping; from other segments of Carlsbad Boulevard, the project would be partially screened by tree canopy, with the upper portions of the exhaust stacks, heat recovery steam generators (HRSGs) and intake structures visible above the canopy. In either case, the project would introduce contrasting elements of vertical and rectilinear form and line, light and contrastive coloring in relation to the dark visual foreground of tree canopy, resulting in a moderate level of contrast.

Overall visual dominance of the project would remain visually subordinate to the much larger and taller EPS structure. The vertical form and line of stacks and HRSGs would silhouette against the sky (sky-line) above the tree canopy to a degree, increasing dominance and attracting attention to a moderate degree.

The project would not block high quality or scenic views from key viewpoints in this general area. Vertical features would intrude into the sky, but remain visually subordinate.

Due to the moderate level of contrast, subordinate visual dominance, and weak view blockage, overall visual change due to structures would be low to moderate.

Impact Significance – In the context of the setting's high visual sensitivity, the low to moderate level of project visual change would remain a less-than-significant visual impact.

Staff-Recommended Mitigation- Reduction of the structure's color contrast would be an important factor in reducing overall project contrast and dominance from this and other KOPs. Staff thus recommends adoption of Condition of Certification **VIS-1**, painting of all project structures to ensure the lowest feasible color contrast in the short term. In this instance, a darker color more closely matching the color value of the surrounding foreground tree canopy would reduce color and overall contrast.

Additional screening of the facility with in-fill perimeter landscape plantings, as discussed in applicant's Conceptual Landscape Screening Details, Data Response 107c-1, would further reduce project line and form contrast in the long term, although tall tree screening would be limited to the areas north of the proposed new transmission lines. Staff thus recommends Condition of Certification **VIS-2**, Perimeter Landscape Screening and Replacement Planting (SR 2008a)(Data Response Set 2).

The recommended planting of landscaping along the northern edge of the tank sites would provide substantial visual improvement to the beach and Carlsbad Boulevard viewsheds. Staff therefore recommends Condition of Certification **VIS-3**, Screening of Staging Sites D and E, as discussed under Construction Impacts, above.

After the completion of construction, the former recommended tree screening of the tank sites would help partially screen the proposed Carlsbad Seawater Desalination

Project, which is to be constructed where the third fuel oil tank (EPS Tank 3) is located.

Residual Impact Significance After Mitigation with Staff-Recommended Measures- With staff-recommended measures, overall project visual change within this portion of the viewshed could be reduced to a low level, a less-than-significant level of impact, in the long term. With recommended Condition of Certification **VIS-3**, Screening of Construction Staging Sites D and E, the overall visual impact would be beneficial in the long term.

KOP 2 – View from Pannonia Trail at Capri Park

Visual Resources Figure 5a and 5b depicts the view from Pannonia Trail at Capri Park at approximately ¾-mile distance from the project site (PEAR Figure 5.13-7)(SR 2008h). This view is typical of elevated views from the relatively limited number of residences on the north side of the lagoon with unobstructed views of the project site. These viewers represent the only residents with substantial views of the project.

Visual Sensitivity

Residents in general are considered to have potentially high levels of viewer concern due to the long periods of viewing time, typically high levels of concern for their place of residence, and concern with potential effects on property values. Those residents most likely to experience visual impact would be a limited number of viewers north of the lagoon whose views of the site are not obstructed by other homes, terrain, or trees. These views are from predominantly elevated positions on the hillsides facing the site, within a foreground (1/2-mile) or near-middle-ground (up to one- mile) radius of the project site. Visual exposure to the project site is considered moderate, mediated by limited viewer numbers, distance from the project site, and screening at the site. Existing visual quality for potentially affected residential viewers depends on location and the presence of scenic views, but is predominantly moderately high, since those with views of the site are also those with elevated views of the lagoon and ocean.

Overall visual sensitivity of this viewer group is thus moderate to high.

Visual Change

As depicted in **Visual Resources Figure 5b**, the vertical and rectilinear form and line of the power plant would contrast with the irregular silhouette of the foreground tree canopy, as would the marked color contrast of the project as shown. The project contrast in general would be accentuated further by silhouetting against the sky. Overall, visual contrast at these distances would be moderate.

Visual dominance would be moderate. Although dominance is amplified by the sky-lining and form contrast previously described, which would draw viewers' attention to the project, the project would also be visually subordinate to the much larger and more prominent EPS within the same view. The new CECP features however would increase the portion of the view exhibiting industrial character.

The project would 'sky-line,' intruding into views of the sky to a moderate degree.

Overall, visual change would be moderate**.**

Impact Significance – In the context of moderate to high overall viewer sensitivity, project impacts could potentially be significant from viewpoints such as KOP 2.

Staff-Recommended Mitigation- Staff recommends Condition of Certification **VIS-1**, painting of all project structures to ensure the lowest feasible color contrast in the short term. This should include painting of HRSGs, turbine inlet filters, and other features below 88 feet in height in a dark color and value to match the surrounding tree canopy; and painting of exhaust stacks of a color and value to blend with the sky. Also, staff recommends Condition of Certification **VIS-2**, which requires additional perimeter landscape screening, and replacement planting to enhance screening of tall project features in the long term. In this case, in-fill planting of trees, and additional tall tree screening extending farther south on the eastern berm along I-5 would be important in achieving long term screening from views in this portion of the lagoon.

Residual Impact Significance After Mitigation with Staff-Recommended Measures- With lowered color contrast, and with greater tree screening over time, both through increased height of existing screening and with in-fill from new, tall tree plantings, project contrast could be lowered to a low-to-moderate level, particularly in the long term. With those measures, impacts could be reduced to an adverse but less than significant level, though in the long term.

KOP 3 – View from end of Cove Drive

Visual Resources Figure 6a and 6b represents the view from end of Cove Drive (PEAR Figure 5.13-8)(SR 2008h). This view, from a public access area on the northern shore of the inner lagoon just west of Bristol Cove approximately .6 miles from the site, is representative of recreational viewers along the northern shoreline of the inner lagoon.

Visual Sensitivity

KOPs 3, 4 and 5 are scenic vistas identified in the City of Carlsbad Local Coastal Program Agua Hedionda Land Use Implementation Plan and were used in the AFC and this study for visual simulation and analysis. They are all representative of recreational visitors to Agua Hedionda Lagoon within foreground distance of the project site.

Agua Hedionda Lagoon is the site of various recreational activities including boating, swimming, hiking, bicycling, fishing, picnicking and sight-seeing. Various public and private parks and facilities provide recreational destinations with foreground views over the lagoon and toward the project site. These include a pocket park at Harbor Drive, boat ramps at Harrison Street, Adams Street and Bayshore Drive, a large number of private boat ramps in Bristol Cove along adjoining Cove and Marina Drives, and various formal and informal beaches and trails along the northern shore of the lagoon. The North Coast YMCA Aquatic Park provides access to the middle lagoon, the only portion of the lagoon in which swimming is allowed, and directly faces the project site at a distance of roughly 500 feet. Adams and Park Drives, overlooking the northern lagoon shoreline, provide continuous, scenic views for motorists, joggers and bicyclists and are a designated Scenic Corridor under the City General Plan. The lagoon is also the site of the Agua Hedionda Discovery Center, a nature study center located at its eastern end. In effect, then, the entire northern shoreline and vicinity of the outer, middle, and inner lagoon represent a high sensitivity viewpoint for recreational viewers. Viewer concern, viewer exposure, and existing visual quality for this group of viewers and viewpoints are all high. Overall viewer sensitivity is thus high.

Visual Change

As depicted in **Visual Resources Figure 6B**, the project would introduce elements of vertical and rectilinear form and line contrast, silhouetted against the backdrop of the sky. It would also present light, contrastive coloring in relation to the dark visual foreground of tree canopy, resulting in a moderate level of contrast.

The project would attract viewers' attention due to its contrastive, vertical form and industrial character. It would remain visually subordinate to the larger existing EPS facility within the same view, but would also compound the industrial character of this

segment of the view, and increase the portion of the view with industrial character. Overall dominance would be moderate (co-dominant).

The project would not block scenic views from vantage points in this general area. Vertical features would intrude into the sky and alter the existing silhouette of tree canopy.

Overall visual change would thus be moderate.

Impact Significance – In the context of high viewer sensitivity in the lagoon viewshed, however, moderate visual impacts could potentially be significant.

Staff-Recommended Mitigation- Staff recommends Condition of Certification **VIS-1**, painting of all project structures to ensure the lowest feasible color contrast in the short term. In this instance, a darker tan or green color more closely matching the color value of the surrounding foreground tree canopy would reduce color and overall contrast; or, alternatively, dark-colored HRSGs, and light-colored stacks to reduce contrast against the sky. Staff also recommends Condition of Certification **VIS-2**, which provides additional perimeter landscape screening, and replacement planting to enhance screening of tall project features in the long term. In this case, additional tall tree screening extending farther south on the eastern berm along I-5 would be important in achieving long-term screening from views in this portion of the lagoon.

Residual Impact Significance After Mitigation with Staff-Recommended Measures - With staff-recommended conditions, overall contrast would be reduced to a weak level, a less than significant impact, though in the long term with maturation of recommended in-fill landscaping.

KOP 4 – View from end of Hoover Street

Visual Resources Figure 7a and 7b presents a view from the end of Hoover Street (PEAR Figure 5.13-9)(SR 2008h). This view is a readily accessible public access point near the shoreline recreation trail on the lagoon shore, approximately .4 mile from the project site. Like KOP 3, it is typical of recreational views from the lagoon shore, at a somewhat closer distance from the project site.

Visual Sensitivity

As under KOP 3, viewer concern, viewer exposure, and existing visual quality for this group of viewers and viewpoints are all high. Overall viewer sensitivity is thus high.

Visual Change

Because of the particular angle of this view, the project appears well-screened by the tall existing Eucalyptus canopy on the berm bordering I-5. This existing Eucalyptus screening nearly equals the height of the proposed CECP structures and, especially from views farther west on the lagoon such as this, effectively screens the greater part of the project. As the viewer moves closer to the site at lagoon level, the effectiveness of the foreground screening increases due to the effect of viewing angles.

Form, line, and overall contrast of the protruding stacks in this view are weak. However, from views from the water farther to the south, the structures would not be screened by the tall canopy, and overall form, line and color contrast could be moderate.

From this view angle, visual dominance of the CECP structures would be subordinate to the EPS stack and weak generally. However, views from the water farther to the south, where tall screening would be absent the dominance of the structures could be moderate.

View blockage would not occur from this portion of the viewshed.

Overall visual change would thus range from weak to moderate, depending upon the exact location of viewing (on the shore, in the water), angle of view and presence of tall Eucalyptus canopy to screen the structures.

Impact Significance – Impacts in this portion of the viewshed would thus range from less than significant, as in the view depicted in **Visual Resources Figure 7b**, to potentially significant in areas farther south or to the east not screened by tall tree canopy.

Staff-Recommended Mitigation- Staff recommends Condition of Certification **VIS-1**, painting of all project structures to ensure the lowest feasible color contrast in the short term. Staff recommends Condition of Certification **VIS-2**, additional perimeter landscape screening and replacement planting to enhance screening of tall project features in the long term. In this case, additional tall tree screening extending farther south on the eastern berm along I-5 would be important in achieving long term screening from views in this portion of the lagoon.

Residual Impact Significance After Mitigation with Staff-Recommended Measures- With the recommended Conditions of Certification, impacts throughout this portion of the near inner lagoon viewshed would be reduced to less than significant levels in the long term with tree canopy maturity.

KOP 5 – View from end of Harbor Drive

Visual Resources Figure 8a and 8b presents a view from the end of Harbor Drive, looking south from a distance of approximately .3-mile (PEAR Figure 5.13-10)(SR 2008h). This view, from a public vista point on the north shore of the middle lagoon, looking directly to the site, is representative of recreational viewers in and around the middle lagoon. The middle lagoon is the only area in which swimming is permitted. The North Coast YMCA Aquatic Park can be seen in the foreground to the right.

Visual Sensitivity

As under KOP 3, viewer concern, viewer exposure, and existing visual quality for this group of viewers and viewpoints are all high. Overall viewer sensitivity is thus high.

Visual Change

As depicted in **Visual Resources Figure 8b**, from this viewing angle the existing berm and tall Eucalyptus canopy provides nearly complete screening of the project. With

currently proposed 139-foot stacks, the stacks would protrude slightly above the tree canopy into the sky to a slight degree. Because the existing tree screening on the north part of the site is particularly dense and tall, screening in the middle lagoon viewshed is substantial, however, and project contrast would be low.

The project's dominance would be subordinate from this portion of the viewshed.

No view blockage by the project would take place from this location. A low level of sky-lining of the exhaust stacks would take place.

Overall Visual Change – Overall visual change from foreground viewpoints in the middle lagoon would be low.

Impact Significance – No adverse impacts within the middle lagoon viewshed are anticipated.

Staff-Recommended Mitigation- No mitigation is required.

Views from Residential Receptors South of the Site
South of the project site, views by residents south of Cannon Road and west of Carlsbad Boulevard are almost entirely blocked by intervening structures, including a landscaped masonry wall on the north side of Cannon Road, between the railroad track and Cannon Park. Overall, views to the project site from this portion of the viewshed are negligible. No KOPs were selected in this area for this reason.

KOP 6 – View from southbound U.S. Interstate 5 at Agua Hedionda Lagoon

Visual Resource Figure 9a and 9b represents a view from southbound I-5 at Agua Hedionda Lagoon (PEAR Figure 5.13-11)(SR 2008h). KOP 6 is representative of views of southbound motorists at a foreground distance from the project site as they cross the lagoon.

Visual Sensitivity

I-5 separates the middle and inner lagoons. This segment of highway presents highly scenic views toward both the lagoon and ocean. The northern earthen berm of the CECP site, and its tall Eucalyptus trees, are prominent in this view, as depicted in **Visual Resource Figure 9b**. Existing visual quality for southbound motorists in the foreground vicinity of the project site is thus moderately high.

The estimated number of average daily vehicle trips on I-5 by the EPS property is 206,000 (CECP 2007a, 5.12.3.1.1). Although duration of visual exposure to the project site is brief, the number of viewers is very high, and many commuters are likely to pass the site twice a day, daily. However, viewer exposure to the project site, due to substantial screening by the existing earth berm and tall trees adjoining the highway, is considered moderate.

Although typical urban motorists (e.g., commuters) are not necessarily focused on scenery or scenic values, this portion of I-5 has been identified as a 'third priority' scenic route in the San Diego County General Plan Scenic Highway Element, and as a

designated “Community Scenic Corridor” in the City of Carlsbad General Plan Circulation Element. The plans demonstrate recognition of special scenic value accorded views along this portion of the highway by the county and city. I-5 viewers along this highway segment are thus considered to have a moderately high viewer concern.

Overall viewer sensitivity for southbound motorists on I-5 is thus considered to be moderate to high.

Visual Change

As depicted in **Visual Resources Figure 9b**, from this viewing angle the existing berm and trees would almost completely screen the project. With proposed 139-foot stacks, the top of the stacks would be visible above the tree canopy to a very slight degree, with little noticeable form, line and color contrast against the sky. A slight degree of color contrast would make the project visible beneath the tree canopy. Overall, contrast would be low.

The project would not attract attention from this KOP and visual dominance would be very subordinate (low).

The project would not block views from this KOP.

Overall visual change would be low.

Impact Significance – Given the low level of visual change from this viewpoint, anticipated impacts would be negligible.

Recommended Mitigation - None needed.

KOP 7 – View from northbound U.S. I-5 north of Cannon Road

Visual Resources Figures 10a and 10b represent a view from northbound I-5 north of Cannon Road. The existing transmission lines are visually dominant and lower the visual quality of the scene. North of this point, however, visual intrusions from the industrial features of the EPS are not evident, and potential visual prominence of the project increases (PEAR Figure 5.13-11)(SR 2008h). **Visual Resources Figure 10c** depicts a view of the site with balloons indicating the tops of stacks and HRSGs.

Visual Sensitivity

Existing visual quality for northbound motorists is moderate due to an absence of the ocean or lagoon views that distinguish the view of southbound motorists, as well as the presence of EPS transmission lines crossing the highway. The intrusion of transmission lines and prominence of the freeway itself are partly off-set by the vividness of the landscaped earth berms and high tree canopy west of the highway, which also screen the industrial EPS features. As discussed under KOP 6, visual exposure to the project would be moderate, and viewer concern is moderately high due to special designations of the highway. Overall viewer sensitivity for northbound motorists on I-5 in this segment is considered to be moderate.

Visual Change

Views of the project stacks and HRSGs would be seen primarily from the segment of I-5 not screened by tall Eucalyptus on the earth berm. As motorists travel northward screening from the Eucalyptus becomes more complete. As illustrated in **Figure 10b**, the light-colored, vertical and rectilinear forms of the CECP stacks, HRSGs, and new transmission lines west of the generation units would be partially screened by the existing landscaped berm and associated tall tree screening, contrasting to a moderate degree with the existing setting. As indicated in **Figure 10c**, the prominence of the power plant would increase considerably as motorists pass by the site.

Visually prominent project features, particularly the exhaust stacks, HRSGs, new 230 kV switchyard east of the railroad tracks, and new transmission towers west of the new CECP generation Units 6 and 7, would be visually subordinate to the taller, closer existing transmission towers and lines near Cannon Road; they would become co-dominant (moderate dominance) at their nearest and most visually prominent points north of the transmission right-of-way as motorists pass the site. The impression on passing viewers would be relatively strong, but also brief.

Blockage of scenic views would not occur. Taller project features would intrude into views of the sky to a moderate degree.
Overall, visual change would be moderate.

Impact Significance – In the context of moderate overall visual sensitivity, project impacts would be adverse but less-than-significant for northbound motorists in the foreground vicinity to the site.

Staff-Recommended Mitigation – None required at this KOP. However, staff recommends Condition of Certification **VIS-1**, painting of all project structures to ensure the lowest feasible color contrast in the short term. Staff also recommends Condition of Certification **VIS-2**, which provides for additional perimeter landscape screening and replacement planting to enhance screening of tall project features in the long term. In this segment of I-5, additional tall tree screening extending farther south on the eastern berm along the highway would be most important in achieving more effective long-term screening from views along the highway, and to to replace trees lost to old age over the long term.

Residual Impact Significance After Mitigation with Staff-Recommended Measures- With lowered color contrast, and with greater tree screening over time, both through increased height of existing screening and with in-fill from new, tall tree plantings, project contrast could be lowered to a low-to-moderate level, particularly in the long term. With those measures, impacts could be neutral or beneficial in the long term.

KOP 8 – View: Carlsbad Boulevard looking east from Encina Power Station outfall

VISUAL RESOURCES Figure 11a and 11b represents the view of motorists, pedestrians and beach-goers on Carlsbad Boulevard, looking east near the existing power station's outfall from the pedestrian walkway (PEAR Figure DR 111) (SR 2008h).. This KOP was requested by the City of Carlsbad to depict the anticipated level of

visibility of the project from viewpoints farther south on Carlsbad Boulevard and Carlsbad Beach.

Visual Sensitivity

The same discussion as under KOP 1 applies generally to this KOP, located roughly ½-mile to the south on Carlsbad Boulevard. As under KOP 1, viewer exposure, viewer concern and visual quality from this KOP are all high. Overall, sensitivity of this viewshed is thus considered high.

Visual Change

As depicted in **Visual Resources Figure 11b**, contrast of the project from this viewpoint would be moderate. While most of the project would be screened by existing tree canopy, upper portions of the exhaust stacks would sky-line, creating a moderate degree of form and line contrast from the nearest viewing locations on Carlsbad Boulevard. In the worst case, if the stacks presented strong color contrast with the sky, contrast would be increased and could reach moderately strong levels from the nearest viewing locations.

Project structures would remain subordinate to existing EPS features.
No views would be blocked from this KOP. The stacks would intrude into the sky to a small degree, but highly scenic views to the ocean to the west would strongly draw viewers attention away from the site.

With moderately strong contrast, subordinate visual dominance, and weak view blockage, overall visual change due to structures could be moderate from the nearest viewpoints on Carlsbad Boulevard directly west of the site.

Impact Significance – In the context of the setting's high visual sensitivity, moderate project visual change could represent a potentially significant visual impact.

Staff-Recommended Mitigation - Reduction of the structure's color contrast would be an important factor in reducing overall project contrast and dominance from this and other KOPs. Staff thus recommends adoption of Condition of Certification **VIS-1**, painting of all project structures to ensure the lowest feasible color contrast in the short term. In this case, stacks should be of a light-colored, low-reflectivity value to blend with the sky in order to minimize potential contrast.

Residual Impact Significance After Mitigation with Staff-Recommended Measures- With lowered color contrast, project contrast could be reduced to a low-to-moderate level. With that measure, impacts could be reduced to a less than significant level.

KOP 9 – View from Burlington Northern Santa Fe Rail Corridor looking east

Visual Resources Figure 12-a and 12-b represents a simulated view from a passenger train looking directly east, adjacent to the project site, and is representative of viewers on the regional 'Coaster' commuter rail service and on Amtrak, both of which pass the site several times daily (PEAR Figure DR 68-5b)(SR 2008h).

Visual Sensitivity

A portion of the Burlington Northern Santa Fe (BNSF) North County Transit District Rail Corridor (formerly Atchison Topeka and Santa Fe) directly abuts the CECP site to the east, separating the site from the remaining EPS property. Passenger train service through the corridor is provided by the San Diego Coast Express Rail or "Coaster," and Amtrak. Five thousand rail passengers per weekday travel between San Diego and Oceanside (American Public Transportation Association 2008).

The rail corridor is identified as one of four categories of scenic corridors established under Goal C.2 of the Scenic Roadways portion of the city's General Plan Circulation Element. Goal C.11 calls for improvement of the visual quality of the corridor adjacent to this rail line. Consequently, viewer concern is considered to be high. Viewer exposure is low-to-moderate: even absent specific mitigation, proposed intervening earth berms would conceal a large portion, though not all, of the power plant. In addition, viewer exposure is very brief, lasting only a few seconds, and applies only to passengers with views facing eastward. However, the number of viewers is relatively high, and viewer exposure occurs repeatedly, often on a daily basis.

Visual quality of the railroad line is characterized by the quality of views of the corridor seen from the rail line. Existing visual quality in this specific segment of the rail corridor is moderate: a visual foreground consisting mainly of raised earthen berms with substantial tree screening filtering views of the adjoining industrial facilities, particularly on the west side of the EPS, but intermittently on both sides. Views of the lagoon and ocean are not visible from this rail segment.

Overall sensitivity of this KOP is thus considered moderate, reflecting the modest existing visual quality and very brief viewer exposure.

The BNSF right-of-way abutting the CECP western boundary is also part of an approved regional, multi-jurisdictional Coastal Rail Trail (CRT), which has not yet been constructed in the CECP project vicinity. The CRT is a multi-use, Class I and Class II bicycle trail that has been partially constructed in other portions of its alignment and is to be located primarily within the railroad right-of-way in the segment adjoining the CECP. As part of a multi-jurisdictional memorandum of understanding, the City of Carlsbad is planning a trail segment that would stretch between Tamarack Avenue and the Poinsettia Coaster station and include a pedestrian bridge over Agua Hedionda Lagoon. Potential effects on future CRT viewers are discussed below under Cumulative Impacts. Please also review the **Land Use** section of this staff assessment for further analysis.

Visual Change

As depicted in **Visual Resources Figure 12B**, visual contrast from the rectilinear and vertical forms of the stacks, HRSGs, and new transmission poles would be strong, increasing the industrial character of this rail segment, but would also be very brief. The additional height of new engineered earthen berms on this boundary would also add to that contrast. The project would come into view as passengers approached Cannon Road from the south, or the edge of the lagoon from the north, and appear prominent for a period of a few seconds

For passengers with views eastward, the project would be dominant in view for a few seconds.

The project would intrude into eastward views of the sky briefly.

Taking into consideration the brevity of visual exposure, visual change would be moderate.

Impact Significance – In the context of moderate overall viewer sensitivity, project impacts could be adverse but less than significant for train passengers in the foreground vicinity to the site.

Staff-Recommended Mitigation- Although impacts from this KOP would be less than significant, staff recommends Condition of Certification **VIS-1,** painting of all project structures to ensure the lowest feasible color contrast in the short term. Staff also recommends Condition of Certification **VIS-2,** to include additional landscape screening on the new western earth berm adjoining the railroad track, as simulated in **Figure 12b**, and as called for in the City of Carlsbad General Plan Circulation Policies C.6 and C.11., in order to ensure conformance with those policies.

Within this segment of railroad track, the addition of tall shrub screening extending along the western spoil berm would add substantially to long-term screening of the power plant for train viewers and future CRT viewers.

Residual Impact Significance After Mitigation with Staff-Recommended Measures - With lowered color contrast, and with greater tree and shrub screening over time, project contrast could be lowered to a moderate-to-low level, particularly in the long term. With those measures, particularly considering the brief exposure of passengers to these views, impacts could be reduced to an adverse but less than significant level. The project would also conform with General Plan policies C.6 and C.11.

<u>Overall Project Operation Impacts on Existing Visual Character or Quality</u>

Project operation impacts from all identified KOPs on the existing visual character and quality of the setting would be less than significant with project owner and staff-

recommended color mitigation and conditions of certification (Condition of Certification **VIS-1)**, staff and project owner-recommended perimeter landscape screening (Condition of Certification **VIS-2** staff-recommended screening of construction staging

sites D and E (Condition of Certification **VIS-3**) and project owner and staff-recommended lighting mitigation (Condition of Certification **VIS-4**). With these measures, the impacts from project at operation would not substantially degrade the existing visual character or quality of the site and its surroundings, as perceived by sensitive receptors in the project viewshed, although in some cases in the long term.

LINEARS

Overhead Transmission Lines -The nine proposed new transmission towers and associated power lines would all be located to the west of the CECP site and connect and terminate at the existing EPS power plant immediately to the west. Four new 84-foot poles would be located near the railroad right-of-way and would be visible in the foreground to passing train passengers. They would also be visible from Highway I-5 to the east, and would be partially screened by the existing berm and landscaping. Please refer to KOPs 6, 7 and 9 for discussion of potential visual impacts of the proposed transmission towers.

Pipelines –If reclaimed water (as opposed to desalinated seawater) becomes CECP's industrial water source, a proposed 3,700-foot long reclaimed water line on Cannon Road from Avenida Encinas could create a temporary visual disturbance along Cannon Road. No long-term impacts would occur as a result of this pipeline; temporary impacts from pipeline construction are discussed above, under Construction Impacts. Gas lines would be constructed underground between the EPS property and the CECP site using the railroad right-of-way. No visual impacts would be anticipated.

VISIBLE WATER VAPOR PLUMES

The proposed project would be cooled by use of air-cooled condensers. Therefore, no visible water vapor plumes would be emitted from the plant cooling system. Staff conducted visible plume modeling of HRSGs using the CSVP model and concluded that, due to higher than normal exhaust temperatures proposed by the applicant, anticipated visible plume occurrences would be negligible (approximately 1 plume-hour/year). Staff's plume modeling analysis is provided in **Appendix VR-2.**

D. LIGHT OR GLARE

"Would the project create a new source of substantial light or glare that would adversely affect day or nighttime views in the area?"

The proposed project during operation has the potential to introduce light offsite to surrounding properties, and up-lighting to the nighttime sky. If bright exterior lights were not hooded, and lights not directed onsite they could introduce significant light or glare to the vicinity.

Project construction lighting would occur between 7:00 PM and 7:00 AM for up to 25 months. Some construction activities may take place 24 hours a day, 7 days a week.

Currently, night lighting on the Encina Power Station (EPS) property is primarily from the existing generation building and exhaust stack, and pole-mounted area lighting. According to the AFC Project Description, night lighting would be directed downward

and would be down-shielded or capped to reduce glare and light trespass. Where lighting is not required for normal operation, safety or security, switches or motion detectors would be provided to allow these areas to remain dark except as needed (CECP 2007a, 2.2.13.1). To the extent possible, night construction lighting would be pointed toward the center of the site. Task-specific lighting would be used to the extent practical (CEC 2007a, 2.2.13.1). FAA aviation strobe lighting could be required on the taller project structures (CECP 2008--, (DR 110, set 2).

With the effective implementation of the applicant's proposed light trespass mitigation measures as described in the AFC, the project's construction and operation-related lighting impacts in the context of the existing lighting are anticipated to be less than significant. With adequate screening and shielding, proposed new lighting, including aviation strobe lighting, would remain subordinate to the similar existing lighting at the larger, adjacent EPS. Staff recommends Condition of Certification **VIS-4** to ensure full compliance and verification of night lighting measures.

CUMULATIVE IMPACTS AND MITIGATION

As defined in Section 15355 of the CEQA Guidelines (California Code of Regulations, Title 14), a cumulative impact is created as a result of the combination of the project under consideration together with other existing or reasonably foreseeable projects causing related impacts. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time. In other words, while any one project may not create a significant impact to visual resources, the combination of the new project with all existing or planned projects in an area may create significant impacts. A significant cumulative impact would depend on the degree to which (1) the viewshed is altered; (2) view of a scenic resource is impaired; or (3) visual quality is diminished.

Carlsbad Seawater Desalination Project

The proposed Carlsbad Seawater Desalination Project consists of a 50- million-gallon-per-day (56,000 acre-feet per year) seawater desalination plant and associated water delivery pipelines, to be constructed at the Encina Power Station. The desalination project is to be constructed on the site of EPS fuel oil storage Tank 3. The permitted project is slated to begin construction in 2010.

With staff-recommended Condition of Certification **VIS-3**, Screening of Construction Staging Sites D and E, landscape screening would be in place at the completion of construction of the CECP, providing replacement screening of the desalination plant. This would replace the existing oil tanks with landscaping, representing a beneficial impact in both the short- and long-term.

Future Non-Industrial Uses of Decommissioned EPS Site

Although the time frame is not known, it is assumed that at some point in the future, the remaining generation Units (4 and 5) within the EPS generation facility not decommissioned under the CECP project, will also be decommissioned, in accordance with long-range City of Carlsbad plans. At that time, the City envisions complete removal of the existing EPS generation plant, including the generation building and

substation, and re-zoning the entire site to non-industrial coastal dependent uses. Consequently, the City opposes the CECP proposal, and has expressed concern over the potential for the CECP to cause foreseeable future visual impacts due to incompatibility of its industrial character with adjacent future land uses. The concern is that if the CECP were visually prominent from the EPS site, then future non-industrial coastal-dependent uses, including recreational and visitor-serving uses, would be adversely affected by the industrial character of these views.

VISUAL RESOURCES Figures 13a and 13b (KOP 10) depicts the view of CECP Site looking east from the eastern portion of the existing EPS site (PEAR Figure DR 67c) (SR 2008h).

This KOP, requested by the city of Carlsbad, represents views toward the CECP site from a nearby area of the existing EPS site west of the railroad tracks, and simulates a typical close-range view of the CECP under a future scenario in which public uses would occur on the EPS current site.

As depicted in Figure 13B, the CECP site would be highly filtered from these viewpoints, for a combination of reasons:

- Existing tall Eucalyptus trees on the eastern boundary of the EPS site, west of the railroad tracks, currently provide substantial screening sufficient to strongly filter the CECP project.
- Additional berm and landscape screening on the eastern boundary of the EPS site, of the kind visible in this photograph, could easily be included in any future land use plan for the EPS in order to augment or fill in any unscreened portions of the boundary between the two sites, such that visibility of the CECP could be minimized.

Given these mitigation opportunities, the cumulative impact on future views of the CECP project as seen from the EPS site would appear to be readily mitigable, and thus less than significant, from a specifically visual perspective.

Coastal Rail Trail

The Coastal Rail Trail (CRT) is an approved regional project that would eventually create a Class I and Class II bicycle trail and a walking trail from San Diego to Oceanside primarily within the railroad right-of-way. Portions of the project have been completed, and a planned portion of the 7.2 mile trail involves use of the BNSF rail corridor next to the CECP site. The precise trail alignment in this segment has not yet been determined. Please see the **Land Use** section of this staff assessment for more specific analysis on the CRT.

Visual Resources Figure 14a and **-14b (KOP 11)** depicts the CECP as it would appear to users of the proposed Coastal Rail Trail, looking south approximately 500 feet from the project site assuming that the trail were to be located within the existing railroad right-of-way (PEAR Figure DR 68-6)(SR 2008h).

From the trail, visual change would progress from moderate to strong levels as one approached the power plant. However, as trail users approached the power plant,

screening of the earthen berm would also become increasingly effective. With staff-recommended Condition of Certification **VIS-2** and project owner-proposed landscape plantings on the north- and west-facing berms, overall impacts of the project to trail users would be less than significant, declining over time with landscape maturity.

North Coast Interstate 5 HOV/Managed Lanes Project

The North Coast Interstate 5 HOV/Managed Lanes Project (I-5 Widening Project) is being proposed by the California Department of Transportation (Caltrans) and) includes the portion of I-5 that borders the east side of the Encina Power Station property and the CECP site. While Caltrans has yet to release a complete Draft Environmental Impact Statement / Environmental Impact Report (Draft EIR/EIS) for the 28-mile project that runs from La Jolla Village Drive north to Harbor Drive in Oceanside, the project involves multiple phases, including the current construction of one additional carpool lane in each direction from Genesee Avenue to Del Mar Heights Road on I-5. Caltrans is also proposing to add two carpool/managed lanes in each direction from Del Mar Heights Road to Vandergrift Boulevard/Harbor Drive in Oceanside, and potentially one general-purpose lane in each direction from Del Mar Heights Road to State Route 78. In the segment of I-5 immediately adjacent the CECP in the city of Carlsbad, Caltrans has indicated that there are four (4) alternative alignments under study, each including two new elevated High Occupancy Vehicle (HOV) lanes near the center median between the Agua Hedionda Lagoon and Cannon Road on ramp/off ramp, directly east of the proposed CECP and SDG&E Cannon Substation. Preliminary engineering and environmental studies have been underway for several years. The latest indication from Caltrans on the release of the I-5 widening project Draft EIR/EIS was the summer of 2009 (Caltrans 2009b). Environmental studies are anticipated to be completed in 2009 with construction beginning from the southern project terminus in San Diego. However, northern project construction in the vicinity of the CECP is not anticipated for several years (Caltrans District 11 website: http://www.dot.ca.gov/dist11/facts/5hov.pdf.), which staff has been told is a minimum of 5 -10 years following initial project commencement. Caltrans staff has prepared four alternatives for the I-5 widening project and provided preliminary layout information for these four in the immediate CECP site vicinity (Data Responses DR 67a-1, DR-105-1 through 4)(SR2007d). Caltrans staff have emphasized that these alternatives are not final (Jacobo, Le, Personal conversations, 6/5/2008). Energy Commission staff reviewed the four preliminary alternatives for the I-5 widening project and concludes the following:

- The four alternatives as depicted would all require complete removal of the earthen berm and associated tall tree landscaping currently occupying the eastern boundary of the CECP site.
- Removal of the earthen berm and associated landscaping would eliminate visual screening along the eastern edge of the proposed CECP site and the existing Encina Power Station from I-5, and from sensitive viewpoints to the north and east of the project site, including viewpoints within the inner Agua Hedionda Lagoon.
- At its tallest point, the CECP would be approximately 100 feet in height above the surrounding grade, visible at close proximity to passing motorists. The remaining Encina Power Station property, which includes a generation building and stack, switchyard, transmission poles, and other ancillary above-grade features, would become visible within the KOP 2, 3, 4, 6, and 7 viewsheds.

- It is Energy Commission staff's current understanding that the standard Caltrans "Design Exceptions" (e.g., retaining walls, non-standard side slopes, visual barriers, and non-standard landscaping, etc.) would not be constructed within the existing public right-of-way along this portion of I-5 due to lack of sufficient room between the right-of-way line and the proposed power plant footprint.

- The adverse effect on visual quality of this segment of I-5 from the loss of the existing berm and trees, and the resulting exposure of the EPS and the proposed CECP as seen by south-bound motorists on I-5 is considered to be potentially severe. Although proposed elevated lanes at the center median of I-5 could partially screen views of the CECP as seen from the lagoon and points east, this structure would not replace the existing visual screening, which currently provides screening of up to 60 feet above surrounding grade (including both berm and tree canopy), and contributes an attractive landscape feature in the form of its tree canopy and other landscaping.

The cumulative visual effect introduced by the proposed CECP in combination with the I-5 widening project would thus nullify the less-than-significant visual impact discussed in this analysis for KOPs 2, 3, 4 (north shore of lagoon), and 6 and 7 (Highway I-5), since that determination was dependent upon the presence of the existing berm, existing landscape screening, and the staff-recommended planting of additional in-fill landscape screening. Absent mitigation, it currently appears that a significant cumulative visual impact could occur in the absence of modification to either the I-5 widening project alternatives, the CECP, or both.

In addition, the cumulative effects resulting from a removal of the existing berm and trees, and the exposure of the CECP and EPS power plants would not, absent mitigation, conform to California Coastal Act Policy 30251 which states

> *"permitted development shall be sited and designed to protect views to and along the ocean and scenic coastal areas, to minimize the alteration of natural land forms, to be visually compatible with the character of surrounding areas, and, where feasible, to restore and enhance visual quality in visually degraded areas."*

It would also not be consistent with the City of Carlsbad Scenic Roadways Goal A which is to. .. "preserve and enhance the visual …characteristics of the local community through sensitive planning and design of transportation and utility corridors," and the city's Scenic Roadway Policy C.2 which identifies this portion of I-5 as a "Community Scenic Corridor."

Therefore, in order to address potential cumulative impacts of the I-5 Widening Project, staff recommends adoption of Condition of Certification VIS-5, Cumulative Impact Buffer Zone, Coordination with Caltrans, and Mitigation Plan.

Under Condition of Certification VIS-5, the applicant shall be required to maintain a buffer zone immediately west of I-5, between the existing NRG fence line and existing east tank farm perimeter (ring) road, in order to maintain existing visual screening; accommodate future I-5 widening as necessary; and accommodate future visual

screening and hazard protection features needed to fully address potential cumulative impacts that could be caused by the proposed I-5 widening.

In order to confirm that Condition VIS-5 and related condition Worker Safety-7 would be adequate to fully address potential future I-5-related cumulative impacts, Energy Commission staff, with the assistance of Caltrans staff, conducted a June, 2009 on-site survey to measure the dimensions of the recommended buffer zone in relation to the I-5 widening alternatives currently analyzed in Caltrans' pending (unpublished) DEIS for that project. The results of that June, 2009 on-site survey are presented in detail in the **Worker Safety & Fire Protection** section of this FSA. The following summarizes these findings as they relate to potential cumulative visual impacts:

- According to staff's on-site survey, at the narrowest point between the proposed future I-5 right-of-way and the edge of a 30-foot-wide lower access road adjoining proposed CECP Unit 6, there would be sufficient room for a 75-foot-wide buffer zone, even when considering the largest of the four Caltrans build alternatives;

- at the narrowest point between the proposed Caltrans right-of-way and the proposed lower access road adjoining CECP Unit 7, there would be sufficient room for a 90-foot-wide buffer zone.

From measurement of existing site plans and site surveys, staff determined that the existing visual buffer west of I-5, consisting of a raised earth berm and Eucalyptus trees of up to 45-feet in height, had the following dimensions:

- at the narrowest cross-section between the existing I-5 right-of-way and existing upper ring road adjoining proposed CECP Unit 6, the existing landscaped berm is approximately 45 feet in width;

- at the narrowest cross-section between the existing I-5 right-of-way and existing upper ring road adjoining proposed CECP Unit 7, the existing landscaped berm is approximately 50 feet in width;

These cross-sections correspond to those measured in staff's on-site survey with Caltrans.

- at the widest cross-section adjoining the sites of the proposed CECP Units 6 and 7, the existing berm is roughly 75 feet wide.

Thus, on the basis of staff's in-the-field measurements of available buffer zone in relation to Caltrans' proposed I-5 widening right-of-way line, there would appear to be sufficient room for a landscaped berm of similar or greater width to the existing berm, within the proposed buffer zone. Where the existing berm is 45 feet wide adjacent to proposed Unit 6, available buffer zone is up to 75 feet; where the existing berm is approximately 50 feet wide adjacent to proposed Unit 7, available buffer zone is up to 90 feet.

Staff concludes that there would in fact be more than sufficient buffer zone within the CECP site to construct a new landscaped berm, similar or greater in size to the existing berm, located west of the existing berm and the proposed future Caltrans right-of-way.

Because the existing landscaped berm was determined by staff's analysis in this FSA (under Assessment of Impacts, above) to be sufficient to reduce potential visual impacts of the proposed project to less-than-significant levels, staff concludes that the construction of such a new landscaped earth berm within the buffer zone called for under Conditions VIS-5 and Worker Safety-7 would be capable of providing comparable visual screening in the long term, if the existing berm were to be removed.

As described under recommended Condition VIS-5, if construction of such a new landscaped berm is determined to be the most feasible measure to address potential cumulative visual impacts of the I-5 Widening Project, staff recommends construction of a new landscaped berm to the west of the existing berm at the earliest feasible date and no later than start of project operation, in order to maximize growing time for trees planted on the new berm. With this early construction, staff anticipates that visual screening of the CECP would be substantially advanced by the time of any future I-5 widening, which is currently anticipated to occur five to ten years following release of the Draft EIR/EIS (no sooner than 2015, and most likely later given probable delays).

Other Potential Nearby Development Sites

In its letter of October 24, 2007, the City of Carlsbad expressed concern about potential project visual incompatibility with an undeveloped parcel located directly east of I-5 designated for Travel/Recreation Commercial use under the City General Plan (City of Carlsbad, 1994).

In the absence of the proposed Caltrans I-5 widening project, discussed below, the proposed CECP project would not be visually prominent in views from the referenced site, and would thus be compatible with its designated use, due to screening effects of the existing earth berm and landscape screening.

With the proposed I-5 widening project, the existing earth berm and tall landscape screening could be removed, exposing the CECP and EPS sites to view from the parcel of concern. However, proposed elevated lanes near the center median of the I-5 project under all alternatives would partially, and possibly substantially screen the CECP and EPS projects from views from the adjoining parcel. Impacts to this parcel from the I-5 project are thus likely to obscure potential impacts of the CECP project.

Sewer Interceptor and Lift Station Projects

The City of Carlsbad has proposed a Sewer Interceptor project requiring condemnation and use of a 20-foot wide right-of-way running north-south at the western boundary of the CECP site. The City has also proposed construction of a lift station connected with this project that would occupy a portion of the northwest corner of the CECP site. Based on plans provided by the City, the proposed sewer right-of-way would encroach on approximately 1/3 of the area proposed by the applicant for use as a spoil berm. It is unclear to staff at this time to what extent this encroachment would interfere with or preclude the placement of spoil as proposed in the AFC. At a minimum, the design of

the proposed berm would need to be modified, and in the worst case the berm could be precluded.

From a purely visual perspective, elimination of the proposed spoil berm on the western boundary of the CECP would result in greater visual exposure of the CECP as seen by passengers on Amtrak and Coaster trains as they pass the CECP site. This increased exposure would represent a somewhat more adverse visual effect on those passengers. However, as discussed elsewhere in this FSA, the existing visual quality of this segment of the railroad right-of-way is relatively low due to the industrial nature of the surrounding EPS site, and the surrounding, engineered side slopes. In addition, the exposure of train passengers to views of the CECP in this segment would be very brief. In this context, adverse impacts to viewers with or without the proposed western spoil berm and landscaping are considered to be less-than-significant.

As depicted in City plans, the proposed lift station could conflict with some landscape screening measures described in Condition of Certification VIS-2, and result in removal of some existing tree screening. As suggested in the photograph and simulation shown in FSA Figure 8a and 8b (KOP 5), construction of the lift station would result in minimal canopy loss and additional visibility of the CECP as seen from the middle lagoon. The northernmost existing tree canopy prominent in this view would not be affected. Resulting impacts to sensitive viewers in the middle lagoon would thus appear to be relatively minor.

The lift station would have adverse effects on the view of passing train passengers. As discussed above, these views would be very brief, and in the context of the existing, compromised visual quality of the EPS/CECP site as seen from passing trains, impacts would be adverse, but less-than-significant. Nevertheless, in order to address potential cumulative impacts connected with the lift station project, Condition of Certification VIS-2 calls for replacement of any trees removed due to that project on the CECP site, as feasible.

LOSSAN

The LOSSAN (San Diego – Los Angeles – San Luis Obispo) rail corridor improvements project would entail double-tracking of the rail line adjoining the CECP site to the west at some time in the future. Site-specific and time-certain information on this project is unknown at this time, but staff is unaware of any requirements of the double-tracking project that would entail substantial visual impacts in or near the CECP project. Double-tracking could require widening of the existing railroad bridge over the Agua Hedionda lagoon and ROW through the EPS This change, therefore, is not anticipated to result in substantial adverse cumulative impacts in relation to the CECP, which would have minimal visual effect on this portion of the lagoon viewshed.

COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Visual Resources Table 3 provides an analysis of the applicable LORS pertaining to aesthetics or preservation and protection of sensitive visual resources relevant to the proposed project. Conditions of certification are proposed to make the project conform to a LORS where appropriate.

(VISUAL RESOURCES Table 3)
Proposed Project's Consistency with
LORS Applicable to Visual Resources

LORS		Consistency Determination	Basis for Consistency
Source	**Policy and Strategy Descriptions**		
State			
California Coastal Act of 1976 Section 30251 – Scenic and Visual Qualities	The scenic and visual qualities of coastal areas shall be considered and protected as a resource of public importance. Permitted development shall be sited and designed to protect views to and along the ocean and scenic coastal areas, to minimize the alteration of natural land forms, to be visually compatible with the character of surrounding areas, and, where feasible, to restore and enhance visual quality in visually degraded areas.	Consistent, as conditioned. The CECP project would be consistent with this policy. However, the CECP project in combination with the future I-5 Widening project could potentially not be consistent.	Views of scenic coastal resources including the ocean and adjoining lagoon would not be adversely affected. With existing prominent tree screening, the CECP site appears visually compatible with its coastal surroundings, and does not appear visually degraded from public viewpoints. However, in combination with the future I-5 Widening project, the project setting would be severely degraded and be incompatible with its surroundings.
California Streets and Highways Code, Sections 260 through 263 – Scenic Highways	Provides for local protection of scenic quality in State-designated scenic highways.	Not applicable.	The adjoining portion of Highway I-5 is State-eligible, but has not been designated as an official State scenic highway.
Local			
City of Carlsbad General Plan, 1994 as amended <u>Land Use Element</u> - Implementation Policy C.7	C.7 Evaluate each application for development of property with regard to the following specific criteria: 1. Site design quality which may be indicated by the harmony of the proposed buildings in terms of size, height and location, with respect to existing neighboring development. 2. Site design quality which may be indicated by the amount and character of landscaping and screening. 3. Site design quality which may be indicated by the arrangement of the site for efficiency of circulation, or on-site and off-site traffic safety, privacy, etc.	Consistent, as conditioned.	The proposed CECP would be generally consistent with this policy, based primarily on the effectiveness of existing and staff-conditioned landscape screening, which would largely conceal much of the project from the public and thus preserve visual compatibility with its surroundings.

LORS		Consistency Determination	Basis for Consistency
Source	**Policy and Strategy Descriptions**		
	4. The provision of public and/or private usable open space and/or pathways designated in the Open Space and Parks and Recreation Elements. 5. Contributions to and extensions of existing systems of foot or bicycle paths, equestrian trails, and the greenbelts provided for in the Circulation, Parks and Recreation and Open Space Elements of the General Plan.		
<u>Circulation/Scenic Highways Element</u> - Implementation Policy C.2 Policy C.2 - establishes the system of scenic corridors, which includes Highway I-5, Carlsbad Boulevard, and the BNSF rail corridor which adjoin the CECP site.	C.6 Enhance and preserve the natural and developed environments along each designated scenic route. C.9 Coordinate the scenic corridor program with the State, County and adjacent cities wherever possible.	Policy C. 6 – Consistent, as conditioned	C.6 With staff-recommended Conditions of Certification, the project would preserve and in some cases enhance the setting along the scenic routes. C.9 Staff has addressed the objectives of the City scenic corridor program in the PSA analysis and resulting recommended conditions of certification. With recommended conditions the project would conform with those objectives.
City of Carlsbad Specific Plan 144, as amended 2006	4. All buildings shall be subject to architectural review as prescribed in Ordinance 9268 prior to issuance of a building permit to assure a maximum amount of design compatibility with the neighborhood and existing facilities.	4. Not applicable. 5.	Commission staff determined that SP 144 is not applicable to the CECP project (please refer to the Land Use discussion in this FSA). The following notes on project consistency are provided for informational purposes: 4. Design compatibility will be achieved through compliance with proposed conditions VIS-1, VIS-2, VIS-3 and VIS-4. 5. The proposed heights of structures under CECP would be considerably less tall than the

LORS		Consistency Determination	Basis for Consistency
Source	**Policy and Strategy Descriptions**		
Encina Power Station Precise Development (PDP 00-02)	5. The heights of future power generating buildings and transmission line tower structures shall be of heights and of a configuration similar to existing facilities. All storage tanks shall be screened from view. No other structure or building shall exceed 35 feet in height unless a specific plan is approved at a public hearing. 7. Landscape and irrigation plans prepared by a registered landscape architect shall be submitted in conformance with Ordinance No. 9268 for the screening of existing facilities. Exterior lighting shall be oriented so that adjacent properties shall be screened from glare or a direct light source.	7. . Not applicable.	existing EPS power plant. Under staff-recommended Condition of Certification VIS-3, existing storage tanks on the EPS site would be removed, and the sites screened from view. The CECP would include structures up to 139 feet tall. A specific plan incorporating the CECP has not been approved. However, Commission staff determined that that requirement is not applicable to the CECP (refer to Land Use analysis). 7. Landscape and irrigation plans have been required under staff-recommended Condition of Certification VIS-2. Screening, shielding, and directing of exterior lighting have been required under staff-recommended Condition of Certification VIS-4. As noted for SP 144, Commission staff determined that the city requirement for a PDP amendment would not be applicable to the CECP project (please refer to Land Use analysis).
Agua Hedionda Local Coastal Program - Land Use Implementation Plan, adopted 1982	Identifies land uses and standards by which development will be evaluated within the Coastal Zone. Identifies uses and provides standards adopted by the city of Carlsbad and the California Coastal Act of 1976.	Not applicable.	Although the land use plan of the local coastal program was certified in 1982, authority to approve coastal permits at the CECP site remains with the State Commission.

RESPONSE TO COMMENTS

Caltrans Comments on PSA

In its general comments on the CECP PSA (Caltrans 2009a), Caltrans indicated agreement with CEC staff's conclusion of potential significant adverse cumulative visual impacts if the two projects without appropriate mitigation considerations. Caltrans expressed the importance of moving forward in a coordinated and collaborative manner, and stated that their willingness work in partnership with the applicant to address any significant cumulative impacts.

Staff Response

To address potential cumulative impacts of the two projects, and to facilitate coordination between the applicant and Caltrans, staff has added Condition of Certification **VIS-5,** "Cumulative Impact Buffer Zone, Coordination with Caltrans, and Mitigation Plan," to the FSA.

Comments from City of Carlsbad

City Comments on PSA

The city of Carlsbad (COC 2009a) filed a variety of issues and concerns in regard to the PSA. These comments ranged in scope from identified typographical errors to other errata in the PSA. These have been corrected in the FSA text. Other issues raised within the comment letter included questions about the potential cumulative visual impacts of the proposed City Sewer Interceptor and Lift Station projects and the I-5 Widening project. These issues are discussed in this FSA analysis under Cumulative Impacts.

City Letter to CEC, October 24, 2007

A letter dated October 24, 2007 was received by the Energy Commission from Don Neu, Planning Director for the City of Carlsbad (COC 2007a). The letter expressed several issues of concern, inlcuding potential visual effects of the proposed project, namely:

- project compatibility with nearby residential and recreational land uses.
- project compatibility with adjoining future land uses, including undeveloped land east of I-5 designated for Travel/Recreation Commercial use; the adjacent EPS site under a scenario of EPS decommissioning and replacement with public and visitor-serving uses.
- City cited the requirement imposed on the recently approved Carlsbad Desalination plant to have high-quality architectural design resembling an office building, implying that such treatment would be appropriate for the CECP project.

- project compatibility with the Interstate 5 widening project, including concern for potential removal of existing landscape screening at the CECP site, and request for visual simulation of the project under a future widened freeway condition

- need for assessment of existing screening vegetation and health
- request by the City for authority to require replacement planting at its discretion through the life of the project
- request for analysis of impacts to foreseeable future development on the EPS site, and request for visual simulations of that view
- request for visual simulation of the view from passing railroad cars
- recommendation that all transmission lines be placed underground rather than on towers
- request for clarification on lighting of project exhaust stacks
- concern for possible visible vapor plumes

Staff Response

project compatibility with nearby residential and recreational land uses

> This issue is addressed in the FSA analysis under the discussion of individual residential and recreational KOPs. Briefly, recreational KOPs in the Carlsbad State Beach viewshed (KOPs 1 and 8), and recreational and residential KOPs in the vicinity of Agua Hedionda Lagoon (KOPs 2 through 5) were selected for analysis to represent the anticipated experience of their respective viewer groups. These analyses concluded that the project, with recommended conditions of certification, would have less than significant impacts on these viewers and would therefore be considered compatible from a visual standpoint.

project compatibility with adjoining future land uses, including undeveloped land east of I-5 designated for Travel/Recreation Commercial use; and the adjacent EPS site under a scenario of EPS decommissioning and replacement with public and visitor-serving uses
Potential project visual effects in relation to various foreseeable future projects, including redevelopment of the EPS site, are discussed above under Cumulative Impacts.

City cited the requirement imposed on the recently approved Carlsbad Desalination plant to have high-quality architectural design resembling an office building, implying that such treatment would be appropriate for the CECP project

Staff did not determine that such a mitigation measure would be required for the CECP, since impacts could be reduced to less-than-significant levels with the conditions of certification described in the FSA. In staff's judgment, it would be premature to suggest such a measure absent definite knowledge of a compelling need for it.

project compatibility with the Interstate 5 widening project, including concern for potential removal of existing landscape screening at the CECP site, and request for visual simulation of the project under a future widened freeway condition

This impact was discussed above under Cumulative Impacts. Staff believes further clarification about the I-5 project is needed prior to preparation of simulations of the cumulative condition. Any simulation prepared at this time would require considerable speculation about the possible outcome of coordination efforts called for under Condition of Certification VIS-5.

need for assessment of existing screening vegetation and health

This requested study was provided by applicant under Data Response 70-1.

request by the City for authority to require replacement planting at its discretion through the life of the project

This request by the City has been incorporated into Condition of Certification VIS-2.

request for analysis of impacts to foreseeable future development on the EPS site, and request for visual simulations of that view

This analysis may be found under Cumulative Impacts, above, along with the requested simulation.

request for visual simulation of the view from passing railroad cars

This simulation and accompanying analysis may be found under Cumulative Impacts, above.

recommendation that all transmission lines be placed underground rather than on towers

Staff did not determine that this measure would be required to mitigate significant adverse impacts. The issue was also addressed in Applicant's Data Response 69.

request for clarification on lighting of project exhaust stacks

Applicant's Data Response 71 left the question of whether FAA strobe navigation lighting would be required or not, unresolved.

concern for possible visible vapor plumes

This issue is discussed under **Visible Water Vapor Plumes**, above.

CONCLUSIONS

Staff concludes that with all proposed and recommended conditions of certification, potential project-specific visual impacts of the CECP could be mitigated to acceptable, less-than-significant levels. The project, with all proposed and recommended conditions would not have a *substantial* adverse effect on an identified scenic vista; on a scenic resource; would not substantially degrade the existing visual character or quality of the site and its surroundings; and would not create a new source of substantial light or glare that would adversely affect day or nighttime views in the area. The project with recommended mitigation would thus not cause a *significant* aesthetic impact under CEQA in the long term.

Staff concludes that the CECP would conform with applicable aesthetics-related LORS. Although no project-specific long-term significant impacts are anticipated, staff is concerned that without appropriate coordination and conditions of certification, significant adverse cumulative visual impacts could occur as a result of the planned Caltrans North Coast Interstate 5 HOV/Managed Lanes Project, in combination with the proposed CECP. In addition, staff anticipates potential non-conformance with applicable LORs, including the California Coastal Act and City of Carlsbad General Plan, in the absence of an effective resolution of this potential cumulative impact. In order to address potential cumulative impacts, staff proposes adoption of Condition of Certification VIS-5. On the basis of available information on the alignments of the I-5 Project, available on-site buffer zone area, and area required to provide adequate visual screening of the CECP, implementation of this condition will mitigate potential cumulative impacts to less-than-significant levels.

PROPOSED CONDITIONS OF CERTIFICATION

Surface Treatment of Project Structures and Buildings

VIS-1 The project owner shall treat the surfaces of all project structures and buildings visible to the public such that a) their colors minimize 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.

Surface color treatment shall include painting of HRSGs, turbine inlet filters, and other features below 88 feet in height in a dark color and value to match the surrounding tree canopy; and painting of exhaust stacks of a light color and value to blend with the sky.

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. One set of 11" x 17" color photo simulations at life size scale, of the treatment proposed for use on project structures, including structures treated during manufacture, from Key Observation Points 2 and 5 (locations shown on Visual Resources Figure 1 of the Staff Assessment);

E. A specific schedule for completion of the treatment; and

F. 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 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 colors and finishes 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 [specify local jurisdiction] 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.

Prior to 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;

b) maintenance activities that occurred during the reporting year; and c) the schedule of maintenance activities for the next year.

Additional Perimeter Landscape Screening

VIS-2 The project owner shall provide landscaping that reduces the visibility of the power plant structures in accordance with local policies and ordinances and with findings and recommendations of Applicant Data Responses DR70-1, and DR106 and DR107. Trees and other vegetation consisting of informal groupings of tall, fast-growing evergreen shrubs and trees shall be strategically placed along the eastern, western, and northern facility boundaries as called for in the above-referenced data responses, consistent with transmission line safety requirements. The objective shall be to create landscape screening of sufficient density and height to screen the power plant structures to the greatest feasible extent in the shortest feasible time; and to provide timely replacement for aging or diseased tree specimens on site in order to avoid future loss of existing visual screening. The design approach shall include both fast-growing tall shrubs to provide quick screening, and tall evergreen trees similar to those existing on site, to provide an ultimate overall canopy height comparable to that existing atop the CECP site earth berms.

In addition, the project owner shall, in coordination with the City of Carlsbad, pepare and submit supplemental, modified landscape plans to provide for replacement tree planting as needed, to the greatest feasible extent, in the future event of loss of existing tree screening due to City of Carlsbad sewer and/or lift station projects. Such supplemental landscape plans shall also provide the plan components described in items a through d, below, and be subject to the same verification procedures.

The project owner shall submit to the CPM for review and approval and simultaneously to the City of Carlsbad 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;

D. A procedure for monitoring for and replacement of unsuccessful plantings for the life of the project; and

E. One set of 11”x17” color photo-simulations of the proposed landscaping at five years and twenty years after planting, as viewed from adjoining segments of I-5.

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 Carlsbad 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 Carlsbad 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 CPM and the City of Carlsbad 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. The City of Carlsbad, with the concurrence of the CPM, shall have r authority to require replacement planting of dead or dying vegetation through the life of the project

Landscape Screening of Construction Staging Sites D and E

VIS-3 The project owner shall provide landscaping that reduces the visibility of construction staging activities, equipment and materials at proposed Staging Sites ‘D’ and ‘E’ of the EPS site (near EPS fuel tanks #1 and #2) as seen from Carlsbad Boulevard and other public viewpoints, and that complies with local policies and ordinances. Trees and other vegetation consisting of informal groupings of fast-growing evergreens shall be strategically placed along the northern and western boundaries of the staging sites as appropriate, of sufficient density and height provide the greatest feasible screening within the shortest feasible time. Planting of the landscape screening shall be implemented as soon after start of project construction as feasible, in order to maximize growing time and screening of staging activities during the construction period.

If necessary to provide visual screening of staging activities, equipment and materials in the short term, the project owner shall provide temporary dark-colored, opaque fencing to provide visual screening until landscape screening described above has achieved sufficient maturity to provide visual screening.

The project owner shall submit to the CPM for review and approval, and simultaneously to the City of Carlsbad for review and comment. a landscaping plan whose proper implementation will satisfy these requirements. The plan shall include:

F. 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.

G. 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;

H. Maintenance procedures, including any needed irrigation and a plan for routine annual or semi-annual debris removal for the life of the project;

I. A procedure for monitoring for and replacement of unsuccessful plantings for the life of the project; and

J. One set of 11”x17” color photo-simulations of the proposed landscaping at five years and twenty years after planting, as viewed from Key Observation Point 1 (location shown on Visual Resources Figure 3 of the Staff Assessment).

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 Carlsbad 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 Carlsbad 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 CPM and the City of Carlsbad 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.

Temporary and Permanent Exterior Lighting

VIS-4 To the extent feasible, consistent with safety and security considerations, the project owner shall design and install all permanent exterior lighting such that a) lamps and reflectors are not visible from beyond the project site, including any off-site security buffer areas; 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.

The project owner shall submit to the CPM for review and approval and simultaneously to the City of Carlsbad for review and comment 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 fixture hoods/shielding, with light directed downward or toward the area to be illuminated;

D. Light fixtures that are visible from beyond the project boundary shall have cutoff angles that are sufficient to prevent lamps and reflectors from being visible beyond the project boundary, except where necessary for security;

E. All lighting shall be of minimum necessary brightness consistent with operational safety and security;

F. 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; and

G. In order to conform with Condition of Certification BIO-7, FAA-required exhaust stack lighting shall be white strobe-type lighting.

Verification: At least 90 days prior to ordering any permanent exterior lighting, the project owner shall contact the CPM to discuss the documentation required in the lighting mitigation plan.

At least 60 days prior to ordering any permanent exterior lighting, the project owner shall submit to the CPM for review and approval and simultaneously to the City of Carlsbad for review and comment a lighting mitigation plan.

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. 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 submitted to the CPM within 30 days.

Cumulative Impact Buffer Zone, Coordination with Caltrans, and Mitigation Plan

VIS-5 In order to address potential cumulative visual impacts resulting from I-5 widening, the applicant shall maintain a permanent buffer zone, including the existing vegetative visual screening, on the eastern portion of the CECP site, between the existing NRG fence line and storage tank perimeter road. This measure shall be coordinated with Conditions of Certification LAND-1 and HAZ- 8. The existing landscape screening within the buffer zone shall be maintained and enhanced per Condition of Certification VIS-2 after start of project construction. The buffer zone shall be kept available to maintain existing visual screening, accommodate future possible I-5 widening to the extent necessary, and to accommodate both future hazard protection features and visual screening.

In addition, the applicant shall work with Caltrans to develop a Mitigation Plan for accommodating the widening project while maintaining visual screening of the CECP to acceptable levels. This plan could include complete or partial avoidance of the CECP site, complete or partial berm retention or replacement, complete or partial retention of existing landscape screening, and replacement screening as needed. The objective of the plan shall be to accommodate the I-5 widening within the designated buffer zone to the extent that encroachment is unavoidable, while providing needed hazard protection and acceptable levels of visual screening of the power plant.

If construction of a new landscaped berm west of the existing berm and proposed future Caltrans right-of-way is determined to be the most feasible measure to address potential cumulative impacts of the I-5 Widening Project, then design and construction of the new berm shall be implemented at the earliest feasible time, and no later than start of project operation, in order to maximize growing time for trees planted on the new berm. Landscaping of a replacement berm shall include installation of large-container (24-inch box or larger, as needed), fast-growing evergreen trees in sufficient density to provide comparable or better visual screening of the CECP site than currently exists, within the shortest feasible period. Trees shall be selected and located so as to achieve substantial screening within a period of five years from start of project operation.

The plan shall, at a minimum, include the following components:

A. a record of discussions, meetings and planning activities conducted with Caltrans;

B. the conclusions of these coordination activities;

C. a detailed Mitigation Plan providing plans, elevations, cross-sections or other details, including a detailed list of plants and container size, sufficient to fully convey how the objectives of effective visual screening of the CECP are to be achieved; and

D. a proposed construction schedule.

Verification:

At the earliest feasible time, applicant shall coordinate with Caltrans to discuss specific hazard and visual mitigation strategies. Following publication of the I-5 Widening DEIS, applicant shall work with Caltrans to devise a specific Cumulative Impact Mitigation Plan for accommodating hazard protection and visual screening.

Following coordination and plan development with Caltrans, the project owner shall submit a draft of the Cumulative Impact Mitigation Plan to the City of Carlsbad for review and comment and to the CPM for review and approval. The project owner shall submit any required revisions within 30 days of notification by the CPM. The project owner shall not implement the plan until receiving approval from the CPM. After receiving approval, the project owner shall complete implementation of the Mitigation Plan at the earliest feasible opportunity, but not later than 180 days after plan approval. The project owner shall notify the CPM within seven days after implementing the approved plan that the plan is ready for inspection. Planting must be completed and approved by the CPM prior to start of project operation.

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VISUAL RESOURCES APPENDIX VR-1

ENERGY COMMISSION VISUAL RESOURCE ANALYSIS EVALUATION CRITERIA

Energy Commission staff conducts a visual resource analysis according to Appendix G, "Environmental Checklist Form—Aesthetics," California Environmental Quality Act (CEQA). The CEQA analysis requires that commission staff make a determination of impact ranging from "Adverse and Significant" to "Not Significant."

Staff's analysis is based on Key Observation Points or KOPs. KOPs are photographs of locations within the project area that are highly visible to the public — for example, travel routes; recreational and residential areas; and bodies of water as well as other scenic and historic resources.

Those photographs are taken to indicate existing conditions without the project and then modified to include a simulation of the project. Consequently, staff has a visual representation of the viewshed before and after a project is introduced and makes its analysis accordingly. Information about that analytical process follows.

Visual Resource Analysis Without Project

When analyzing KOPs of existing conditions without the project, staff considers the following conditions: visual quality, viewer concern, visibility, number of viewers, duration of view. Those conditions are then factored into an overall rating of viewer exposure and viewer sensitivity. Information about each condition and rating follows.

Visual Quality

An expression of the visual impression or appeal of a given landscape and the associated public value attributed to the resource. Visual quality is rated from *high* to *low*. A high rating is generally reserved for landscapes viewers might describe as picture-perfect.

Landscapes rated high generally are memorable because of the way the components combine in a visual pattern. In addition, those landscapes are free from encroaching elements, thus retaining their visual integrity. Finally, landscapes with high visual quality are visually coherent and harmonious when each element is considered as part of the whole. On the contrary, landscapes rated *low* are often dominated by visually discordant human alterations.

Viewer Concern

Viewer concern represents the reaction of a viewer to visible changes in the viewshed — an area of land visible from a fixed vantage point. For example, viewers have a high expectation for views formally designated as a scenic area or travel corridor as well as for recreational and residential areas. Viewers generally expect that those views will be preserved. Travelers on highways and roads, including those in agricultural areas, are generally considered to have moderate viewer concerns and expectations.

However, viewers tend to have low-to-moderate viewer concern when viewing commercial buildings. And industrial uses typically have the lowest viewer concern. Regardless, the level of concern could be lower if the existing landscape contains discordant elements. In addition, some areas of lower visual quality and degraded visual character may contain particular views of substantially higher visual quality or interest to the public.

Visibility

Visibility is a measure of how well an object can be seen. Visibility depends on the angle or direction of views; extent of visual screening; and topographical relationships between the object and existing homes, streets, or parks. In that sense, visibility is determined by considering any and all obstructions that may be in the sightline—trees and other vegetation; buildings; transmission poles or towers; general air quality conditions such as haze; and general weather conditions such as fog.

Number of Viewers

Number of viewers is a measure of the number of viewers per day who would have a view of the proposed project. *Number of viewers* is organized into the following categories: residential according to the number of residences; motorist according to the number of vehicles; and recreationists.

Duration of View

Duration of view is the amount of time to view the site. For example, a high or extended view of a project site is one reached across a distance in two minutes or longer. In contrast, a low or brief duration of view is reached in a short amount of time—generally less than ten seconds.

Viewer Exposure

Viewer exposure is a function of three elements previously listed, *visibility*, *number of viewers*, and *duration of view*. Viewer exposure can range from a *low* to *high*. A partially obscured and brief background view for a few motorists represents a low value; and unobstructed foreground view from a large number of residences represents a high value.

Visual Sensitivity

Visual sensitivity is comprised of three elements previous listed, *visual quality*, *viewer concern*, and *viewer exposure*. Viewer sensitivity tends to be higher for homeowners or people driving for pleasure or engaged in recreational activities and lower for people driving to and from work or as part of their work.

Visual Resource Analysis with Project

Visual resource analyses with photographic simulations of the project involve the elements of contrast, dominance, view blockage, and visual change. Information about each element follows.

Contrast

Contrast concerns the degree to which a project's visual characteristics or elements — form, line, color, and texture — differ from the same visual elements in the existing landscape. The degree of contrast can range from *low* to *high*. A landscape with forms, lines, colors, and textures similar to those of a proposed energy facility is more visually absorbent; that is, more capable of accepting those characteristics than a landscape in which those elements are absent.[1] Generally, visual absorption is inversely proportional to visual contrast.

Dominance

Dominance is a measure of (a) the proportion of the total field of view occupied by the field; (b) a feature's apparent size relative to other visible landscape features; and (c) the conspicuousness of the feature due to its location in the view.

A feature's level of dominance is lower in a panoramic setting than in an enclosed setting with a focus on the feature itself. A feature's level of dominance is higher if it is (1) near the center of the view; (2) elevated relative to the viewer; or (3) has the sky as a backdrop. As the distance between a viewer and a feature increases, its apparent size decreases; and consequently, its dominance decreases. The level of dominance ranges from *low* to *high*.

View Blockage

The extent to which any previously visible landscape features are blocked from view constitutes view disruption. The view is also disrupted when the continuity of the view is interrupted. When considering a project's features, higher quality landscape features can be disrupted by lower quality project features, thus resulting in adverse visual impacts. The degree of view disruption can range from *none* to *high*.

Visual Change

Visual change is a function of *contrast*, *dominance*, and *view disruption*. Generally, *contrast* and *dominance* contribute more to the degree of visual change than does *view disruption*.

[1] Typically, the Energy Commission does not consider texture in its visual analyses.

VISUAL RESOURCES APPENDIX VR-2

VISIBLE PLUME MODELING ANALYSIS

William Walters

INTRODUCTION

The following provides the assessment of the Carlsbad Energy Center Project (Carlsbad) gas turbine heat recovery steam generator (HRSG) exhaust stack visible plumes. Staff completed a modeling analysis for the applicant's proposed unabated gas turbine/HRSG design.

PROJECT DESCRIPTION

The applicant has proposed two Siemens Rapid Response Combined-Cycle (R2C2) gas turbine/HRSGs with no duct burners. The proposed project design includes inlet air evaporative coolers and steam power augmentation. An air cooled condenser will be used for project cooling needs. The applicant has not proposed to use any methods to abate visible plumes from the HRSG exhausts.

VISIBLE PLUME MODELING METHODS

PLUME FREQUENCY MODELING

The CSVP model was used to estimate plume frequency for the HRSG exhausts. This model provides conservative estimates of plume frequency based on both hourly exhaust parameters and ambient condition data to determine the plume frequency.

CLOUD COVER DATA ANALYSIS METHOD

A plume frequency of 20 percent of seasonal (in this case November through April) daylight no rain/fog high visual contrast (i.e. "clear") hours is used to determine potential plume impact significance. The high visual contrast hours analysis methodology is provided below:

> The Energy Commission has identified a "clear" sky category during which plumes have the greatest potential to cause adverse visual impacts. For this project the meteorological data set[2] used in the analysis categorizes total sky cover and opaque sky cover in 10% increments. Staff has included in the "Clear" category a) all hours with total sky cover equal to or less than 10% plus b) half of the hours with total sky cover 20-100% that have sky opacity equal to or less than 50%. The rationale for including these two components in this category is as follows: a) plumes typically contrast most with sky under clear conditions and, when total sky cover is equal to or

[2] This analysis uses a six year (1990 through 1995) San Diego Lindbergh Field Hourly US Weather Observations (HUSWO) meteorological data set obtained from the National Climatic Data Center (NCDC). This meteorological station location is reasonably close to the site, approximately 29 south southeast of the site, and is also located near the coast and would be expected to provide fairly representative temperature and relative humidity conditions.

less than 10%, clouds either do not exist or they make up such a small proportion of the sky that conditions appear to be virtually clear; and b) for a substantial portion of the time when total sky cover is 20-100% and the opacity of sky cover is relatively low (equal to or less than 50%), clouds do not substantially reduce contrast with plumes; staff has estimated that approximately half of the hours meeting the latter sky cover and sky opacity criteria can be considered high visual contrast hours and are included in the "clear" sky definition.

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 of the plumes is included in the Visual Resources section of the Staff Assessment.

HRSG VISIBLE PLUME MODELING ANALYSIS

Staff evaluated the Applicant's AFC (Carlsbad 2007) and performed an independent psychrometric analysis. The Combustion Stack Visible Plume (CSVP) model was used to estimate the worst-case potential plume frequency for each HRSG stack.

HRSG PARAMETERS

Based on the stack exhaust parameters anticipated by the Applicant, the frequency of visual plumes can be estimated. The operating data for these stacks are provided in Visible Plume Table 1.

Visible Plume Table 1 – HRSG Exhaust Parameters [a]

Parameter	**HRSG Exhaust Parameters**				
Stack Height	100 feet (30.5 meters)				
Stack Diameter	20 feet (6.1 meters)				
Ambient Conditions	Molecular Weight	Mole (%)	Moisture Content [b] (% by weight)	Exhaust Flow Rate (klb/hr)	Exhaust Temp (°F)
Full Load with Inlet Air Evaporative Cooling					
37.4 °F [c]	28.46	7.72	4.88	4,173.2	371
61 °F	28.34	8.80	5.59	4,007.2	363
73.6 °F	28.28	9.34	5.94	3,903.9	358
104 °F	28.29	9.23	5.87	3,851.4	366
Full Load with Inlet Air Evaporative Cooling and Steam Power Augmentation					
73.6 °F	27.75	14.23	9.23	4,036.7	361
104 °F	27.76	14.11	9.15	3,981.7	359

Source: AFC (Carlsbad 2007, Appendix 5.1B Table 5.1B-6)
Note(s): a. Values were extrapolated or interpolated between hourly ambient condition data points as necessary.
b. Calculated based on gas composition data provided in source table.
c. There is no inlet air evaporative cooling at this ambient condition

The exhaust temperatures for this gas turbine/HRSG design are approximately 80 degrees Fahrenheit higher than those from typical combined cycle 7F gas turbine projects due to the single pressure non-reheat HRSG/steam turbine.

HRSG VISIBLE PLUME MODELING ANALYSIS

Staff modeled the HRSG plumes using the CSVP model with a six-year meteorological data set from San Diego. Visible Plume Table 2 provides the CSVP model visible plume frequency results for duct firing and non-duct firing operations using a six-year

(1990-1995) meteorological data set, obtained from the National Climatic Data Center, from San Diego Lindbergh Field.

Visible Plume Table 2 – Staff Predicted Hours with HRSG Steam Plumes San Diego 1990-1995 Meteorological Data

Case	Available (hr)	Full Load Evaporative Cooling		Full Load Evaporative Cooling and Steam Injection	
		Plume (hr)	Percent	Plume (hr)	Percent
All Hours	52,583	0	0.0%	1	0.0%
Daylight Hours	26,598	0	0.0%	0	0.0%
Daylight No Rain No Fog	22,256	0	0.0%	0	0.0%
Seasonal Daylight No Rain No Fog*	10,163	0	0.0%	0	0.0%
Seasonal Daylight Clear**	5,133	0	0.0%	0	0.0%

*Seasonal conditions occur anytime from November through April.
**Available hours based on seasonal daylight clear hours.

A visible plume frequency of 20% of seasonal (November through April) daylight clear hours is used as a plume impact study threshold trigger. Due to the higher then normal combined cycle gas turbine/HRSG exhaust temperatures visible plumes are not predicted to occur under all but the most extreme ambient conditions that might occur at the site, and are predicted to occur well less than 20% of seasonal daylight clear hours plume impact study threshold trigger.

CONCLUSIONS

Visible water vapor plumes from the proposed Carlsbad gas turbine/HRSG exhausts are expected to occur infrequently, if ever, and would occur well below 20 percent of seasonal daylight clear hours. Therefore, no further visual impact analysis of the expected plume sizes has been completed.

No visible water vapor plumes will be emitted from the air cooled condenser.

REFERENCES

Carlsbad (Carlsbad Energy Center LLC.). 2007. Application for Certification for the Carlsbad Energy Center Project, Volumes 1 and 2. Submitted to the California Energy Commission, September 11, 2007.

VISUAL RESOURCES - FIGURE 1

Carlsbad Energy Center Project - Views of the Project Site

1. Panorama from top of turbine building looking north

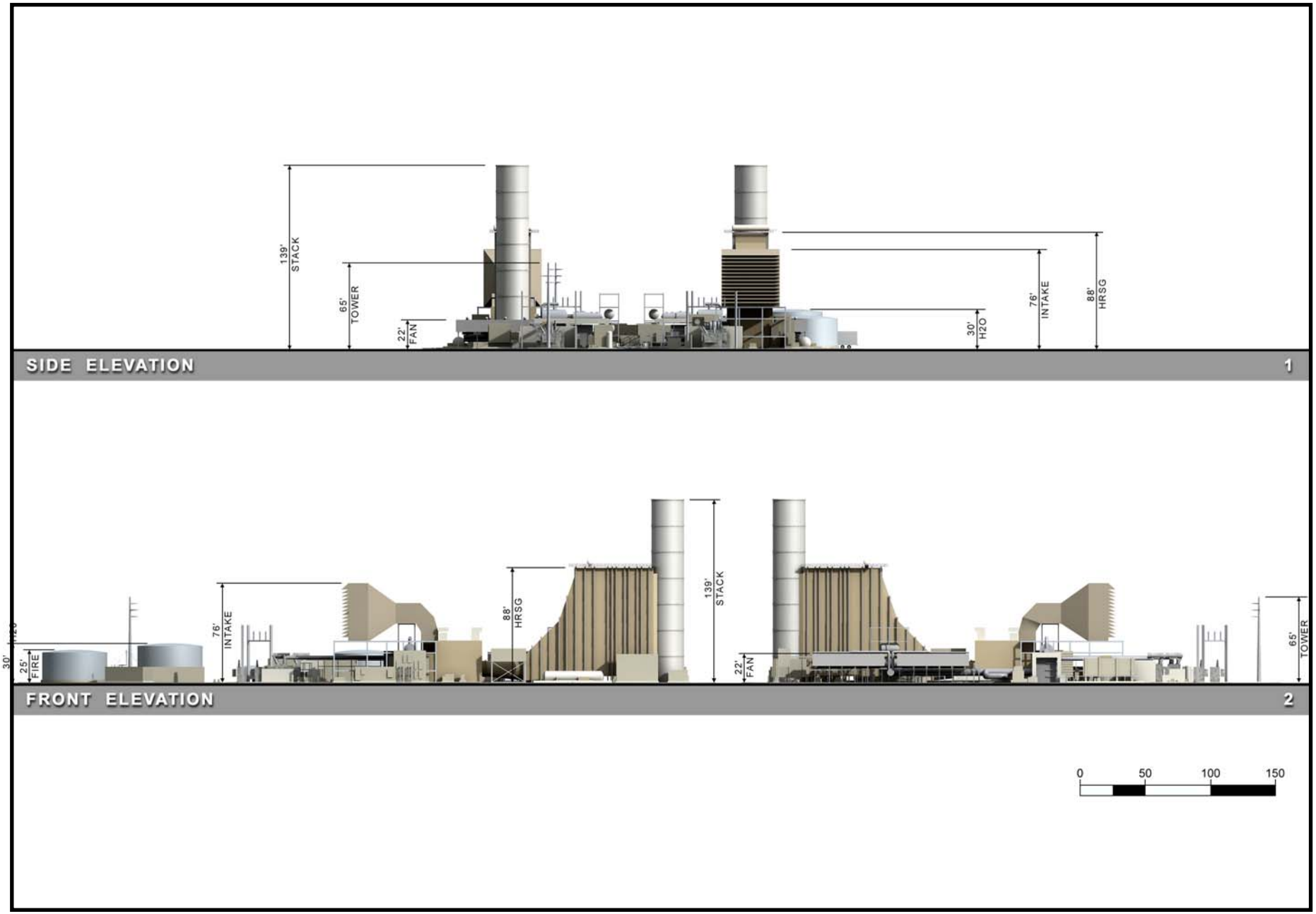
2. Internal road on project site looking southeast

3. Internal road on project site looking northwest

SOURCE: AFC Figure 5.13-4

VISUAL RESOURCES - FIGURE 2

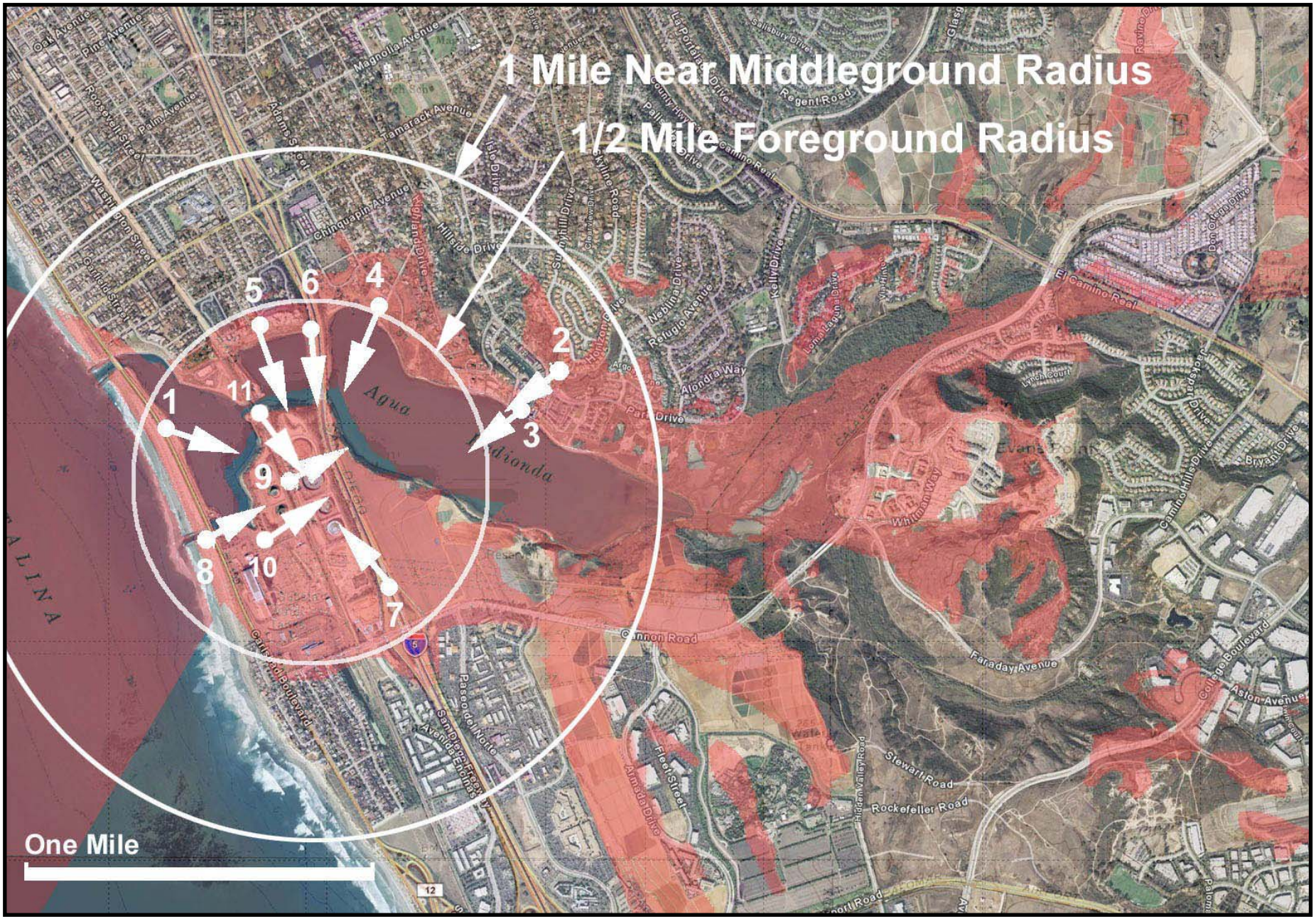
Carlsbad Energy Center Project - Project Architectural Elevations



SOURCE: PEAR Figure 2.2-2B

VISUAL RESOURCES - FIGURE 3

Carlsbad Energy Center Project - Existing Landscape Setting and Key Observation Points



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMETAL PROTECTION DIVISION, NOVEMBER 2009

SOURCE: WK Figure 3

VISUAL RESOURCES - FIGURE 4a and 4b
Carlsbad Energy Center Project - KOP 1 Carlsbad Blvd

KOP 1- Existing View from Carlsbad Boulevard at Agua Hedionda Lagoon looking southeast

KOP 1- Visual Simulation of Proposed Project

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMETAL PROTECTION DIVISION, NOVEMBER 2009
SOURCE: PEAR Figure 5.13-6

VISUAL RESOURCES - FIGURE 5a and 5b
Carlsbad Energy Center Project - KOP 2 Pannonia

KOP 2 - Existing View from Pannonia Trail at Capri Park looking southwest

KOP 2- Visual Simulation of Proposed Project

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMETAL PROTECTION DIVISION, NOVEMBER 2009
SOURCE: PEAR Figure 5.13-7

VISUAL RESOURCES - FIGURE 6a and 6b
Carlsbad Energy Center Project - KOP 3 Cove Drive

KOP 3- Existing View from end of Cove Drive looking southwest

KOP 3- Visual Simulation of Proposed Project

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMETAL PROTECTION DIVISION, NOVEMBER 2009
SOURCE: PEAR Figure 5.13-8

VISUAL RESOURCES - FIGURE 7a and 7b
Carlsbad Energy Center Project - KOP 4 Hoover Street

KOP 4- Existing View from end of Hoover Street looking southwest

KOP 4- Visual Simulation of Proposed Project

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMETAL PROTECTION DIVISION, NOVEMBER 2009
SOURCE: PEAR Figure 5.13-9

VISUAL RESOURCES - FIGURE 7a and 7b
Carlsbad Energy Center Project - KOP 4 Hoover Street

KOP 4- Existing View from end of Hoover Street looking southwest

KOP 4- Visual Simulation of Proposed Project

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMETAL PROTECTION DIVISION, NOVEMBER 2009
SOURCE: PEAR Figure 5.13-9

VISUAL RESOURCES - FIGURE 8a and 8b
Carlsbad Energy Center Project - KOP 5 Harbor Drive

KOP 5- Existing View from Harbor Drive looking south

KOP 5- Visual Simulation of Proposed Project

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMETAL PROTECTION DIVISION, NOVEMBER 2009
SOURCE: PEAR Figure 5.13-10

VISUAL RESOURCES - FIGURE 9a and 9b
Carlsbad Energy Center Project - KOP 6 I-5 Southbound

KOP 6- Existing View from southbound Interstate 5 looking south

KOP 6- Visual Simulation of Proposed Project

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMETAL PROTECTION DIVISION, NOVEMBER 2009
SOURCE: PEAR Figure 5.13-11

VISUAL RESOURCES - FIGURE 10a and 10b
Carlsbad Energy Center Project - KOP 7 I-5 Northbound

KOP 7- Existing View from northbound Interstate 5 looking northwest

KOP 7- Visual Simulation of Proposed Project

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMETAL PROTECTION DIVISION, NOVEMBER 2009
SOURCE: PEAR Figure 5.13-12

VISUAL RESOURCES - FIGURE 10c

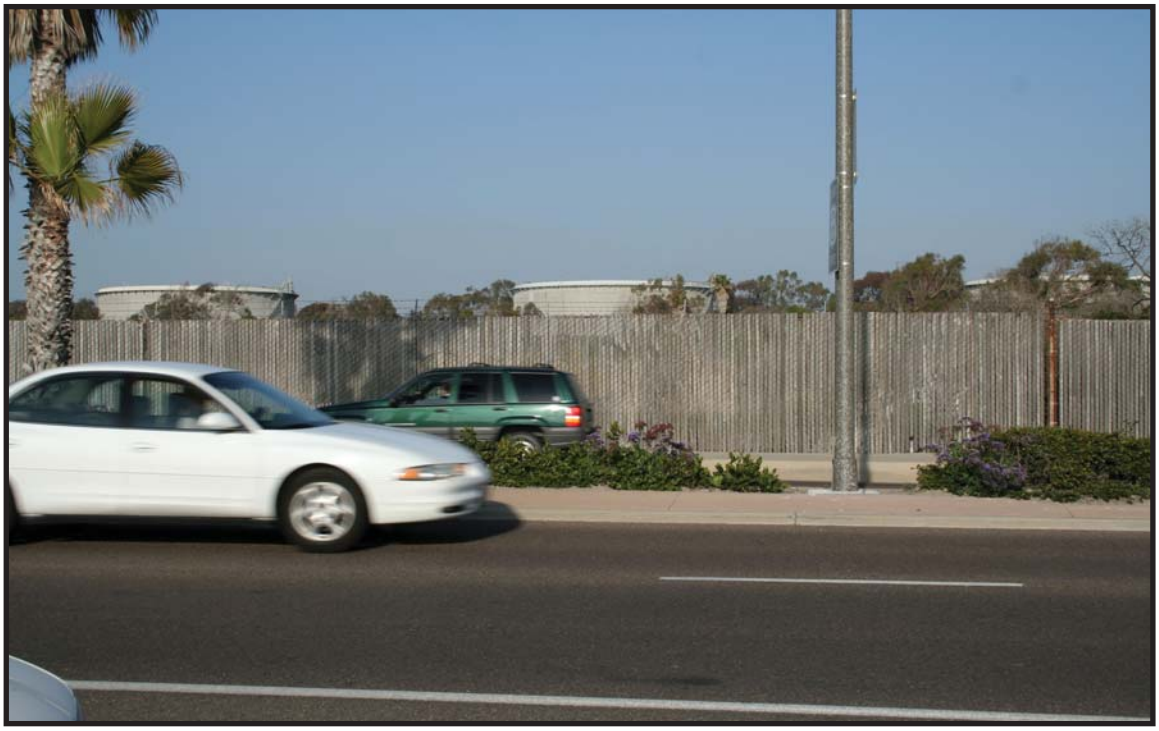
Carlsbad Energy Center Project - KOP 7 (Balloons)

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMETAL PROTECTION DIVISION, NOVEMBER 2009

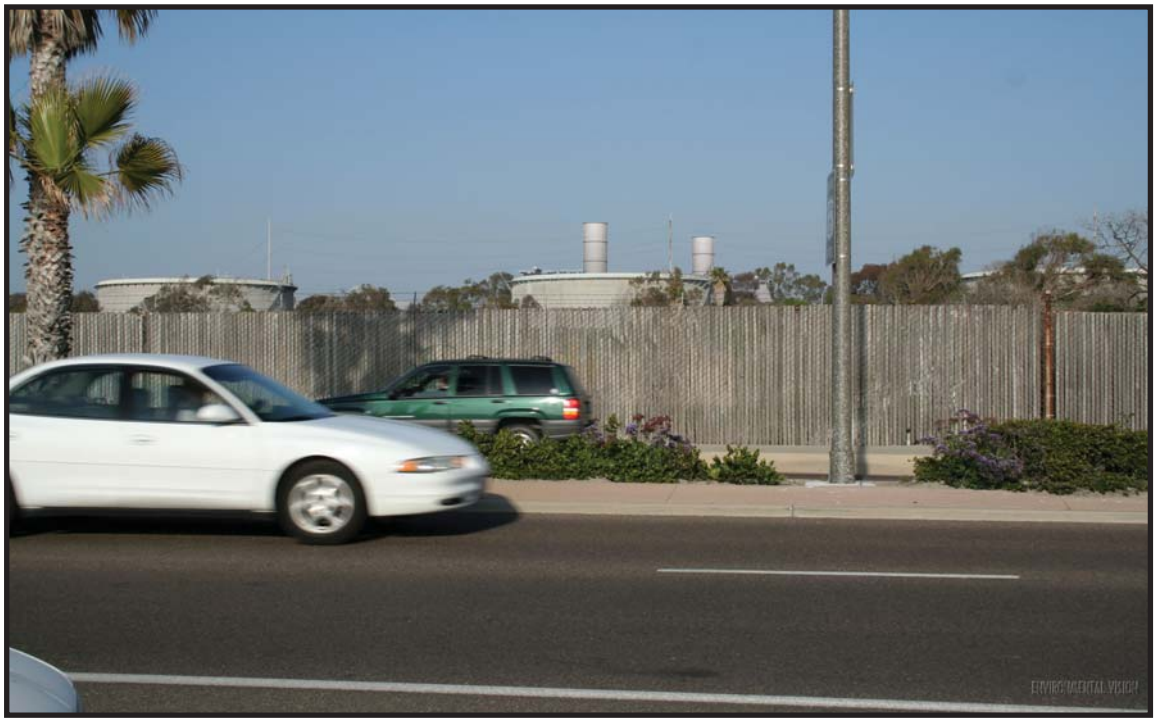
SOURCE: WK Figure 10c (Balloons)

Carlsbad Energy Center Project - KOP 8 Carlsbad Blvd Looking East From Encina Power Station Outfall

KOP 8- Existing View from Carlsbad Boulevard at the Encina Power Station outfall



KOP 8- Visual Simulation of Proposed Project



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMETAL PROTECTION DIVISION, NOVEMBER 2009

SOURCE: PEAR Revised Figure DR 111

VISUAL RESOURCES - FIGURE 12a and 12b

Carlsbad Energy Center Project - KOP 9 View From Burlington Nothern Santa Fe Rail Corridor

KOP 9- Existing View from Train (Approximate)

KOP 9- Visual Simulation of Proposed Project with Landscaping

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMETAL PROTECTION DIVISION, NOVEMBER 2009

SOURCE: PEAR Revised Figure DR 68-5b

VISUAL RESOURCES - FIGURE 13a and 13b

Carlsbad Energy Center Project - KOP 10 View to CECP From EPS Looking East

KOP 10- Existing View from Encina Power Plant Site

KOP 10- Visual Simulation of Proposed Project

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMETAL PROTECTION DIVISION, NOVEMBER 2009

SOURCE: PEAR Figure DR 67c

VISUAL RESOURCES - FIGURE 14a and 14b

Carlsbad Energy Center Project - KOP 11 CECP From Coastal Rail Trail Looking South

KOP 11- Existing View from Proposed Coastal Rail Trail

KOP 11- Visual Simulation of Proposed Project

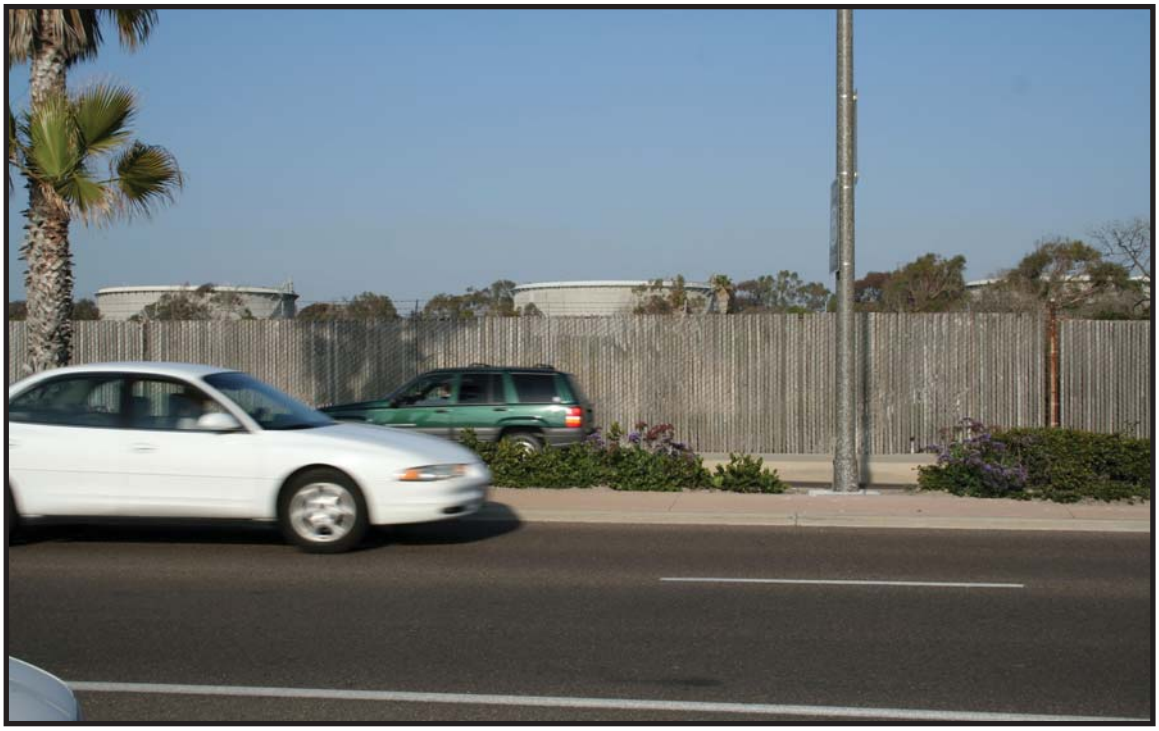
CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMETAL PROTECTION DIVISION, NOVEMBER 2009

SOURCE: PEAR Figure DR 68-6

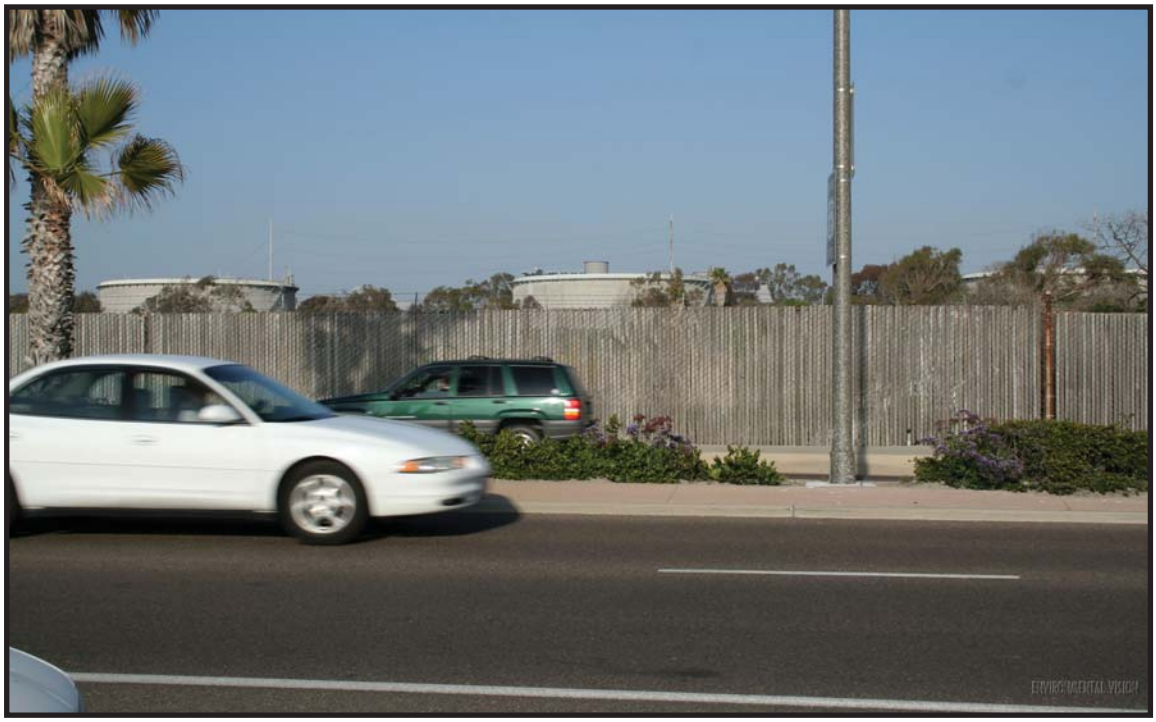
VISUAL RESOURCES - FIGURE 16a and 16b

Carlsbad Energy Center Project - KOP 10 CECP Site From EPS Looking East

KOP 10- Existing View from Carlsbad Boulevard at the Encina Power Station outfall



KOP 10- Visual Simulation of Proposed Project

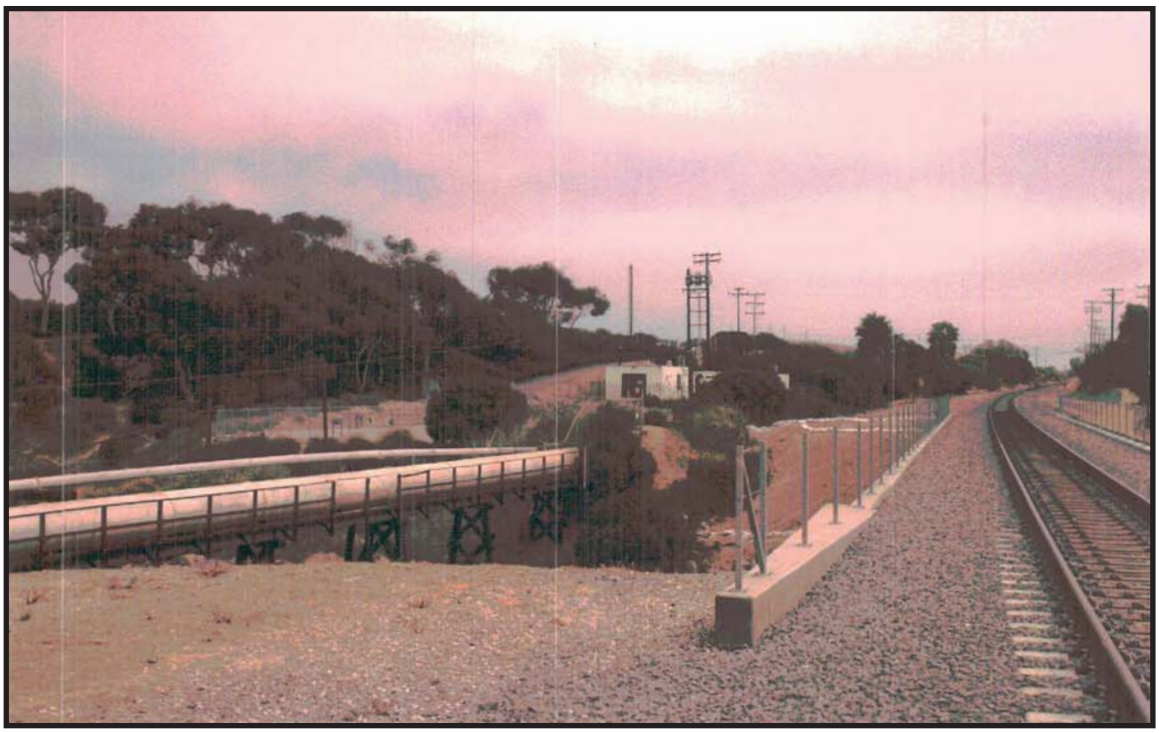


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMETAL PROTECTION DIVISION, NOVEMBER 2009

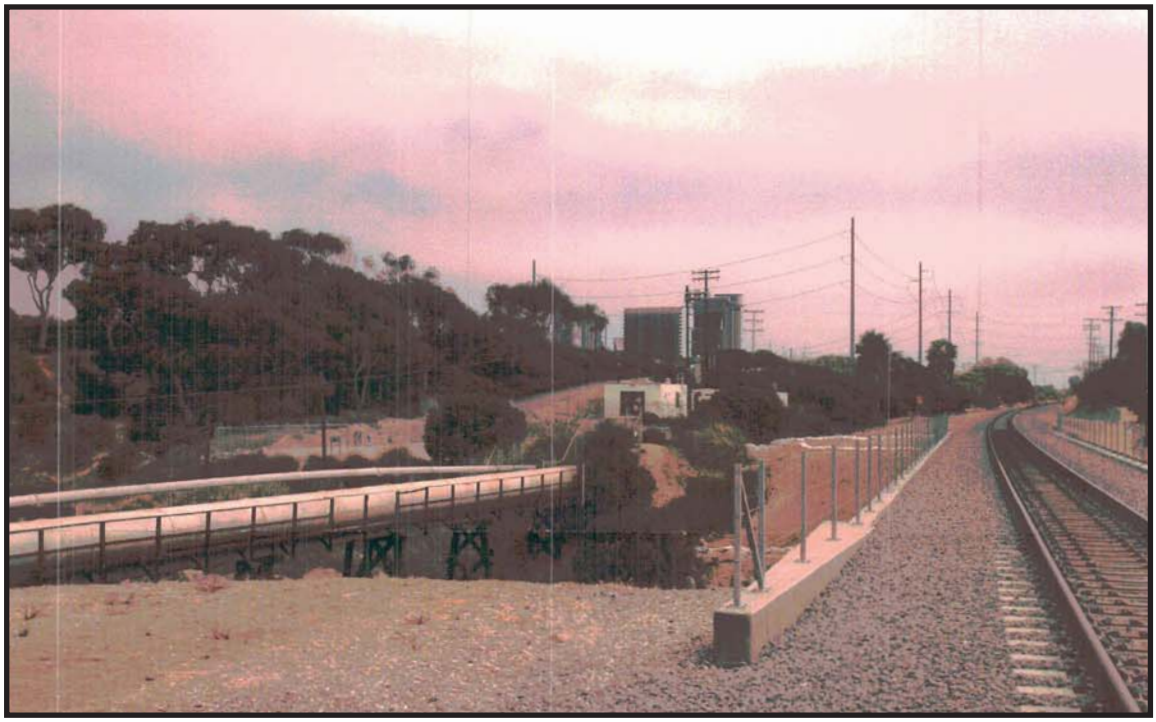
SOURCE: DR Set 2 DR111-1

VISUAL RESOURCES - FIGURE 17a and 17b
Carlsbad Energy Center Project - KOP 11 (DR 68-6)

KOP 11- Existing View from Proposed Coastal Rail Trail



KOP 11- Visual Simulation of Proposed Project



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMETAL PROTECTION DIVISION, NOVEMBER 2009
SOURCE: DR Set 1, DR 68-6

WASTE MANAGEMENT

Ellie Townsend-Hough

SUMMARY OF CONCLUSIONS

Management of the waste generated during demolition, construction and operation of the Carlsbad Energy Center Project 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 and staff's proposed conditions of certification are implemented.

INTRODUCTION

This Preliminary Staff Assessment (PSA) presents an analysis of issues associated with wastes generated from the proposed construction and operation of the Carlsbad Energy Center Project (CECP). 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 & Fire Protection** 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.
- 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 CECP 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). San Diego County Department of Environmental Health 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 4th 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.
California Health and Safety Code Section 101480 101490	These regulations authorize the San Diego County Department of Environmental Health to enter into voluntary agreements for the oversight of remedial action at sites contaminated by wastes.
Title 22, CCR, Chapter 32, §67383.1 – 67383.5	This chapter establishes minimum standards for the management of all underground and aboveground tank systems that held hazardous waste or hazardous materials, and are to be disposed, reclaimed or closed in place.
Title 8, CCR §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).
Title 27, California CCR , division 2, Subdivision 1, Chapter 3, Subchapter 4, Article	This regulation establishes that alternative daily cover (ADC) and other waste materials beneficially used at landfills constitutes diversion through recycling, and requires the California Integrated Waste Management Board to adopt regulations governing ADC.

Local	
City of Carlsbad General Plan (2004)- Public Safety Section	Provides guidance for siting and management of facilities that store, collect, treat, dispose or transfer hazardous waste and hazardous materials.
San Diego County Integrated Waste Management Plan	The plan provides guidance for local management of solid waste and household hazardous waste (incorporates the county's Source Reduction and Recycling Elements, which detail means of reducing commercial and industrial sources of solid waste).
San Diego County Department of Environmental Health, Hazardous Material Division various programs	Hazardous Material Division is the Certified Unified Program Agency (CUPA) for San Diego County that regulates and conducts inspections of businesses that handle hazardous materials, hazardous wastes, and/or have underground storage tanks. Hazardous Material Division programs include assistance with oversight on property re-development (i.e., brownfields) and voluntary or private oversight cleanup assistance.
San Diego County Code Section 68.905	Incorporates by reference the California Health & Safety Code Division 20, Chapter 6.11 which requires the facility to operate as a unified program facility.
San Diego Air Pollution Control District Regulation XI, Subpart M – Rule 361.145	This rule requires the owner or operator of a demolition or renovation to submit an Asbestos Demolition or Renovation Operational Plan (Notice of Intention) at least 10 working days before any asbestos stripping or removal work begins (such as site preparation that would break up, dislodge or similarly disturb asbestos containing materials. A Notice of Intent ()? is required for all demolition regardless of whether there is the presence of asbestos containing material.

SETTING

The proposed CECP is a 558-megawatt (MW) natural gas-fired, combined cycle generating facility (CH2MHILL 2007a, p. 1-1). The combined cycle equipment will consist of two trains which include one combustion turbine generator, one steam turbine generator and associated support equipment.

The facility will be located in the City of Carlsbad, San Diego County, California. The area surrounding the project includes the Pacific Ocean to the west; Interstate 5 and agricultural land to the east; San Diego Gas and Electric operation and maintenance facility, Cannon Road and residential areas to the south; and Agua Hedionda Lagoon to the north.

The proposed project will be built on 23 acres within a 95-acre parcel currently occupied by Encina Power Station (EPS) (CECP 2007a, page 2-3). The EPS consists of five power generation Units 1-5, a small gas turbine peaking plant, switchyards, seven aboveground storage tanks containing fuel oil, a cooling water system, a wastewater treatment facility, and ancillary administration, storage, and maintenance area. The EPS is active and has been in operation since 1954 (CECP 2007a, Appendix 5.14A, Phase I ESA page 2-1).

The CECP will be built on the eastern Tank Farm and Impoundment Basin area of EPS (refer to **WASTE MANAGEMENT** Figure 1). There are seven large aboveground storage tanks (AST) that previously stored Number (No.) 6 fuel oil for use in the historical operation of EPS Units 1-5. The AT&SF railway divides the seven ASTs into the West Tank Farm and East

Tank Farm (See figure **WASTE MANAGEMENT Figure 1**). The older, West Tank Farm consists of Tanks 1, 2, and 3 -- each with a capacity of 5,502,000 gallons. The East Tank Farm consists of Tanks 4 and 5 -- each with a capacity of 10,500,000 gallons – and Tanks 6 and 7, which both have an 18,900,000 gallon capacity (CECP 2007a, Appendix 5.14A page 2-3).

As proposed, Tanks 5, 6, and 7 will be demolished, and the CECP will be built on that specific location. A portion of the construction laydown area will be located in the Tank 1 and 2 basins (see **WASTE MANAGEMENT Figure 2**). The demolition of Tanks 5, 6, and 7 associated with CECP's construction will produce a variety of mixed nonhazardous wastes, such as soil, wood, metal, concrete, etc. Waste will be recycled where practical and non-recyclable waste will be deposited in a Class III landfill. The hazardous waste generated during this phase of the project will consist of used oils, universal wastes, solvents, and empty hazardous waste materials (CECP 2007a, § 5.14.4). Universal wastes are hazardous wastes that contain mercury, lead, cadmium, copper, and other substances hazardous to human and environmental health. Examples of universal wastes are batteries, fluorescent tubes, and some electronic devices.

Operation and maintenance of the plant and associated facilities will 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. 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 application for certification. 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) 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. Staff used a waste volume threshold equal to 10 percent of a disposal facility's remaining permitted capacity to determine if the impact from disposal of project wastes at a particular facility would be significant.

[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 Contamination

A Phase I ESA dated September 2007, was prepared by CH2MHILL for the Encina Power Station and the Agua Hedionda Lagoon. The ESA encompassed 375 acres located on five parcels which included the project site. 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 5.14A of the project Application for Certification (AFC) (CECP 2007a, Appendix 5.14A).

San Diego Gas & Electric (SDG&E) owned and operated the power plant from its original commissioning in 1954 until 1999, when Cabrillo Power purchased most of the property. The remaining aspects of EPS were bought by Cabrillo in 2003 (CECP 2007a Phase I ES-2). The EPS consists of five primary power generation units that are supported by several auxiliary facilities, including a small gas turbine peaking plant, switchyards, aboveground storage tanks (AST) containing fuel oil, a cooling water system, a wastewater treatment facility, and ancillary administration, storage, and maintenance area (CECP 2007a, Phase I ESA).

The Phase I ESA was conducted in 1998, which identified a number of Recognized Environmental Conditions (REC). 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.

Remedial activities were conducted in 2003 and approximately 4,426 cubic yards of petroleum hydrocarbon-impacted soil were excavated around Tanks 1 and 7 (**WASTE MANAGEMENT FIGURE 1**), and transferred offsite for treatment and disposal. A portion of the remedial action was conducted in the tank farm and impound basins including fuel tank laydown area of EPS, around AST Fuel Oil Tanks 1 and 7 (CECP 2007a, Phase I ESA). However, the July 1998 Phase II and August 2007 Phase I ESA identified areas such as tanks, piping, and buildings where samples could not be collected beneath existing structures as potential environmental conditions (CECP 2007a, § 5.14.3.1.1).

Construction of CECP includes demolition and remediation of AST Tanks 5, 6, and 7, and SDG&E's construction of a new 230-kV switchyard on its EPS-adjacent Cannon Substation property. Tanks 5, 6, and 7 and their respective basins lie on the footprint of the proposed plant (See **WASTE MANAGEMENT FIGURE 2**). The applicant is responsible for the removal and possible remediation of Tanks 5, 6, and 7 and the impoundment basins.

WASTE MANAGEMENT TABLE 1 contains a summary of the size of Tanks 5, 6, and 7, and the amount of residual fuel oil contained in the tanks. There is an estimated 49,000 barrels of No. 6 fuel oil in the heel of the tanks. Only the perimeter of Tank 1 and 2's impoundment basins will be used for the laydown area. The footprints of the tanks are not needed. Therefore, Tanks 1 and 2 will not be removed by the applicant (SR 2008a, Data Response 112).

No. 6 fuel oil is a complex blend of hydrocarbons derived from various refinery streams, usually residues, and can contain Hydrogen Sulfide. No. 6 fuel oil contains ingredients that are considered to be hazardous. Hydrogen sulfide may be present in trace quantities and may accumulate to toxic concentrations in the tank vapor space.

WASTE MANAGEMENT TABLE 1

Encino Power Station Aboveground Storage Tanks Slated for Demolition			
	Tank #5	**Tank #6**	**Tank #7**
Net Capacity Barrels (bbl) Gallons (gal)	250,000 10,500,000	445,000 18,690,000	450,000 18,900,000
Diameter & Height (feet, ft)	240 x 32	315 x 32	318 x 32
Residual No. 6 Fuel Oil Barrels (bbl) Gallons (gal)	19,000 78,000	11,000 462,000	19,000 798,000
Additional Water*	2 ft water	none	none

*Water or oily water contained in the Tank due to rain penetrating through the floating roof atop the tank.

Approximately 11,300 tons of soil from the area around tanks 5, 6 and 7 is impacted with No 2 Fuel Oil (SR 2008a page 5-42). The tanks are constructed on top of a 6-inch thick, oil-impregnated sand cushion that is surrounded by a concrete wall. The oil-impregnated sand cushion comprises no. 2 fuel oil mixed with sand at a rate of 22 gallons of No. 2 fuel oil per cubic yard of sand (SR 2008 a page 2-7). No. 2 fuel oil, also known as heating oil, is a low viscosity flammable liquid petroleum product used to fuel building heaters or boilers.

The applicant entered into the Voluntary Assistance Program (VAP), on November 26, 2007, with the San Diego County Department of Environmental Health (SDCDEH) Site Assessment and Mitigation Division for the demolition of Fuel Oil Tanks 5, 6, and 7 (CH2MHILL 2007d). SDCDEH is acting as a lead agency to provide CECP oversight of their environmental work including guidance through assessment and completion of remediation. SDCDEH is designated as the local oversight agency for aboveground tank closure through agreements with the Department of Toxic Substances Control (DTSC) and the San Diego Regional Water Quality Control Board (SDRWQCB). SDCDEH will review the post-demolition soil corrective action plan (CAP), and provide confirmation that characterization and remediation have been completed in accordance with the approved CAP. SDCDEH would issue a closure letter demonstrating satisfactory implementation of the CAP and associated clean-up objectives (SR 2008a, Data Response 112). Staff has proposed Condition of Certification **WASTE-1,** which would ensure the applicant adequately characterizes the site and completes remediation in accordance with an approved CAP.

The tank demolition activities will generate approximately 3,800 tons of metal debris, 49,000 gallons of residual No. 6 fuel oil, and 11,300 tons of waste soil. Work plans documenting

management of hazardous materials, wastes, and recyclable material for the demolition of the tanks will be provided to SDCDEH's Hazardous Materials Division for review and approval. The County of San Diego is the Certified Unified Program Agency and will require the applicant to complete a Hazardous Waste Certification form in accordance with Title 22, CCR Chapter 32 which will confirm that a waste generator has cleaned a stationary tank properly. This form is necessary when a stationary hazardous waste tank or hazardous material AST is taken out of service. Heated oil from Tank 4 will be circulated through Tanks 5, 6, and 7 to provide direct contact with the solidified heels. The heated oil will reduce the viscosity of the heel to enable the oil to be removed along with solids and water from Tanks 5, 6, and 7. Demolition of the tanks also requires a permit from the city of Carlsbad Fire Department. The fire department has oversight and authority for the removal of ASTs that store flammable and combustible liquids. Staff proposes Condition of Certification **WASTE- 2,** which would require the applicant to obtain permits from SDCDEH and the city of Carlsbad Fire Department to mitigate potential impacts.

Initiation of construction activities would not be allowed until the project site is fully assessed and remediated as necessary. In the event that additional potential contamination or hazardous substance releases are identified during assessment of the project site either before or after demolition of Tanks 5, 6, and 7, staff proposes Condition of Certification **WASTE-1** requiring that any additional work must be conducted under the oversight of SDCDEH, with Energy Commission Compliance Project Manager (CPM) involvement. Furthermore, staff proposes Conditions of Certification **WASTE-3** and **WASTE-4** be adopted to address any soil contamination contingency that may be encountered during project 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 SDCDEH with findings and recommended actions. **WASTE–4** also addresses identification and investigation of any soil or groundwater 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 25 months and generate both nonhazardous and hazardous wastes in solid and liquid forms (CECP 2007a, § 5.14.4.1). Before demolition and 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 3,800 tons of metal debris from tank removal, 11,300 tons of waste soil and up to 32,000 gallons of entrained oil will be recycled or disposed of in Class II or III landfill (SR 2008e p. 5-40). During construction approximately 180 tons of solid waste will be generated (CECP 2007a page 5.14-9). The hydrocarbon contaminated soil will be tested and it will be determined if the soil can be used as daily cover at the Otay Class III Landfill (SR 2008e, p. 5-40).The California Integrated Waste Management Board disposal site daily and intermediate cover regulations are contained in Title 27, California code of Regulations, Division 2, Subdivision 1, Chapter 3, Subchapter 4, Article 2. Non-hazardous solid wastes

generated during construction would include approximately 455 tons of scrap wood, concrete, steel/metal, paper, glass, and plastic waste (CECP 2007a, § 5.14.4.1.1). 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. The handling and management of waste generated by tank demolition and remediation and ocean-water purification system will follow the hierarchical approach of source reduction, recycling, treatment, and disposal.

Non-hazardous liquid wastes would also be generated during construction, including sanitary wastes, dust suppression drainage, and equipment wash water. Sanitary wastes would be collected in portable, self-contained toilets and pumped periodically for disposal at an appropriate facility. Potentially contaminated equipment wash water will be contained at designated wash areas and transported to a sanitary wastewater treatment facility (see the **Soil and Water Resources** section of this document for more information on the management of project wastewater).

Hazardous Wastes

During demolition sixty tons of asbestos will be generated and could be recycled at a permitted TSDF. The San Diego Air Pollution Control District (SDAPCD) Regulation XI, Subpart M, Rule 361.145, requires the owner or operator of a demolition or renovation to submit an Asbestos Demolition or Renovation Operation Plan at least 10 working days before any asbestos stripping or removal work begins. **WASTE-6** requires that the project owner submit the SDAPCD Asbestos Notification Form to the CPM for review and approval prior to removal and disposal of asbestos.

The generation of hazardous wastes anticipated during construction also includes empty hazardous material containers, solvents, waste paint, oil absorbents, used oil, oily rags, batteries, and cleaning wastes. The amount of waste generated would be minor if handled in the manner identified in the AFC (CECP 2007a, § 5.14.4.1.3).

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 5.14.4.1.3 and concluded that all wastes would be disposed in accordance with all applicable LORS. Should any construction waste management-related enforcement action be taken or initiated by a regulatory agency, the project owner would be required by proposed Condition of Certification **WASTE-8** to notify 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 CECP would generate non-hazardous and hazardous wastes in both solid and liquid forms under normal operating conditions. (Table 5.14-3 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**.

Filtered cake will be generated from the Ocean-Water Purification System (See **WASTE MANAGEMENT TABLE 2**). The filtered cake will be disposed of in a Class I, II, or III landfill if testing shows it is nonhazardous (SR 2008e, p. 5.41). To ensure proper disposal of filtered cake, 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.

WASTE MANAGEMENT TABLE 2

Wastes Generated during Operation of the Ocean-Water Purification System at CECP				
	Composition	**Estimated Quantity**	**Classification**	**Disposal**
Filtered Cake (dry)	Heavy metals and sludge	100-300 pounds/day	Hazardous/Nonhazardous	Class I, II, or III Landfill
Filtered Cake (wet)	Heavy metals and sludge	300-600 pounds/day	Hazardous/Nonhazardous	Class I, II, or III Landfill

Source: SR 2008e Table 5.14-2 page 5.41

Non-Hazardous Solid Wastes

The generation of as much as 232 tons per year of non-hazardous solid wastes (including filter cake) 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 non-hazardous 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 (CECP 2007a, § 5.14.4.2.1). The applicant estimates the project will generate 65 tons of non-hazardous waste per year, not including filtered cake (CECP 2007a, p. 5.14-10).

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.

The generation of hazardous wastes expected during routine project operation includes used hydraulic fluids, oils, greases, oily filters and rags, spent selective catalytic reduction 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 will 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 Materials Management** section of the PSA.

The amount of hazardous wastes generated during the operation of CECP would be minor, two tons, 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-8** to notify the CPM whenever the owner becomes aware of any such action.

Impact on Existing Waste Disposal Facilities

Non-Hazardous Wastes

During demolition and construction of the proposed project, approximately 4,400 tons of solid waste, 11,300 tons of waste soil, 32,000 gallons of entrained oil, and 232 tons per year of operation waste will be generated and recycled or disposed in a Class III landfill (CECP 2007a, § 5.14.4.1 & SR 2008e page 5-40)). The non-hazardous solid wastes generated yearly at CECP will also be recycled, if possible, or disposed in a Class III landfill.

Table 5.14-4 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 CECP. These Class III landfills are all located in Southern California and in San Diego County. The remaining capacity for the two landfills combined is over 56 million cubic yards. The total amount of non-hazardous waste generated from project construction and operation will contribute less than one percent of the available landfill capacity. Staff finds

that disposal of the solid wastes generated by the CECP can occur without significantly impact the capacity or remaining life of any of these facilities.

Hazardous Wastes

Section 5.14.4.3.2 of the AFC discusses the three Class I landfills in California: the Buttonwillow landfill in Kern County, the Clean Harbors Westmoreland Landfill in Imperial 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 lifetimes. The Westmorland landfill is currently non-operational but on reserve due to lack of need for additional hazardous materials disposal capacity in California (CECP 2007a, §5.14.4.3.2).

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. Approximately three tons of construction hazardous waste, and two tons per year of operation hazardous waste would be generated from the CECP. The volume of hazardous waste from the CECP requiring off-site disposal would be far less than staff's threshold of significance and would therefore not significantly impact the capacity or the remaining life of the Class I waste facilities.

CUMULATIVE IMPACTS AND MITIGATION

The CEQA Guidelines (Section 15355) define cumulative effects 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 the City of Carlsbad and bordering the project site that may have a cumulative effect on CECP. Some of the projects proposed are the Carlsbad Seawater Desalination project at Encina Power Station, I-5 North Coast Corridor expansion, multiple Capital Improvement projects, and the Flower Fields Area (CECP 2007a, §5.14.5).

As proposed, the amount of non-hazardous and hazardous wastes generated during construction and operation of the CECP would add to the total quantity of waste generated in the State of California. However, project wastes would be generated in modest quantities, approximately 4,400 tons of solid waste, 11,300 tons of waste soil, 32,000 gallons of entrained oil, and 232 tons per year of operation waste (CECP 2007a page 5.14-18 and SR 2008e p. 5-40). 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, 3.9 million tons of solid waste was landfilled in San Diego County; CECP's contribution would be less than one percent of the county's waste generation.

COMPLIANCE WITH LORS

Energy Commission staff concludes that the proposed CECP 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 CECP would be required to obtain a hazardous waste generator identification number from the U.S. EPA. The CECP 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.

CONCLUSIONS

Consistent with the three main objectives for staff's waste management analysis (as noted in the Introduction section of this analysis), staff provides the following conclusions:

1) After review of the applicant's proposed waste management procedures, staff concludes that project wastes would be managed in compliance with all applicable waste management LORS. Staff notes that both construction and operation wastes would be characterized and managed as either hazardous or non-hazardous waste. All non-hazardous wastes would be recycled to the extent feasible, and nonrecyclable wastes would be collected by a licensed hauler and disposed of at a permitted solid waste disposal facility. Hazardous wastes would be accumulated onsite in accordance with accumulation time limits (90,180, 270, or 365 days depending on waste type and volumes generated), and then properly manifested, transported to, and disposed of at a permitted hazardous waste management facility by licensed hazardous waste collection and disposal companies.

   However, to help ensure and facilitate ongoing project compliance with LORS, staff proposes Conditions of Certification **WASTE-1** through **11**. These conditions would require the project owner to do all of the following:

   - Ensure the project site is investigated and any contamination identified is remediated as necessary, with appropriate professional and regulatory agency oversight (**WASTE-1**, **2**, **3**, **4**, **5**, and **6**).
   - Obtain a hazardous waste generator identification number (**WASTE-7**).
   - Prepare Construction Waste Management and Operation Waste Management Plans detailing the types and volumes of wastes to be generated and how wastes will be managed, recycled, and/or disposed of after generation (**WASTE-5** and **9**).
   - Ensure that all spills or releases of hazardous substances are reported and cleaned-up in accordance with all applicable federal, state, and local requirements (**WASTE-7)**.
   - Report any waste management-related LORS enforcement actions and how violations will be corrected (**WASTE-8**).

2) Existing conditions at the CECP project site do include areas where prior site uses and/or demolition activities may have resulted in releases of hazardous substances or soil contamination. To ensure that the project site is investigated and remediated as necessary and to reduce any impacts from prior or future hazardous substance or hazardous waste releases at the site to a level of insignificance, staff proposes Conditions of Certification **WASTE-1**, **2**, **3**, **5**, **6**, and **11**. These conditions would require the project owner to ensure that the project site is investigated and remediated as necessary; demonstrate that project wastes are managed properly; and ensure that any future spills or releases of hazardous substances or wastes are properly reported, cleaned-up, and remediated as necessary. Therefore, staff concludes that construction and operation of the proposed CECP project would not result in contamination or releases of hazardous substances that would pose a substantial risk to human health or the environment.

3) Regarding impacts of project wastes on existing waste disposal facilities, staff uses a waste volume threshold equal to ten (10) percent of a disposal facility's remaining capacity to determine if the impact from disposal of project wastes at a particular facility would be significant. The existing available capacity for the three Class III landfills that may be used to manage nonhazardous project wastes exceeds 87 million cubic yards. The total amount of nonhazardous wastes generated from construction and operation of SGGS would contribute less than 0.1 percent of the remaining landfill capacity. Therefore, disposal of project generated non-hazardous wastes would have a less than significant impact on Class III landfill capacity.

   In addition, the two Class I disposal facilities that could be used for hazardous wastes generated by the construction and operation of CECP have a combined remaining capacity in excess of 15 million cubic yards. The total amount of hazardous wastes generated by the CECP project would contribute less than 0.02 percent of the remaining permitted capacity. Therefore, impacts from disposal of CECP generated hazardous wastes would also have a less than significant impact on the remaining capacity at Class I landfills.

Staff concludes that management of the waste generated during demolition, construction and operation of the CECP project 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 CECP project AFC and staffs' proposed conditions of certification are implemented.

PROPOSED CONDITIONS OF CERTIFICATION

WASTE-1 The project owner shall ensure that the CECP project site is properly characterized and remediated as necessary pursuant to the Corrective Action Plan reviewed and approved by the SDCDEH. In no event shall project construction commence in areas requiring characterization and remediation until SDCDEH and the CPM have determined that all necessary remediation has been accomplished.

Verification: At least 30 days prior to remediation the project owner shall submit to the CPM for review and approval copies of all pertinent correspondence, work plans, agreements, and authorizations between CECP and SDCDEH regarding the Corrective Action Plan requirements and activities at the CECP project site. At least 60 days prior to the start of site mobilization, the project owner shall provide to the CPM for review and approval written notice from SDCDEH that the CECP site has been investigated and remediated as necessary in accordance with the Correction Action Plan.

WASTE-2 Prior to removal of the aboveground storage tanks (ASTs), the project owner shall complete a County of San Diego Department of Environmental Health (SDCDEH) Hazardous Waste Tank Certification form and obtain a permit from the City of Carlsbad Fire Department. Prior to demolition of the ASTs, SDCDEH and the Fire Department must acknowledge the form is complete, and provide written concurrence that the information presented is adequate to comply with permitting requirements for removal. This information and written concurrence must be submitted to the CPM for review and approval.

Verification: No less than sixty (60) days prior to commencement of site mobilization, the project owner shall provide the form and permits to remove the ASTs to the CPM for review and approval. The project owner shall inform the CPM via the monthly compliance report, of the data when all ASTs 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 (if needed), 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, representatives of Department of Toxic Substances Control, 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 Department of Toxic Substances Control 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 Construction Waste Management Plan for all wastes generated during 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 description of all construction waste streams, including projections of frequency, amounts generated, and hazard classifications; and
- 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 assure 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 SDCDEH Asbestos Demolition Notification Form to the CPM and the SDCDEH for approval. After receiving approval, the project owner shall remove all 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 date asbestos is removed.

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 detailed description of all operation and maintenance waste streams, including projections of amounts to be generated, frequency of generation, and waste hazard classifications;
- 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 assure correct classification, methods of transportation, disposal requirements and sites, and recycling and waste minimization/source reduction plans;
- 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;
- 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
- 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 Ocean-Water Purification System's filter cake is tested pursuant to, California Code of Regulations, Title 22 Section 66262.10 and report the findings to the CPM.

Verification: The project owner shall report the results of filter cake testing 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.

APPENDIX 1 – PSA COMMENTS

Intervenor California Unions for Reliable Energy (CURE) filed Preliminary Staff Assessment (PSA) comments on January 30, 2009 (CURE 2009). Beginning on page 20 of the comment letter (under point 4."*The PSA Failed to Analyze Tank Removal and Verification Sampling"*), CURE asks the following questions In regard to Waste Management:

1. *"The AFC omitted any timeline for removal of Tanks 5, 6, and 7, and the PSA did not address the issue. The PSA must be revised to include specific information about the removal schedule and whether any removal that may have already been conducted would be in violation of the Federal Code of Regulations (40 CFR 112.5)."*

2. *"Furthermore, neither the AFC nor the PSA mention a schedule for verification soil sampling in the vicinity of the tanks planned to be removed. The PSA should be revised to address the need for verification soil sampling provisions, the schedule for soil sampling and the process by which the results of the sampling would be reviewed and approved by the San Diego County Hazardous Materials Management Division."*

Staff also received comments from the Department of Toxic Substance Control (DTSC) and San Diego County Department of Environmental Health (SDCDEH). DTSC provided staff with a memorandum outlining nine (9) steps that would be necessary for safe construction and operation of the CECP (DTSC 2007). In the memorandum, DTSC provided comments that required CECP to supply documentation on the information that would normally be included in a Phase I ESA report (DTSC 2007a). The applicant provided copies of a July 1998 Phase II ESA, and a 2004 soil remediation report. The AFC contains a copy of their August 2007 Phase I ESA that provides further site characterization of the proposed project site. Staff believes these submittals address DTSC's comments, and help answer comments made by Intervenor CURE.

The appropriate, identified regulatory authority for the demolition of the No. 6 Fuel Oil aboveground storage tanks (AST), and the soil remediation of the eastern Tank Farm resides with the San Diego County Department of Environmental Health -- the official, recognized area Certified Unified Program Agencies (CUPA). During a May 22, 2008 Conference Call (ROC, tn: 46465), Mr. Nassar Sionit, SDCDEH Site Assessment and Mitigation Manager, explained to staff that the EPS eastern tank farm demolition and remediation could be completed by various agencies and departments:

- SDCDEH Site Assessment and Mitigation Program for the soil/groundwater site assessment and Corrective Action Plan.
- SDCDEH Hazardous Materials Division for the AST demolition and waste disposal.
- Regional Water Quality Control Board (RWQCB) for the removal of the aboveground storage tanks.

Staff received an email from Sande Pence, a Supervising Environmental Health Specialist at the SDCDEH, describing the regulations associated with removing ASTs. Staff also

discussed the County's regulating authority as a CUPA with Jim Gohres, a Senior Inspector at SDCDEH's San Marcos California Office. The SDCDEH, Hazardous Materials Management Division regulates businesses that use hazardous materials, dispose of hazardous wastes, and are responsible for the removal of hazardous waste from ASTs. The SDCDEH Hazardous Waste Tank Certification form will be completed prior to the removal of Tanks 5, 6, and 7 within EPS' eastern Tank Farm.

Comments on the Preliminary Staff Assessment from CURE were concerned with the Aboveground Petroleum Storage Act and the Spill Prevention, Control and Countermeasures (SPCC) Plan. On February 4, 2009, staff, in discussions with the San Diego County Department of Environmental Health (SDCDEH) & Cal/EPA Unified Program, determined what the SDCDEH (the local CUPA) had accomplished in regard to their mandate to facilitate the Aboveground Storage Act. Discussion also provided staff with the ability to find out about Cal/EPA's process and timeline for the CUPA completion of requirements stipulated in the Aboveground Petroleum Storage Act. San Diego County Hazardous Material Management Section manager, Robert Rapista and Jon Paine, Cal/EPA Unified Program manager, explained that the Aboveground Petroleum Storage Act is a relatively new program that began implementation in the fall of 2008. Because the RWQCBs recently initiated transferring authority and responsibility for administration of the Aboveground Petroleum Storage Act to the CUPA, not every CUPA received timely training. In the case of San Diego, training occurred in May, 2009. A

To comply with the Aboveground Petroleum Storage Act, a property owner needs to:

*prepare and implement a Spill Prevention Control and Countermeasure (SPCC) Plan

*file a tank facility statement (before 2010)

*pay a fee (by 2010)

Staff proposed Conditions of Certification **WASTE-1**, **2**, and **4** to address issues related to the demolition and remediation of the area of the east tank farm, where Above Ground Storage Tanks 5, 6 and 7 are currently located.

REFERENCES

CEC 2007c – California Energy Commission/j. Reede (tn: 43473). Data Requests #1-73. 11/21/2007. Rec'd 11/21/2007.

CEC 2008b – California Energy Commission/m. Monasmith (tn: 45479). Carlsbad Energy Center Project Data Requests Set #2. 02/28/2008. Rec'd 02/28/2008.

CEC 2008e – California Energy Commission/M. Monasmith (tn: 46181). Data Request Set 2A. 5/06/2008

CEC 2008f – California Energy Commission/M. Monasmith (tn: 46465). Report of Conversation – Waste Management PSA, Tank Demolition/soil Remediation. 5/2/2008

CECP 2007a – Carlsbad Energy Center Project/T. Heming (tn: 42299). Application for Certification for the Carlsbad Energy Center Project. 09/11/2007. Rec'd 09/11/2007.

CH2MHILL 2007a- CH2MHILL/R. Manson (tn: 42983). Phase II Attachment DR73-1 for Environmental Site Assessment. Rec'd 11/20/2007.

CH2MHILL 2007d – CH2MHILL/R. Mason (tn: 43841). Report on Soil Remediation Encina Power Station Attachment DR73-2 to Data Responses. 12/20/2007 Rec'd 12/20/2007.

CURE 2009 - California Unions for Reliable Energy / G. Smith (tn: 49950). Comments on Preliminary Staff Assessment. 1/30/2009

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SDCDEHHMD 2008a - (San Diego County Department of Environmental Health Hazardous Materials Division). E-mail to Ellie Townsend-Hough, April 28, 2008.

SDCDEHHMD 2008b - (San Diego County Department of Environmental Health Hazardous Materials Division). E-mail to Ellie Townsend-Hough, April 28, 2008.

SR 2008a – Stoel Rives/K. Hellwig (tn: 45674) Data Response Set 2 (#76 – 112). 3/18/2008

SR 2008e – Stoel Rives/J McKinsey (tn: 47257) Project enhancement and Refinement Document (12 copies); Effects on bio Resources of Agua Hedionda lagoon (4 copies); Revised AQ Modeling Files (6 CDs); Cal ISO Report. 7/25/2008

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 Carlsbad Energy Center Project (CECP) 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 **-9**, 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 would 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.

The Carlsbad Fire Department has stated that its ability to respond during a major crisis may very well be impacted by the operation of this power plant. Staff has thoroughly reviewed this matter, listened to comments from the applicant and the Carlsbad Fire Department, encouraged the applicant and the fire department to meet (which they did), and has reviewed written comments and reports on this matter. Staff has also conducted an initial assessment and after consideration of all information available to date, particularly the applicant's Fire Needs Assessment (SR 2008t), staff has determined that while this project may have an impact on the fire department's ability to respond to a fire or other emergency under unique catastrophic circumstances, the potential for impact is below staff's level of significance**.** Therefore, staff agrees with the applicant that mitigation is not required.

The applicant has indicated that the CEPC will be operated remotely from a control room on the adjacent Encina Power Station (EPS) site. For the reasons stated in this assessment, staff believes that a combined-cycle power plant cannot be operated safely and effectively from a remote location and thus proposes a Condition of Certification that would require the project owner to ensure that, at a minimum, two workers are always present on the below-grade CEPC site when the power plant is operating.

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 (PSA) is to assess the worker safety and fire protection measures proposed by the CECP and to determine whether the applicant has proposed adequate measures to:

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

LAWS, ORDINANCES, REGULATION, AND STANDARDS

Worker Safety and Fire Protection Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
Federal	
Title 29 U.S. Code (USC) section 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).
Title 29 Code of Federal Regulation (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 sections 1910.1 to 1910.1500.
State	
Title 8 California Code of Regulations (Cal Code Regs.) all applicable sections (Cal/OSHA regulations)	These sections require 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 Cal Code Regs. section 3, et seq.	This section incorporates the current addition of the Uniform Building Code.
Health and Safety Code section 25500, et seq.	This section presents Risk Management Plan requirements for threshold quantity of listed acutely hazardous materials at a facility.
Health and Safety Code sections	These sections require a Hazardous Material Business Plan detailing emergency response plans for hazardous materials

25500 to 25541	emergency at a facility.
Local (or locally enforced)	
CaliforniaFire Code 2007	The fire code contains general provisions for fire safety, including requirements for proper storage and handling of hazardous materials and listing of the information needed by emergency response personnel. Enforced by the Carlsbad Fire Department.
National Fire Protection Association standards	These standards provide specifications and requirements for fire safety, including the design, installation, and maintenance of fire protection equipment. Enforced by the Carlsbad Fire Department.

SETTING

The proposed facility would be located in the city of Carlsbad within an industrial area that is currently served by the local fire department. Fire support services to the site would be under the jurisdiction of the city of Carlsbad Fire Department (CFD). There are a total of six fire stations within the city of Carlsbad. The closest station to the CECP site would be Station #1, located at 1275 Carlsbad Village Drive, approximately 1.7 miles away. The total response time from the moment a call is made to the point of arrival at the site would be approximately 6 minutes (CECP 2007a, § 5.16.4.5). The next closest station would be Station #4, located at 6885 Batiquitos Drive, about 3.7 miles away, which would respond within 7 to 8 minutes (CFD 2008).

The CFD would also be the first responder to incidents involving hazardous materials, with backup support provide by a U.S. Marine Corp unit based at Camp Pendleton, and/or the San Diego City and County Hazardous Materials Incident Response Team (DEH-HIRT). According to the DEH-HIRT, it is capable of handling any hazardous materials-related incident and would have a minimal response time of one hour (CECP 2007a, §§ 5.10.3.6.2 and 5.10.3.6.3, and CFD 2008). All CFD firefighters (except one) are trained paramedics (CFD 2008).

Worker Safety and Fire Protection Table 2
Equipment and Personnel at Carlsbad Fire Department*

CFD Station	Total Response Time**	Distance to CECP	EMS/HazMat Capability***
Station #1	6 min	~1.7 miles	Y/Y
Station #4	7-8 min	~3.7 miles	Y/Y

*Source: phone conversation with Fire Marshal Weigand (CFD 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 and first responder for hazardous materials incidents, and all except one personnel are trained paramedics.

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 in 2007 concluded that the areas beneath existing structures may have environmental conditions that would require remediation and that this should be assessed during the time these structures are removed (CECP 2007a, § 5.14.3.1.1). To address the possibility that soil contamination would be encountered during construction of the CECP, proposed Conditions of Certification **Waste-1** and **Waste-2** require a registered professional engineer or geologist to be available during soil excavation and grading to ensure proper handling and disposal of contaminated soil. See the staff assessment section on **WASTE MANAGEMENT** for a more detailed analysis of this topic

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

Two issues are assessed in **Worker Safety-Fire Protection**:

1. the potential for impacts on the safety of workers during demolition, construction, and operations activities, and

2. fire prevention/protection, emergency medical response, and hazardous materials spill response during demolition, construction, and operations.

Worker safety issues are thoroughly addressed by 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 does, staff will recommend that the applicant mitigate this impact by providing increased resources to the fire department.

Staff has also established a procedure when a local fire department has identified either a significant incremental project impact to the local agency or a significant incremental cumulative impact to a local agency. Staff first conducts an initial review of the position and either agrees or disagrees with the fire department's determination that a significant impact would exist if the proposed power plant is built and operated. A process then starts whereby the project applicant can either accept the determination made by staff or refute the determination by providing a Fire Needs Assessment and a Risk Assessment. The Fire Needs Assessment would address fire response and equipment/staffing/location needs while the Risk Assessment would be used to

establish that while an impact to the fire department may indeed exist, the risk (chances) of that impact occurring and causing injury or death is less than significant.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Worker Safety

Industrial environments are potentially dangerous during construction and operation of facilities. Workers at the proposed CECP 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 CECP 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 would 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 would be taken to ensure compliance with the applicable LORS during the construction and operational phases of the project.

Construction Safety and Health Program

CECP encompasses construction and operation of a natural gas fired-facility. Workers would be exposed to hazards typical of construction and operation of a gas-fired simple cycle facility.

Construction Safety Orders are published at Title 8 California Code of Regulations sections 1502, et seq. These requirements are promulgated by Cal/OSHA and would be applicable to the construction phase of the project. The Construction Safety and Health Program would include the following:

- Construction Injury and Illness Prevention Program (8 Cal Code Regs. § 1509)
- Construction Fire Prevention Plan (8 Cal Code Regs. § 1920)
- Personal Protective Equipment Program (8 Cal Code Regs. §§ 1514 — 1522)
- Emergency Action Program and Plan

Additional programs under General Industry Safety Orders (8 Cal Code Regs. §§ 3200 to 6184), Electrical Safety Orders (8 Cal Code Regs. §§2299 to 2974) and Unfired Pressure Vessel Safety Orders (8 Cal Code Regs. §§ 450 to 544) would 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
- Permit-Required Confined Space Entry Program

The Application for Certification (AFC) includes adequate outlines of each of the above programs (CECP 2007a, § 5.16.4.3.1). Prior to the start of construction of CECP, detailed programs and plans would be provided to the California Energy Commission Compliance Project Manager (CPM) and to the CFD pursuant to the Condition of Certification **WORKER SAFETY-1**.

Operations and Maintenance Safety and Health Program

Prior to the start of operations at CECP, the Operations and Maintenance Safety and Health Program would be prepared. This operational safety program would include the following programs and plans:

- Injury and Illness Prevention Program (8 Cal Code Regs. § 3203)
- Fire Protection and Prevention Program (8 Cal Code Regs. § 3221)
- Personal Protective Equipment Program (8 Cal Code Regs. §§ 3401 to 3411)
- Emergency Action Plan (8 Cal Code Regs. § 3220)

In addition, the requirements under General Industry Safety Orders (8 Cal Code Regs. §§ 3200 to 6184), Electrical Safety Orders (8 Cal Code Regs. §§2299 to 2974) and Unfired Pressure Vessel Safety Orders (8 Cal Code Regs. §§ 450 to 544) would be applicable to the project. Written safety programs for CECP, which the applicant would develop, would ensure compliance with the above-mentioned requirements.

The AFC includes adequate outlines of the Injury and Illness Prevention Program, Emergency Action Plan, Fire Prevention Program, and Personal Protective Equipment

Program (CECP 2007a, § 5.16.4.3.2). Prior to operation of CECP, all detailed programs and plans would be provided to the CPM and CFD 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. Both safety and health programs would be comprised of six more specific programs and would require major items detailed in the following paragraphs.

Injury and Illness Prevention Program

The IIPP would include the following components as presented in the AFC (CECP 2007a, § 5.16.4.3.2):

- identity of person(s) with authority and responsibility for implementing the program;
- safety and health policy of the plan;
- definition of work rules and safe work practices for construction activities;
- 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;
- safety procedures; and
- training and instruction.

Fire Prevention Plan

California Code of Regulations requires an Operations Fire Prevention Plan (8 Cal Code Regs. § 3221). The AFC outlines a proposed Fire Prevention Plan which is acceptable to staff (CECP 2007a, § 5.16.4.3.2). The plan would accomplish the following:

- determine general program requirements;
- determine fire hazard inventory, including ignition sources and mitigation;
- develop good housekeeping practices and proper materials storage;
- establish employee alarm and/or communication system(s);
- provide portable fire extinguishers at appropriate site locations;
- locate fixed fire-fighting equipment in suitable areas;
- specify fire control requirements and procedures;
- establish proper flammable and combustible liquid storage facilities;
- identify the location and use of flammable and combustible liquids;

- provide proper dispensing and determine disposal requirements for flammable liquids;
- establish and determine training and instruction requirements and programs; and
- identify personnel to contact for information on plan contents.

Staff proposes that the applicant submit a final Fire Prevention Plan to the CPM for review and approval and to the CFD for review and comment to satisfy proposed Conditions of Certification **WORKER SAFETY-1** and **WORKER SAFETY-2**.

Personal Protective Equipment Program

California regulations require Personal Protective Equipment (PPE) and first aid supplies whenever hazards are present that, due to process, environment, chemicals or mechanical irritants, can cause injury or impair bodily function as a result of absorption, inhalation, or physical contact (8 Cal Code Regs. §§ 3380 to 3400). The CECP operational environment would require PPE.

All safety equipment must meet National Institute of Safety and Health (NIOSH) or American National Standards Institute (ANSI) standards and would carry markings, numbers, or certificates of approval. Respirators must meet NIOSH and Cal/OSHA standards. Each employee must be provided with the following information pertaining to the protective clothing and equipment:

- proper use, maintenance, and storage;
- when to use the protective clothing and equipment;
- benefits and limitations; and
- when and how to replace the protective clothing and equipment.

The PPE Program ensures that employers comply with the applicable requirements for PPE and provides employees with the information and training necessary to protect them from potential workplace hazards.

Emergency Action Plan

California regulations require an Emergency Action Plan (8 Cal Code Regs. § 3220). The AFC contains a satisfactory outline for an emergency action plan (CECP 2007a, § 5.16.4.3.2).

The outline lists plans to accomplish the following:

- establish emergency escape procedures and emergency escape route for the facility;
- determine procedures to be followed by employees who remain to operate critical plant operations before they evacuate;
- provide procedures to account for all employees and visitors after emergency evacuation of the plant has been completed;
- specify rescue and medical duties for assigned employees;

- identify fire and emergency reporting procedures to regulatory agencies;
- develop alarm and communication system for the facility;
- establish a list of personnel to contact for information on the plan contents;
- provide emergency response procedures for ammonia release; and
- determine and establish training and instruction requirements and programs.

Written Safety Program

In addition to the specific plans listed above, additional LORS called *safe work practices* apply to the project. Both the Construction and the Operations Safety Programs would 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" in this **Worker Safety and Fire Protection** section.

Safety Training Programs

Employees would 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—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 worksites typical of large, complex, industrial-type projects such as the construction of gas-fired power plants. In order to reduce and/or eliminate these hazards, it has become standard industry practice to hire

a Construction Safety Supervisor to ensure a safe and healthful environment for all personnel. That this standard practice has reduced and/or eliminated hazards has been evident in the audits staff recently conducted of power plants under construction. 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 in four areas:

- to improve their safety and health performance;
- to assist them in striving for the elimination of the four hazards (falls, electrical, caught in/between and struck-by hazards), which account for the majority of fatalities and injuries in this industry and have been the focus of targeted OSHA inspections;
- to prevent serious accidents in the construction industry through implementation of enhanced safety and health programs and increased employee training; and
- to recognize those subcontractors with exemplary safety and health programs.

To date, there are no OSHA or Cal/OSHA requirements that an employer hire or provide for a Construction Safety Officer. OSHA and Cal/OSHA regulations do, however, require that safety be provided by an employer and the term *Competent Person* is used in many OSHA and Cal/OSHA standards, documents, and directives. A Competent Person is usually defined by OSHA as an individual who, by way of training and/or experience, is knowledgeable of standards, is capable of identifying workplace hazards relating to the specific operations, is designated by the employer, and has authority to take appropriate action. Therefore, in order to meet the intent of the OSHA standard to provide for a safe workplace during power plant construction, staff proposes Condition of Certification **WORKER SAFETY-3,** which would require the applicant/project owner to designate and provide for a power plant site Construction Safety Supervisor.

As discussed above, the hazards associated with the construction industry are well documented. These hazards increase in complexity in the multi-employer worksites typical of large, complex, industrial-type projects such as the construction of gas-fired power plants.

Accidents, fires, and a worker death have occurred at Energy Commission-certified power plants in the recent past due to the failure to recognize and control safety hazards and the inability to adequately supervise compliance with occupational safety and health regulations. Safety problems have been documented by Energy Commission staff in safety audits conducted in 2005 at several power plants under construction. The findings of the audit staff include, but are not limited to, such safety oversights as:

- lack of posted confined space warning placards/signs;
- confusing and/or inadequate electrical and machinery lockout/tagout permitting and procedures;

- confusing and/or inappropriate procedures for handing over lockout/tagout and confined space permits from the construction team to commissioning team and then to operations;
- dangerous placement of hydraulic elevated platforms under each other;
- inappropriate placement of fire extinguishers near hotwork;
- dangerous placement of numerous power cords in standing water on the site, thus increasing the risk of electrocution;
- construction of an unsafe aqueous ammonia unloading pad;
- 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 Condition of Certification **WORKER SAFETY-4**. A Safety Monitor, hired by the project owner, yet reporting to the Chief Building Official (CBO) and CPM, will serve as an “extra set of eyes” to ensure that safety procedures and practices are fully implemented at all power plants certified by the Energy Commission. During the audits conducted by staff, most site safety professionals welcomed the audit team and actively engaged it in questions about the team’s findings and recommendations. These safety professionals recognized that safety requires continuous vigilance and that the presence of an independent audit team provided a fresh perspective of the site.

Fire Hazards

During construction and operation of the proposed CECP 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, 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 would be adequate to assure protection from all fire hazards.

Staff reviewed the information provided in the AFC and spoke to representatives of the Carlsbad 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 CFD (CFD 2008).

Construction

During construction, portable fire extinguishers would be placed throughout the site at appropriate intervals and periodically maintained, and safety procedures and training would be implemented according to the guidelines of the Construction Fire Protection and Prevention Program. In addition, the CECP proposed site is within the tank farm area of the Encina Power Station, which has an existing hydrant system that could provide extra protection during construction (CECP 2007a, § 2.2.12).

Operation

The information in the AFC indicates that the project intends to meet the fire protection and suppression requirements of the 2007 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 would include both fixed and portable fire extinguishing systems. The fire protection system would be comprised of the existing hydrant system and a new R2C2 system installed for CECP structures. The fire water would be potable city water supplied by the fire protection tank with water pressure maintained by a jockey pump, an electric pump, and a diesel-driven pump (CECP 2007a, § 2.2.12).

Emergency access to the site will be via two points: one on the south via Cannon Road to Avenida Encinas to the project site and the other from the west via Carlsbad Boulevard and through the Encina Power Station. Access to the below-grade “bowl” will also be via two points, one on the south and one on the north. Revised Figure 2.2-1 (SR 2008h) shows these access points and depicts the width of the ramps leading down into the bowl and set-back space of the structures from the sides of the bowl. All distances shown on this figure are consistent with the requirements of the fire codes for a “fire lane” and thus will allow fire trucks and other emergency vehicle access to the actual power plant site in the bowl. California Fire Code (CFC) section 503.1.1 and NFPA 1 Uniform Fire Code section 18.2.2.3.1 both require that an access road extend to within 150 feet of all portions of a facility and CFC section 503.2.1 and NFPA 1 section18.2.2.5.1.1 both require that the access road have an unobstructed width of at least 20 feet. Staff review of the plot plans for the project and in conversations with the applicant shows that these minimum requirements will be met and exceeded. The plot-plans show that both ramps and the road around the power plant at the bottom of the “bowl” will be at least 30 feet wide at all places. Therefore, all emergency vehicles and especially fire trucks will have ample space to be able to respond to an emergency at any location within the bowl.

Nevertheless, while these codes and requirements are known to the applicant as evidenced by their listing in the AFC, in order to ensure that the project owner builds the facility precisely to code, staff proposes an additional Condition of Certification **WORKER SAFETY-6** that would require the project owner to construct the facility with the fire lanes and ramp-widths as described in Revised Figure 2.2-1. The widths of the fire lanes will be no less that 30 feet and the ramps would have a grade no greater than 10%. Should any change or revision to these widths be requested for any reason by the project owner, the project owner would be required to submit those changes to the CPM for review and approval and to the CFD for review and comment.

Fire hydrants would be installed per NFPA requirements. A fixed water mist system would be installed in areas of risk (including the ammonia storage area, fire pumps, and turbines), and a fixed sprinkler system would be installed in the turbine lube oil system. A carbon dioxide or dry chemical fire protection system would be provided for the combustion turbine generators and accessory equipment (CECP 2007a, § 2.2.12).

The fire protection system would have fire detection sensors and monitoring equipment that would trigger alarms and automatically actuate the suppression systems. In addition to the fixed fire protection system, appropriate class of service portable extinguishers and fire hydrants/hose stations would be located throughout the facility at code-approved intervals (CECP 2007a, § 2.3.1.1.2). These systems are standard requirements by the NFPA, and the UFC and staff has determined that they will ensure adequate fire protection.

The applicant would be required by Conditions of Certification **WORKER SAFETY-1** and**-2** to provide the final Fire Protection and Prevention Program to staff and to the CFD 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 fire-fighting staff. However, staff has determined that the potential for both work-related and non-work-related heart attacks exists at power plants. In fact, staff's research on the frequency of EMS response to gas-fired power plants shows that many of the responses for cardiac emergencies involved non-work-related incidences, including 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 many private and public locations (e.g., airports, factories, government buildings) maintaining on-site cardiac defibrillation devices. Therefore, staff concludes that, with the advent of modern cost-effective cardiac defibrillation devices, it is proper in a power plant environment to maintain such a device on site in order to treat cardiac arrythmias resulting from industrial accidents or other non-work related causes.

Staff proposes 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.

WIDENING OF INTERSTATE-5 AND MITIGATION

Staff has also considered a separate future project that is several years off—the widening of Interstate Highway 5 through Carlsbad-- but has the potential to affect the setting for emergency response by the CFD. The I-5 freeway is proposed to be widened and may thus encroach on the present "buffer" that exists between the highway and the faciltiy fenceline. This "buffer" consists of trees, bushes, and a raised area above the I-5 grade. According to the California Department of Transportation (Caltrans 2009), all four configurations of the I-5 widening currently under consideration will result in the removal of some if not all the current vegetation and raised area that serve as the "buffer". The present "buffer" would serve many safety functions if the CECP is certified, built, and operated, including protection of critical engergy infrastructure and workers from errant vehicles leaving I-5, increasing security of the power plant by blocking access and line-of-sight viewing, and enabling fire-fighting equipment to use the existing upper ("ring") road that is above the power plant site as a viewing and fire-fighting platform.

Staff has extensively reviewed and evaluated the potential impact of the propsoed I-5 widening on safety at the proposed CECP. On June 11, 2009, staff met with Caltrans staff and the applicant at the CECP site to view the survey markers made by Caltrans engineers the day before and to discuss the precise distance of encroachment onto the CECP site should the I-5 widening project be built eight to ten years from now.

The two areas where the Caltrans I-5 widening come the closest to the power plant are:

1. Directly east of the water treatment trailer parking area (which is east of Structure 43-water treatment pumps on AFC Revised Fig. 2.2-1, which is attached to this FSA section in Appendix A as Figure 1). At this location, the Caltrans I-5 **8+4 with Barrier configuration** will extend the Caltrans ROW west to **26'** from the western edge of the existing upper ring road (8' from eastern edge; see wooden stake with red flag in Photo 023 attached to this FSA section in Appendix A). There would be a total of **105 feet** from the Caltrans ROW to the nearest structure, a water treatment trailer. If the current 45° slope going down inside the "bowl" (se Photo 002) is replaced with a vertical retaining wall that is located west of the existing slope toe and a 30' fire lane is maintained, the CECP would have a total of **75 feet** of flat area for visual-blocking vegetation and a protective barrier + security fence. That would be the maximum distance from the Caltrans ROW available at this location.
2. Directly east of the SCR skid (Structure 18 on AFC Revised Fig. 2.2-1 which is attached to this FSA section in Appendix A as Figure 1), the **8+4 with Barrier configuration** will extend the Caltrans ROW west to **18 feet** from the **western** edge of the existing upper ring road (essentially up to the existing eastern edge of the ring road; see Photos 009 and 017). There would be a total of **120'** from the Caltrans ROW to the nearest structure, the SRC skid. If the current 45° slope going down inside the site bowl is replaced with a vertical retaining wall located west of the current "toe" and a 30' fire lane is maintained, CECP would have a total of **90'** of flat area for visual-blocking vegetation and a protective barrier + security fence. That would be the maximum distance from the Caltrans ROW available at this location.

If the I-5 **10+4 with Barrier configuration** is chosen by Caltrans, the CECP at the closest point would have **45 feet** available for visual-blocking vegetation and a protective barrier + security fence if a retaining wall is used.

After review of this matter with the assistance of Caltrans, staff believes there is ample room under both the 8+4 and 10+4 configurations (the widest configurations Caltrans is considering) for the placement of a dirt berm west of the future Caltrans ROW. This berm can serve as a place for visual-blocking vegetation and serve as a protective barrier room for a security fence. Staff also believes that the I-5 encroachment will still leave room for a perimeter fire access road at the bottom of the bowl where the power plant will be located. Therefore, staff concludes that the widening of I-5 will not imapct on safety or emergency response access to the proposed CECP site.

Because protection of the nation's energy infrastructure as well as workers is of paramount importance, staff thus proposes Condition of Certification **WORKER SAFETY-7**. This condition would require the project owner to place a barrier (earth or other materials) along the entire eastern property line shared by the CECP and Interstate-5 and that it be of sufficent strength and height so as to prevent a runaway car or semi-trailer truck from piercing the barrier and going over the edge and down into the power plant site. This barrier shall also serve to prevent line-of-sight viewing of the power plant site from the shoulder of I-5. In designing the barrier, the project owner will be required to consult with Caltrans and then submit a final plan to the Energy Commission Compliance Project Manager for review and approval. The project owner will be free to negotiate cost-sharing of this barrier with Caltrans and will be required to submit the cost-sharing contract with Caltrans to the CPM for review and approval. Staff believes that this barrier will serve the dual purpose of protecting safety and security. The loss of the existing above-grade "ring" road is offset by the required below-grade perimeter road for emergency response vehicles that will be built to code specifications as per **WORKER SAFETY-6**.

COASTAL RAIL TRAIL

Another fire access issue involves the various proposed routes for a Coastal Rail Trail. Staff believes that a Rail Trail on the eastern side of the railroad ROW, an option under consideration, raises several security, safety, and fire access problems. Staff discusses the security and safety concerns in the **HAZARDOUS MATERIALS MANAGEMENT** section of the FSA and fire access issues here.

As seen in Appendix D **photo 063**, the current rail corridor is single-track and sunken below existing grade as it goes by the power plant site. Staff understands that one option for the LOSSAN Rail Corridor would have two tracks within this area and sink the new side-by-side tracks a bit further below grade. The most current plot-plan for the CECP site (Figure 1) shows a dirt road that is just east of the western fenceline. A review of **photos 059 and 060** shows this dirt road is very wide, runs the length of the CECP project site, and starts on the south end of the site (the SW corner of the site) where an access gate is located. This access gate and dirt road will serve as the construction entrance for heavy equipment and for access to the north side of the site for this heavy equipment. The applicant proposes to pave this road or at least make a sturdier route with gravel. After construction, the gate at the SW corner will serve as an

emergency vehicle access point that will be required by proposed Condition of Certification **WORKER SAFETY-6**. This road will also serve as faster means of accessing the northern end of the site for emergency response vehicles during Commissioning and Operations and the placement of dirt spoils to form a berm along most of it will not block its use. Furthermore, the City has a sewer under this road now and maintains a sewer easement. Therefore, in order to preserve this road on the western side of the CECP site for emergency response access, staff proposes Condition of Certification **WORKER SAFETY-9** which will require the continued presence of this access road and prohibit the placement of a coastal rail trail at this location. The proposed Condition is consistent with those proposed in the **LAND USE** and **HAZARDOUS MATERIALS MANAGEMENT** sections of this FSA.

OPERATION OF THE POWER PLANT

When staff learned that the applicant proposes to operate the CECP from a remote control room on the EPS site, staff identified the following issues as being relevant to remote operation:

- The proposed use, location, and redundancy of operational warning sensors, fire sensors, ammonia sensors, pipeline sensors, valve activation, fire suppression systems, and CCTV locations.
- The response times for personnel to reach the power plant from the control room.
- The staffing level of each shift and whether they are dedicated to running the CECP or will have duties involving the EPS.
- The frequency of routine visual inspections and the time spent on the CECP site.
- The frequency of on-site security surveillance of the CECP site by security guards.
- The worker training program for a remote operation.
- How workers will access the CECP site in an emergency given the frequency of long freight trains blocking access to the site directly from the EPS site for a period of time.
- The location and response times for all manually activated valves (e.g., the main gas pipeline shut-off valve) should remote activation fail.
- Emergency shut-down procedures should access to the site be blocked or delayed due to an accident (vehicle, train), high winds knocking down power lines, etc. when a shut-down is warranted.

The Energy Commission does have experience with certified power plants that are run remotely. These include the three GWF power plants at Tracy, Henrietta, and Hanford. Henrietta and Tracy are simple-cycle and are usually started-up remotely but at least one worker is always dispatched to the site and stays on the site until the units are shut-down (or is relieved at a shift-change). These are peaker power plants, are run infrequently, and have always had at least one worker present when operating. However, they are being converted to combined-cycle power plants and thus will no longer be operated remotely and will always have multiple workers present when operating. The Hanford peaker is a bit different and is run from the existing Hanford LLP coke-fueled power plant on the same site. Hanford peaker is also being converted to a combined-cycle power plant and it can either be operated from its own control room or from the existing Hanford LLP plant. The differences between the Hanford-Hanford LLP sites and the CECP-EPS sites are significant. The distance from the control room at the Hanford LLP site and the Hanford combine cycle site is less than 500 feet. There are no

railroad tracks separating them and there is no “bowl” to traverse into. At the CECP site, the shortest distance from a possible location for a control room at the EPS to the CECP site in the bowl is ~1085 feet but could be longer. And, since this would be a combined-cycle power plant, workers should always be on-site.

After identifying and considering the above issues, staff’s major concern about the absence of a permanent worker-force on the site during operations is that a small problem (e.g., ammonia piping leak, small fire, small gas leak) would turn into a big problem because it wasn’t detected soon enough. Therefore, staff believes that a combined-cycle power plant cannot be operated safely and effectively from a remote location and thus proposes an additional Condition of Certification **WORKER SAFETY-8** that would require the project owner to ensure that at a minimum, two workers are always present on the CEPC site (in the “bowl”) when the power plant is operating.

CUMULATIVE IMPACTS AND MITIGATION

Staff reviewed the potential for the construction and operation of the CECP project combined with existing industrial facilities and expected new facilities, including the existing adjacent Encina Power Station, to result in impacts on the fire and emergency service capabilities of the CFD and initially found that there was a potential for cumulative impacts to occur. The CFD had indicated that although it is currently able to respond to all incidents in its jurisdiction, resources are stretched thin and the proposed CECP may add a burden to the department. The CFD as a whole has six fire stations spread over 48 square miles. In CFD’s opinion, this low station density and the fact that the CFD has not expanded while the city of Carlsbad has grown, contribute to the CFD’s concern regarding future response capabilities. A particular concern of the CFD is the likelihood of a seismic event in the region, which would require that all of its resources be used. In CFD’s opinion, if such a regional event were to occur, the proposed CECP would impact the Carlsbad Fire Department. According to the CFD, any new project in its jurisdiction, especially a facility that stores and uses hazardous and flammable materials such as the CECP, is likely to impact the CFD (CFD 2008).

Given the CFD’s opinion that its ability to respond during a major crisis might be impacted by the operation of this power plant, staff conducted a thorough review of this matter that included evaluating all comments and information provided by the applicant and the CFD and by reviewing the past history of emergency responses at the Encina Power Station.

As a result of staff’s query to the applicant about past emergency response to the EPS, the following information was received:

Fire Response: Since NRG acquired EPS in 1999, there have been no fires of any type at EPS and CFD has not been called or had to respond to any fires at EPS. NRG does not have information regarding fires or CFD response to fire at EPS prior to NRG's acquisition of the site in 1999.

HazMat Spill Response: Since NRG acquired EPS in 1999, there have not been hazmat spills of type of spill quantity that required CFD response or San Diego County Department of Environmental Health response. CFD relies on the San Diego County

Department of Environmental Health for hazardous materials response within the City. NRG has a contract with NRC Environmental Services to provide hazardous materials response if such response is needed at EPS.

Accident Response (rescue operation; trench cave-in; confined space; etc): Since NRG acquired EPS in 1999, there have been no rescue operations at EPS. NRG has NRC Environmental Services act as attendant during all confined space work at EPS.

EMS Response (heart attack; heat stroke; etc): Since NRG acquired EPS in 1999, there have been EMS responses by CFD to EPS on average of one response every 2 to 3 years. With the exception of one EMS response several years ago where an on-site contractor experienced difficulty breathing, the EMS calls have been false alarms, or determined to not have required EMS response.

Based upon the applicant's Fire Needs Assessment (SR 2008t, which was produced by an independent contractor to the applicant, and remains unrefuted by any another Fire Needs Assessment), staff's preliminary risk assessment, the history of emergency response at the EPS, staff's experience with power plants around the state, and staff's experience with a similar-sited power plant where access is restricted due to a below-grade location, staff concludes that while it is possible that during a major earthquake (or other major event) response to the power plant could impact on the Carlsbad Fire Department, the probability of that happening is less than significant. Therefore, this project would not have a significant incremental or cumulative impact on the department's ability to respond to a fire or other emergency and no mitigation is required.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Please see Appendix B for responses to comments.

COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Staff concludes that construction and operation of the CECP 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 CECP 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 Condition of Certification **WORKER SAFETY-3** through**-9**, the project would incorporate sufficient measures to ensure adequate levels of industrial safety and comply with applicable LORS. Staff also

concludes that the operation of this power plant would not present a significant cumulative impact on the local fire department and therefore mitigation is not required.

PROPOSED CONDITIONS OF CERTIFICATION

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

- a Construction Personal Protective Equipment Program;
- a Construction Exposure Monitoring Program;
- a Construction Injury and Illness Prevention Program;
- a Construction Emergency Action Plan; and
- a Construction Fire Prevention Plan.

The Personal Protective Equipment Program, the Exposure Monitoring Program, and the Injury and Illness Prevention Program shall be submitted to the CPM for review and approval concerning compliance of the program with all applicable safety orders. The Construction Emergency Action Plan and the Fire Prevention Plan shall be submitted to the Carlsbad 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 Carlsbad 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:

- an Operation Injury and Illness Prevention Plan;
- an Emergency Action Plan;
- Hazardous Materials Management Program;
- Fire Prevention Plan (8 Cal Code Regs. § 3221); and
- Personal Protective Equipment Program (8 Cal Code Regs, §§ 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 Fire Prevention Plan and the Emergency Action Plan shall also be submitted to the Carlsbad 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 Carlsbad 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:

- have overall authority for coordination and implementation of all occupational safety and health practices, policies, and programs;
- assure that the safety program for the project complies with Cal/OSHA and federal regulations related to power plant projects;
- assure that all construction and commissioning workers and supervisors receive adequate safety training;
- complete accident and safety-related incident investigations and emergency response reports for injuries and inform the CPM of safety-related incidents; and
- assure that all the plans identified in Conditions of Certification Worker Safety-1 and -2 are implemented.

Verification: At least 60 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, and for implementing 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 60 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 its use 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 its use. The training program shall be submitted to the CPM for review and approval.

Verification: At least 60 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 the below-grade site fire lanes,, access points, and ramps (with no more than a 10% grade) are constructed as per the dimensions shown in Revised Figure 2.2-1 and that at least two access points through the site perimeter and into the below-grade power plant site are available to the CFD and other emergency response providers. The final blueprints for the site shall be submitted at least 30 days prior to the start of site mobilization to the Carlsbad Fire Department for review and comment and to the CPM for review and approval. A copy of the transmittal letter to the Carlsbad Fire Department shall also be sent to the CPM. Any requested changes in the fire lanes, ramps, and access points shall be made is writing to the CPM and the CBO for review and approval after obtaining comments from the CFD.

Verification: At least 60 days prior to the start of site mobilization, the project owner shall submit a copy of the final site blueprints to the Carlsbad Fire Department for review and comments and to the CPM for review and approval. The project owner shall also submit to the CPM a copy of the transmittal letter to the CFD.

WORKER SAFETY-7 The project owner shall place a barrier of sufficient strength and height at the eastern fence line of the project at the widened Interstate-5 Right of Way so as to prevent a runaway car or semi-trailer truck from piercing the barrier and going over the edge and down into the power plant site. This barrier shall also serve to prevent line-of-sight viewing of the power plant site from the shoulder of I-5. In designing this barrier, the project owner shall consult with Caltrans and then submit a final plan to the CPM for review and

approval. The project owner may also negotiate cost-sharing of this barrier with Caltrans and if the project owner chooses to do so, the cost-sharing contract with Caltrans shall be submitted to the CPM for review and approval.

Verification: At least 60 days prior to the start of site mobilization, the project owner shall submit a copy of the final plans for the barrier and any cost-sharing contract to the CPM for review and approval.

WORKER SAFETY-8 The project owner shall ensure that not less than two workers - two technical workers or one technical and one security staff - will be present on the site (the "bowl") at all times whenever the CECP is operating. The project owner shall prepare a plan describing the work force that shall be present on the power plant site (the "bowl"), their shifts, their duties, their training, the method(s) of real-time continuous communication with the control room they will have available, their enclosed stations (e.g., portable office building), and facilities for personal hygiene on the site, to the CPM for review and approval.

Verification: At least 60 days prior to the start of commercial operations, the project owner shall submit a copy of the staffing plan to the CPM for review and approval.

WORKER SAFETY-9 The project owner shall maintain the current dirt access road located on the western perimeter fenceline in a sufficient state so as to serve as an emergency response road. In no event shall the project owner grant or dedicate an easement for the Coastal Rail Trail east of the Rail Corridor on the CECP site.

Verification: At least 60 days prior to the start of site mobilization, the project owner shall submit to the CPM for review and approval a copy of the final plans for maintaining this access road.

REFERENCES

California Fire Code 2007. 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.

Caltrans 2009a – California Dept. of Trans/J. Kosup (tn: 50098) Caltrans Comments on the Preliminary Staff Assessment. 02/05/2009

CECP 2007a – California Energy Center Project/T. Hemig (tn: 42299). Application for Certification for the Carlsbad Energy Center Project. 09/11/2007. Rec'd 09/11/2007.

CFD 2008 – Carlsbad Fire Department. Record of conversation with Fire Marshal James Weigand, May 28, 2008.

NFPA 1 Uniform Fire Code 2003, Vol. 1. Published by the National Fire Protection Association with incorporated provisions of the Western Fire Chiefs Association Uniform Fire Code.

SR 2008t – Stoel Rives/K Hellwig (tn: 49006). Fire Risk & Emergency Response Assessment Report. 11/17/2008

WORKER SAFETY/FIRE PROTECTION APPENDIX B

Response to Agency and Public Comments

POWER OF VISION Comments

POV2009a – Power of Vision/Julie Backer (tn: 49934). Comments on Preliminary Staff Assessment ("Safety" Comments). 1/30/2009

Comment: CECP cannot be adequately protected in case of a fire or wild fires. The site is difficult to access for emergency responders. The lowered elevation of CECP will make it difficult for fire personnel to access. When I-5 is widened there will be not room for maneuvering large fire trucks.

Response: Staff has made a considerable effort to review this matter and has reviewed all materials and opinions supplied to date. As the above analysis demonstrates, there is ample room for access now and in the future should I-5 be widened. Staff has experience in siting and in monitoring compliance during the construction and operation of a power plant located in a similar below-grade and constricted location, the Palomar Power Plant in nearby Escondido. This power plant site has high walls located on three sides and is open and at grade only to the south. The ability to provide emergency response was not a concern of the Escondido Fire Department. In fact, almost all urban power plants are located at constricted locations and yet emergency access is ensured by LORS that require minimum widths of fire lanes and access roads. Staff believes that the CECP site is no different and that access would be in compliance with all appropriate LORS.

Comment: Transmission lines present a difficulty to responders in case of an earthquake.

Response: Adequate vertical clearance for emergency response vehicles is required by the California Fire Code section 503.2.1 and NFPA 1 Uniform Fire Code section18.2.2.5.1.1. This project would comply with these codes.

Comment: Page 4.1-25 of the PSA, Facility Operation states, "…CECP operation would not require new employees because…workforce would be provided by…workforce which operates the existing Encina Power Station". Elsewhere, the PSA states that the CECP will be remotely controlled from the existing Encina Power Station. NRG has made public statements promising that it will be shutting down the Encina Power Station in the near future. If so, how will the CECP be operated? Cal ISO has expressed concerns about the reduced reliability of having power plants remotely controlled. Will there be workforce always at the CECP site to detect anomalous operating sounds that cannot be heard in a remote operating center, or in the event that emergency situations arise impeding the rapid deployment of personnel from the Encina plant to the CECP site? Currently, personnel have to pass through two electrically operated gates and, possibly, two train barrier gates, to traverse from one plant to another. We therefore recommend that the construction of an independently staffed control room at the CECP be a CEC licensing condition.

Response: Staff shares this concern and after careful review and evaluation, has proposed Condition of Certification **WORKER SAFETY-8** that would require the project owner to ensure that at a minimum, two workers are always present on the CEPC site (in the "bowl") who have real-time continuous communication with the control room when the power plant is operating.

KERRY SIEKMANN Comments

KS2009a – Kerry Siekmann/Terramar Assn. (tn: 49956). Comments on Preliminary Staff Assessment (Comments18, 20). 1/28/2009

Comment: During the January 7-8, 2009 CEC workshop, the Carlsbad Fire Chief reported that the location for the proposed CECP was difficult to access because of its location. If there were a major event at the plant, fire protection would be stretched beyond capacity. What about fire protection coverage for the neighborhoods close to the plant as well as the rest of the city during that event?

Response: As mentioned in the response to Power of Vision above, staff has made a considerable effort to review this matter and has reviewed all materials and opinions supplied to date. Staff believes that the CECP project can be built and operated in compliance with all fire protection LORS. As to fire protection coverage for the neighborhood during a major "event" at the power plant, staff believes that the CFD will be able to respond to the major event in the same manner regardless of whether the power plant is built or not built. Staff found no incremental or cumulative impact on the fire department.

Comment: The proposed widening of the 1-5 was public knowledge long before application was made for the proposed CECP. During the CEC workshop January 7-8, 2009, CEC staff informed us of the safety issues involved with the proposed widening of the 1-5. The 1-5 widening would encroach upon the berm making a fire road around the project impossible. The proposed CECP would sit dangerously close to the 1-5 putting the proposed CECP and the neighborhoods surrounding in peril. During the workshop the applicant announced that if the 1-5 widening occurred that they would not construct the project as submitted. Shouldn't the widening of the 1-5 be resolved before this project can even be considered?

Response: Please see response to Power of Vision and to the lengthy discussion in the FSA above

CITY OF CARLSBAD Comments

COC 2009a– City of Carlsbad /J Garuba (tn: 50009). City of Carlsbad Comments regarding the Preliminary Staff Assessment (pp 36-37). 1/30/2009

Comment: The City has concerns that in the event that emergency situations arise in the future, there will not be personnel available for rapid deployment. As it is currently proposed, personnel will have to pass through two electrically operated gates and, possibly, two train barrier gates, to traverse from one plant to another.

Response: Staff shares the concern of the City of Carlsbad and of Powwr of Vision regarding he porposal to not staff the CECP site but rather to have staff in a remote

control room at the EPS site. Staff believes that this staffing proposal is not adequate to ensure the safety, reliability, and security of the CECP site and proposes Condition of Certification **WORKER SAFETY-8**. This Condition would require the project owner to ensure that at a minimum, two workers are always present on the CEPC site (in the "bowl") who have real-time continuous communication with the control room when the power plant is operating.

WORKER SAFETY/FIRE PROTECTION - FIGURE 1

Carlsbad Energy Center Project - Photo 002

SOURCE: Dr. Alvin Greenberg, June, 2009

WORKER SAFETY/FIRE PROTECTION - FIGURE 2

Carlsbad Energy Center Project - Photo 009

SOURCE: Dr. Alvin Greenberg, June, 2009

WORKER SAFETY/FIRE PROTECTION - FIGURE 3

Carlsbad Energy Center Project - Photo 017

SOURCE: Dr. Alvin Greenberg, June, 2009

WORKER SAFETY/FIRE PROTECTION - FIGURE 4

Carlsbad Energy Center Project - Photo 023

SOURCE: Dr. Alvin Greenberg, June, 2009

ENGINEERING ASSESSMENT

FACILITY DESIGN

Testimony of Erin Bright

SUMMARY OF CONCLUSIONS

The California Energy Commission staff concludes that the design, construction, and eventual closure of the Carlsbad Energy Center Project and its linear facilities would likely comply with applicable engineering laws, ordinances, regulations and standards. The proposed conditions of certification, below, would ensure compliance with these laws, ordinances, regulations and standards.

INTRODUCTION

Facility design encompasses the civil, structural, mechanical, and electrical engineering design of the Carlsbad Energy Center Project (CECP). 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 (CECP 2007a, Appendices 2A through 2G). 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	City of Carlsbad 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 Carlsbad Energy Center Project (CECP) will be located on a 23-acre parcel within the existing Encina Power Station in the City of Carlsbad, San Diego County. 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 (CECP 2007a, Appendices 2A through 2G).

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 CECP 2007a, Appendices 2A through 2G, 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, are 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.

The CECP 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 (CECP 2007a, AFC § 2.3.2.5) 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 CECP 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 Carlsbad, San Diego 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, 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.

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 CECP 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** portion 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 Gas Turbine (CGT) Foundation and Connections	2
Heat Recover Steam Generator (HRSG) Foundation and Connections	2
HRSG Stack Foundations and Connections	2
Steam Turbine (ST) Foundations and Connections	2
CGT Generator Foundations and Connections	2
ST Generator Foundations and Connections	2
CGT Generator Transformer Foundations and Connections	2
ST Generator Transformer Foundations and Connections	2
Auxiliary Transformer Foundations and Connections	2
Generator Circuit Breaker Foundations and Connections	2
Electrical Package Foundations and Connections	2
Medium Voltage Switchgear Foundations and Connections	2
ST Fin Fan Cooler Foundations and Connections	2
Rotor Air Fin Fan Cooler Foundations and Connections	2
Condensate Polishing Fin Fan Cooler Foundations and Connections	2

Equipment/System	Quantity (Plant)
ST Lube Oil Cooler Foundations and Connections	2
CGT Lube Oil Cooler Foundations and Connections	2
CGT Inlet Filter Foundations and Connections	2
Air Compressor Foundations and Connections	2
Fuel Gas Compressors Enclosure Foundations and Connections	1
Fuel Gas Conditioner/Meter Foundations and Connections	1
Selective Catalytic Reduction Skid Foundations and Connections	2
Balance of Plant Power Control Center Foundations and Connections	2
Steam Turbine Power Control Center Foundations and Connections	2
Continuous Emissions Monitoring System Foundations and Connections	2
Ammonia Storage Foundations and Connections	2
Chemical Dosing Equipment Foundations and Connections	2
Oil/Water Separator Foundations and Connections	2
Boiler Feedwater Pump Foundation and Connections	2
Boiler Blowdown Tank Foundations and Connections	2
Gland Steam Condenser Foundations and Connections	2
Raw/Reclaimed Water Tank Foundation and Connections	1
Demineralized Water Storage Tank Foundation and Connections	1
Fire Water Tank Foundation and Connections	1
Raw Water Forwarding Pumps Foundations and Connections	1
Demineralized Water Forwarding Pumps Foundations and Connections	1
Fire Water Pumps Enclosure Foundations and Connections	1
Deaerator/Drain Tanks/ Condensate Pumps Foundations and Connections	2
Reverse Osmosis Drain Foundations and Connections	1
Crane Maintenance Pad Foundations and Connections	2

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, § 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.

Verification: 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.

Verification: 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, Section 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 investigations 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 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 B31.2 (Fuel Gas Piping Code);
- ANSI B31.3 (Chemical Plant and Petroleum Refinery Piping Code);
- ANSI B31.8 (Gas Transmission and Distribution Piping Code);
- Title 24, California Code of Regulations, Part 5 (California Plumbing Code);
- Title 24, California Code of Regulations, Part 6 (California Energy Code, for building energy conservation systems and temperature control and ventilation systems);
- Title 24, California Code of Regulations, Part 2 (California Building Code);
- San Diego County codes; and
- City of Carlsbad regulations and ordinances.

The CBO may deputize inspectors to carry out the functions of the code enforcement agency (2007 CBC, Appendix Chapter 1, §103.3, Deputies).

Verification: 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

CECP 2007a – Carlsbad Energy Center Project/T. Hemig (tn: 42299)**.** Application for Certification for the Carlsbad Energy Center Project. 09/11/2007

GEOLOGY AND PALEONTOLOGY

Testimony of Dal Hunter, Ph.D., C.E.G

SUMMARY OF CONCLUSIONS

The proposed Carlsbad Energy Center Project (CECP) is located in an active geologic area on the coast of Southern California between Los Angeles and San Diego. 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, several major off-shore faults are located between 2 and 11 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 California Building Code (2007) requires that structures be designed to resist seismic stresses from ground acceleration and, to a lesser extent, liquefaction potential. A 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**, would present 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 CECP site. Numerous paleontological resources have been documented within 3 miles of the project, but no significant fossils were found during field explorations 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 proposed Conditions of Certification, **PAL-1** through **PAL-7**.

Based on this information, the Energy Commission staff believes that the potential 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, is low. It is staff's opinion that the proposed CECP 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 CECP as well as the CECP's potential impact on geologic, mineralogic, and paleontologic resources. Staff's objective is to ensure that there would 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) (CECP 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 CECP 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 California Building Code (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 (IBC, 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 proposed project site and linear alignments are not located within a designated Alquist-Priolo Earthquake 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.
California Coastal Act, sections 30244 and 30253	Section 30244 requires mitigation for adversely impacted archaeological and paleontological resources. Section 30253 requires that risks to life and property that may result from geologic, flood and fire hazards be minimized, and that the “stability and structural integrity” of the site and natural landforms in the surrounding area be maintained.
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	
County of San Diego	The county requires compliance with the seismic design criteria in the CBC (2007) and mitigation of geologic hazards associated with earthquakes according to the Seismic Hazards Mapping Act. Identification of and setback from faults that present potential surface rupture hazards are required, as set forth in the Alquist-Priolo Earthquake Zoning Act. The "Conservation Element" of the General Plan and Guidelines for Determining Significance address monitoring and collection of discovered resources on county lands.
County of San Diego Grading Ordinance, section 87.430	May require paleontological monitor on grading sites located on county land. Discusses suspension of operations, notification of county officials, and recovery of paleontological resources, and resumption of operations.
County of San Diego Guidelines for Determining Significance for Paleontological Resources	Relies in part on guidelines set forth by the state by CEQA.
County of San Diego General Plan, Part X, Conservation Element	Provides for protection of natural resources on County lands, including Unique Geological Features which includes fossiliferous formations.
City of Carlsbad (COC) General Plan	Requires compliance with public safety aspects in the general plan with regard to geologic hazards during construction, specifically site grading and trenching. The Cultural Resources Guidelines used by the Planning Department also provide for evaluation of potential impacts to scientifically valuable resources.

SETTING

The proposed CECP would be constructed on approximately 23 acres located on the existing Encina Power station property (approximately 95 total acres) on the south side of Carlsbad, California in San Diego County. The entire facility, including the future Carlsbad Energy Center Project and existing Encina Power Plant, occupy a peninsula with the Pacific Ocean to the west and the Agua Hedionda lagoon to the north and east. The proposed CECP site would be constructed on the Agua Hedionda side of the peninsula. The site is situated between Interstate 5 (San Diego Freeway) to the east and the Atchison, Topeka & Santa Fe Railroad tracks to the west. Alternative facilities proposed in the Project Enhancement and Refinement Document (PEAR) could also be constructed on additional acreage adjacent to the proposed CECP site to the southeast, and additional project linears would extend across the railroad tracks to Carlsbad Boulevard to the southwest (SR 2008h)

The 7.5 minute topographic quadrangle map (USGS 1968) indicates the original ground elevation on the 23-acre site was at least 40 feet above mean sea level (msl). The site has been generally graded with artificial fill material for construction of the existing tank

farm and surrounding berms. The top of the berms at the south end of the 23-acre site is at an approximate elevation of 55 feet, and the pad on which the tanks were constructed is at 31 feet, based on boring elevations in a recent geotechnical report (CECP 2007d). The peninsula on which the proposed power plant facilities are to be located is an elevated plateau, and the margins drop off relatively steeply into the lagoon on three sides. The slope to the west from the existing Encina Power Plant is more gradual towards the Pacific Ocean. Berms have also been constructed, primarily on the northeast side adjacent to the San Diego Freeway. The large fuel oil tanks and associated facilities that currently occupy the site will be demolished and removed. General remediation and re-grading would take place prior to construction of the new plant. In general, berms separating individual tank pads would be removed, and the proposed CECP power plant would be constructed within a single large area confined by the remaining perimeter berms.

The proposed power plant would be capable of generating 540 megawatts (MW) of electricity during normal operations, and up to 558 MW during peak hours. The natural gas-fired, combined-cycle facility would consist of two trains, each with a natural-gas combustion turbine generator (CTG) and steam turbine generator (STG). Two heat recovery steam generators (HRSG) would convert exhaust from the CTG's to high-pressure steam, which would in turn power the STG's. An evaporative air-cooling system that utilizes reclaimed water would dispose of heat rejected by the steam turbines. Demineralized water produced on-site would provide steam makeup. Auxiliary components would include a fuel and water tanks, fuel/gas and electric booster compressors, a gas scrubber/filter, and flow-metering and gas pressure control stations.

New project linears proposed for construction inside the plant site boundaries include 138-kilovolt (kV) and 230-kV overhead power lines, which would connect to the existing switchyards at the Encina Power Plant. Approximately 1,100 feet each of 18-inch diameter natural gas, 12-inch diameter sewer, and potable water pipelines would also connect to existing mains on the property. Roughly half of the 3,700 total lineal feet of new 12-inch-diameter reclaimed water [Is this the currently proposed configuration? How about the desalination plant?]pipeline would be off the 23-acre CECP site. It would follow the east side of the railroad tracks from the southwest corner of the new plant site, and connect to an existing main to the east at the intersection of Cannon Road and Avenida Encinas.

Alternatives to the facilities proposed for construction in the AFC (CECP 2007a) are presented in the PEAR document (SR 2008h). The alternatives include an increased stack height, ocean-water purification and industrial wastewater systems, Tanks 5, 6 and 7 demolition and remediation, and a new 230-kV switchyard. The purification and wastewater systems would be located within the proposed 23-acre CECP site, although ocean water supply and discharge pipelines would extend to near Carlsbad Boulevard to the southwest. The switchyard site is adjacent to the 23-acre site to the southeast, and would include construction of 138-kV and 230-kV transmission lines of approximately 2,059 and 1,800 feet in length, respectively. The tank demolition and remediation was included as part of the original AFC, but a change in jurisdiction over the activities is proposed.

REGIONAL SETTING

The proposed CECP site would be located on the west coast of Southern California approximately 30 miles north of San Diego, California. The low relief coastal strip changes to hilly terrain inland from Carlsbad, and only small, localized mountain ranges at relatively low elevations are present. The San Marcos and Merriam Mountains, which attain elevations of 1,200 to 1,800 feet above mean sea level (amsl), lie roughly 10 miles to the east. The Agua Tibia Mountains, located approximately 25 miles to the northeast, and the Santa Ana Mountains, located 30 miles to the north, reach heights of 4,000 to 6,000 feet. These mountain ranges are associated with movement on the Elsinore Fault Zone. The proposed site is within the Peninsular Ranges geomorphic province, which is characterized by major northwest-striking, right-lateral strike-slip faults (Norris and Webb, 1990). The Rose Canyon Fault, which is part of the Newport-Inglewood-Rose Canyon Fault Zone mapped off-shore approximately 2 miles southwest of the proposed plant site, is the closest major structure (CDMG 2007). The nearest major on-shore structure is the Elsinore Fault.

The geology of the Peninsular Ranges is similar to the Sierra Nevada Range. Mesozoic granitic, and lesser gabbroic and metamorphic rocks form the core of the geomorphic province (Norris and Webb, 1990; CDMG 1966; CDMG 2007). The nearest mapped Mesozoic rocks are approximately 2.5 miles east of the proposed CECP site. Relatively thin Tertiary and Quaternary sediments deposited in marine and transitional environments, overlie the crystalline basement rocks. Continental sediments are locally common as well, particularly in modern drainages. Post-Mesozoic rocks are prevalent along the coast, and extend 5 to 8 miles inland in the vicinity of Carlsbad. The inland sediments reflect periods of higher sea levels in the past, as well as uplift due to tectonic activity.

PROJECT SITE DESCRIPTION

The proposed power plant site is located on the west coast of Southern California, and is situated on a peninsula on the south side of Agua Hedionda lagoon. Fill from past grading of the site covers Quaternary and Tertiary sediments that were deposited in marine and transitional environments. Quaternary age paralic sediments immediately underlie the artificial fill. These deposits represent transitional facies associated with a series of wave-cut terraces. The oldest paralic deposits are present to the east and uphill from the coast line. As sea level fell, in response to decreases in ocean water volume and/or temperature and uplift associated with regional and local tectonics, paralic sediments were deposited on progressively lower wave-cut terraces (Lajoie, et al.,1991). The most recent terrace deposits associated with a stranded bench are represented by the materials present at the proposed CECP site. Terraces were cut into middle Eocene deposits of the Santiago Formation in the Carlsbad area, so that Quaternary sediments are in unconformable contact with Tertiary sediments. The marine arkosic sandstones were derived from granitic sources to the east. The stratigraphy of geologic units in the Carlsbad area as mapped by various authors is presented in **Geology and Paleontology Table 2**.

Geology and Paleontology Table 2
Stratigraphic Units in the Vicinity of Carlsbad California

Rogers (CDMG, 1966)	Tan and Kennedy (CDMG, 1996)	Kennedy and Tan (CDMG, 2007)	Age	Description
Qal	Qb	Qmb	Holocene (Unconsolidated)	Beach deposits
	Qal	Qya		Alluvial and stream deposits
Qm	Qt_1	Qop_{6-7}	Late to middle Pleistocene	Old paralic (terrace) deposits
	Qt_2	Qop_{2-4}		
Tm*	Qt_3	$Qvop_{13}$	Early to middle Pleistocene	Very old paralic (terrace) deposits
	Qt_4	$Qvop_{10-11}$		
E	Tsa	Tsa	Middle Eocene	Santiago Formation
* Older mapping tentatively date these undivided marine deposits as 'Pliocene(?)' in age				

No site-specific geotechnical investigation was conducted for the proposed Carlsbad Energy Center Project 23-acre site. However, the AFC for CECP (CECP 2007a) includes the geotechnical report (CECP 2007d) that was conducted for the proposed Desalinization Project, located within the Encina Power Station 95-acre parcel. Five of the borings are located at the southeast end of the proposed CECP site, and revealed fill materials to depths ranging from 1 to 3.5 feet. Borings across the Atchison, Topeka & Santa Fe Railroad tracks to the southwest encountered fill to depths of up to 9 feet. Only information presented for borings on or nearest the proposed CECP 23-acre site will be discussed in the following text. The fill is composed predominantly of silty sand and poorly graded sand with gravel that contains fine to medium grained sand, 5 to 30 percent non-plastic to low plasticity fines and locally up to 40 percent gravel. Some clayey sand with 30 to 40 percent medium plasticity fines occurs below 3.5 feet in deeper fills southwest of the railroad tracks. No subsurface information, particularly fill depth, was available on the majority of the 23-acre site. Compaction of fill materials could not be documented in the geotechnical report (CECP 2007d).

The composition of the paralic sediments on the coast of Southern California is reflective of deposition in a transitional environment, which includes strandline, beach, estuarine and colluvial facies (CDMG 2007). Predominant lithologic types are sandstone and conglomerate, with lesser siltstone and claystone, and the soils tend to be reddish-brown, poorly bedded, and poorly to moderately indurated (CDMG 1996; CDMG 1996a; CDMG 2007). Kennedy and Tan (CDMG 2007) have mapped 20 different terraces. Each is numbered according to relative age and geographic position. The lower numbers refer to older strandlines that are generally at higher elevations and farther inland. The different benches are also divided into two groups, old paralic deposits (Qop_x) and very old paralic deposits ($Qvop_x$), although all are Pleistocene in age. The unit numbers also reference particular named terraces which are mapped at a given elevation above sea level. For example, the terrace deposit that is present beneath fill at the proposed CECP site is $Qop_{6-7,}$ which is one of the youngest mapped old paralic deposits. The benches on which the sediments rest are the (6) Nestor terrace at 22 to 23 meters elevation, and the (7) Bird Rock terrace at 9 to 11 meters (CDMG 2007). Older work by Tan and Kennedy (CDMG 1996) uses an earlier version of the numbered terrace system, although the lower designations refer to younger units (i.e. Qt_1).

Borehole logging in the geotechnical report for the proposed desalinization plant indicates that the terrace deposits are predominantly composed of silty sand and poorly graded sand (CECP 2007d). The soils contain 5 to 30 percent non-plastic to low plasticity fines. Gravel is conspicuously lacking, except for boring GB-08 on the west side of the railroad tracks, which contains 15 percent fine gravel from 7 to 10.5 feet.

The Santiago Formation reportedly consists of up to three separate light-colored, poorly bedded, poorly indurated, medium to coarse-grained arkosic sandstone units deposited in a marine environment (CDMG 1996a; CDMG 2007). The basal unit contains the coarsest sand with local conglomerates, the central unit is composed predominantly of medium-grained sand, and the upper unit is coarse-grained (CDMG 2007). Interbeds of siltstone and claystone deposited in a lagoonal setting are common. These fine-grained materials are prone to landsliding (CDMG 1996a). Soils encountered in boreholes at the southeast end of the proposed 23-acre site and across the railroad tracks from the site are variable (CECP,2007d). In general, finer-grained facies are present beneath fill or terrace deposits. The fine-grained soils consist of clayey sand and sandy lean clay with 30 to 100 percent medium plasticity fines. Silty sands with 20 to 40 percent low plasticity fines are commonly interbedded. Coarser-grained, lower plasticity facies are more common at depth beneath fine-grained soils. The coarser soils are poorly graded and silty sands with 5 to 40 percent non-plastic to low plasticity fines. Clayey sand beds occur locally. The upper fine-grained soils range in thickness from 8 to 35 feet, and appear to be thinner to the north.

The borings presented in the geotechnical report (CECP 2007d) attached to the AFC (CECP 2007a) were collared at various locations in the vicinity of the existing fuel oil tanks. Collar elevations range widely from 30 feet (bottom of tank grade) to 55 feet (top of berms) amsl. Therefore, depths from surface to the Quaternary paralic deposits/Eocene Santiago Formation contact are better expressed in terms of elevation relative to sea level. The geotechnical investigation reports elevations of 34 feet, and 23 to 29 feet amsl at the southeast end of the 23-acre site, and across the railroad tracks from the site, respectively. If the load elevation of the tank farm, and presumably of the proposed CECP power plant, is at 30 to 31 feet above amsl according to boring collar elevations, then the footing elevation of new construction would be at or within 7 feet of the top of the Santiago Formation in the vicinity of the borings. However, calculated elevations to the top of the Santiago Formation from collar elevations and borehole logging indicate a much wider range for the upper surface, from 8 to 43 feet above amsl. Two collar elevations on the boring logs appear to be incorrect, such that the lowest calculated depth to the Santiago Formation is 25 feet higher in these holes. Therefore, the lowest contact elevation relative to the proposed project site from all nearby borings is more probably 27 feet amsl. Due to the discrepancies in the geotechnical report attached to the AFC, and that the subsurface information applies to only a small portion of the proposed CECP site, the depth to the Santiago formation is unclear. A project and site-specific geotechnical investigation would need to be performed as required by the CBC (2007), and by proposed **Facility Design** Conditions of Certification **GEN-1**, **GEN-5** and **CIVIL-1**, and should clarify this depth. The depth is of concern primarily because of the high potential for finding vertebrate fossils within the Santiago formation.

The geotechnical report for the nearby desalinization plant indicates that ground water occurs at depths of 3 to 5 feet msl (CECP 2007d). Ground water depths calculated from borehole logs in the report range from -28 feet to 5.5 feet amsl. Two collar elevations on the boring logs appear to be incorrect, such that the lowest calculated depth to the ground water is 25 feet higher in these holes. Therefore, the actual calculated range of ground water elevations is more probably -3 to 5.5 feet msl. It is recommended that all areas of proposed power plant construction that lack subsurface information be investigated to establish depths to ground water, as well as other geologic conditions per CBC (2007) and proposed **Facility Design** Conditions of Certification **GEN-1**, **GEN-5**, and **CIVIL-1** requirements.

Several northwest-striking active and potentially active faults related to regional strike-slip faulting are present in the proposed CECP project area and throughout the Peninsular Ranges Geomorphic Province. Active regional reverse and thrust faulting associated with compressional tectonics continues to cause uplift in the Transverse Ranges 70 miles to the north. EQFAULT Version 3.00, a computer program for the deterministic estimation of peak site acceleration using three-dimensional articulated planar elements (faults), was used to model seismogenic sources (Blake, 2006a). The site latitude and longitude inputs were 33.1417 degrees and -116.3335 degrees, respectively. The search radius was 80 miles. The attenuation relationship used was that recommended by Boore and others (1997) for Site Class D. The various faults are listed in Table 3 - Active Faults in the Project Area, along with the distance from the proposed project site and maximum earthquake magnitude. The peak acceleration and estimated intensity the site would experience during a maximum magnitude earthquake on 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).

Fault Name, Zone or System	Approximate Distance (mi)	Estimated Maximum Earthquake Event		
		Maximum Earthquake Magnitude (Mw)	Peak Site Acceleration (g)	Estimated Site Intensity (Modified Mercali Scale)
San Jacinto-Borrego	66.1	6.6	0.050	VI
San Andreas – San Bernardino, Coachella	66.5	8.0	0.105	VII
San Jose	69.1	6.4	0.053	VI
Cucamonga	71.3	6.9	0.067	VI
Sierra Madre	71.8	7.2	0.079	VII
Pinto Mountain	72.4	7.2	0.064	VI
San Andreas-Coachella	73.5	7.2	0.063	VI
North Frontal Fault Zone	75.4	7.2	0.076	VII
Burnt Mountain	77.3	6.5	0.042	VI
Upper Elsian Park Blind Thrust	77.9	6.4	0.048	VI
Cleghorn	78.4	6.5	0.042	VI
San Andreas – Cholame, Mojave, 1857 Rupture	79.8	7.8	0.082	VII

Geology and Paleontology Table 3
Active Faults in the Project Area

Fault Name, Zone or System	Approximate Distance (mi)	Estimated Maximum Earthquake Event		
		Maximum Earthquake Magnitude (Mw)	Peak Site Acceleration (g)	Estimated Site Intensity (Modified Mercali Scale)
Rose Canyon	4.6	7.2	0.461	X
Newport-Inglewood (Offshore)	5.6	7.1	0.394	X
Coronado Bank	20.6	7.6	0.209	VIII
Elsinore (Temecula)	24.5	6.8	0.120	VII
Elsinore (Julian)	24.7	7.1	0.140	VIII
Elsinore (Glen Ivy)	34.7	6.8	0.092	VII
San Joaquin Hills	36.0	6.6	0.098	VII
Palos Verdes	36.4	7.3	0.115	VII
Earthquake Valley	43.6	6.5	0.066	VI
Newport-Inglewood (L.A. Basin)	46.9	7.1	0.085	VII
San Jacinto-Anza	47.2	7.2	0.089	VII
San Jacinto-San Jacinto Valley	47.8	6.9	0.076	VII
Chino-Central Ave. (Elsinore)	48.0	6.7	0.083	VII
Whittier	52.3	6.8	0.067	VI
San Jacinto-Coyote Creek	52.5	6.6	0.060	VI
Elsinore (Coyote Mountain)	57.5	6.8	0.062	VI
San Jacinto-San Bernardino	60.7	6.7	0.057	VI
Puente Hills Blind Thrust	62.4	7.1	0.083	VII

The nearest active fault in the proposed CECP project area is the Rose Canyon Fault, which is the southern extension of the Newport-Inglewood-Rose Canyon Fault Zone (Norris and Webb, 1990; CDMG 2007). **Geology and Paleontology Table 3** indicates the zone is 4.6 miles from the proposed power plant site. However, the closest strand of the Rose Canyon Fault Zone is located approximately 2 miles southwest of the site, and the furthest is 8.5 miles beyond. The next closest active right-lateral strike-slip faults are the Coronado Bank Fault, located approximately 20 miles offshore to the southwest, and the Elsinore Fault, located 25 miles to the northeast.

Although sense-of-motion on nearly all faults within 45 miles of the proposed site is right-lateral, some vertical component of movement is generally present as well. Down-drop direction, as well as amount of offset, varies greatly from fault to fault, and along individual faults. This variable vertical movement, along with possible regional uplift due to compressional tectonics associated with the Transverse Ranges, is partly responsible for formation of strandlines above present day sea level (Lajoie, et al., 1991). Complicated structures are generated within the larger fault zones and in areas where multiple structures merge. For example, pull-apart basins and sag ponds are common features in areas where faults step to the left or right. Lake Elsinore, and possibly Lake Henshaw, occupy low areas that developed between faults along the Elsinore Fault Zone (Norris and Webb, 1990). Tight folding patterns also develop in areas where faults merge. A series of anticlines have been mapped where the Christianitos and Inglewood-Rose Canyon Fault Zones merge offshore approximately 11 miles northwest of the proposed CECP site.

Geology and Paleontology Table 4 (Estimated Deterministic Peak Ground Accelerations) summarizes the historic seismicity in the region between 1800 and 2008. EQSEARCH Version 3.00 software was used to search an abbreviated and modified version of the published CGS earthquake catalog for California (Blake, 2006b). The proposed site latitude and longitude inputs were 33.1417 degrees and -117.3335 degrees, respectively. The range of historic earthquake magnitudes selected was 5.5 to 9.0, and the search radius was 80 miles. The attenuation relationship used was that recommended by Boore, et al. (1997) for Site Class D. The locations of each seismic was obtained from the California Historical Online Database (CGS October 2007) and the Fault Activity Map of California (CDMG 1994). The faults evaluated for this proposed site are summarized in **Geology and Paleontology Table 3**.

Latitude North	Longitude West	Date	Depth (km)	Earthquake Magnitude	Site Acc. (g)	Site Modified Mercali Scale Intensity	Approx. Distance (mi)	Location of Epicenter
34.017	116.500	07/24/1947	0.0	5.50	0.025	V	77.1	Morongo Valley
33.933	116.383	12/04/1948	0.0	6.50	0.042	VI	77.3	Desert Hot Springs
32.967	116.000	10/21/1942	0.0	6.50	0.042	VI	78.1	Fish Creek Mountain / Lower Borrego Valley
34.203	116.827	06/28/1992	5.0	6.70	0.046	VI	78.8	Landers-Big Bear
32.200	116.550	11/04/1949	0.0	5.70	0.027	V	79.4	Baja California
34.100	118.100	07/11/1855	0.0	6.30	0.037	V	79.5	Los Angeles Region
34.200	117.900	08/28/1889	0.0	5.50	0.024	V	80.0	Azusa Area

Geology and Paleontology Table 4
Estimated Deterministic Peak Ground Accelerations

Latitude North	Longitude West	Date	Depth (km)	Earthquake Magnitude	Site Acc. (g)	Site Modified Mercali Scale Intensity	Approx. Distance (mi)	Location of Epicenter
33.000	117.300	11/22/1800	0.0	6.50	0.199	VIII	10.0	San Diego Region
32.700	117.200	05/27/1862	0.0	5.90	0.062	VI	31.5	San Diego Region
33.700	117.400	05/15/1910	0.0	6.00	0.055	VI	38.7	Glen Ivy Hot Springs
32.800	116.800	10/23/1894	0.0	5.70	0.047	VI	38.9	East of San Diego
33.699	117.511	05/31/1938	10.0	5.50	0.042	VI	39.8	Santiago Peak
33.750	117.000	04/21/1918	0.0	6.80	0.074	VII	46.2	San Jacinto
33.617	117.967	03/11/1933	0.0	6.30	0.054	VI	49.1	Long Beach
33.800	117.000	12/25/1899	0.0	6.40	0.057	VI	49.3	San Jacinto & Hemet
33.900	117.200	12/19/1880	0.0	6.00	0.044	VI	52.9	East of San Bernardino
33.501	116.513	02/25/1980	13.6	5.50	0.033	V	53.4	Anza
33.683	118.050	03/11/1933	0.0	5.50	0.032	V	55.7	Long Beach
33.343	116.346	04/28/1969	20.0	5.80	0.036	V	58.7	Borrego Springs
34.000	117.250	07/23/1923	0.0	6.25	0.045	VI	59.5	San Bernardino Region?
34.000	117.500	12/16/1858	0.0	7.00	0.067	VI	60.0	San Bernardino Region
33.400	116.300	02/09/1890	0.0	6.30	0.045	VI	62.3	San Jacinto Fault?
32.817	118.350	12/26/1951	0.0	5.90	0.036	V	63.0	San Clemente Island
33.408	116.261	03/25/1937	10.0	6.00	0.037	V	64.6	Buck Ridge
33.200	116.200	05/28/1892	0.0	6.30	0.043	VI	65.6	San Jacinto Fault?
33.283	116.183	03/19/1954	0.0	6.20	0.040	V	67.2	Arroyo Salada
33.283	116.183	03/19/1954	0.0	5.50	0.028	V	67.2	Arroyo Salada
32.700	116.300	02/24/1892	0.0	6.70	0.052	VI	67.2	Laguna Salada, Baja California
33.217	116.133	08/15/1945	0.0	5.70	0.030	V	69.6	San Jacinto
33.190	116.129	04/09/1968	11.1	6.40	0.043	VI	69.7	Borrego Mountain
33.988	116.606	07/08/1986	11.7	5.60	0.028	V	72.4	North Palm Springs
34.200	117.400	07/22/1899	0.0	5.50	0.026	V	73.2	Lytle Creek-Cajon Pass
34.200	117.100	09/20/1907	0.0	6.00	0.033	V	74.3	San Bernardino Region
34.061	118.079	10/01/1987	9.5	5.90	0.031	V	76.6	Whittier Narrows
34.017	116.500	07/24/1947	0.0	5.50	0.025	V	77.1	Morongo Valley

All but one of the earthquakes listed in **Geology and Paleontology Table 4** occurred more than 30 miles from the proposed CECP site. The coordinates of the nearest earthquake presented in **Geology and Paleontology Table 4**, a Magnitude 6.5 (M6.5) event that took place on November 22, 1800, place the epicenter in the vicinity of the Rose Canyon Fault just offshore from Solana Beach to the south. However, the California Historical Online Database (2007) indicates the earthquake occurred in the vicinity of the offshore San Diego Trough Fault, 30 miles to the west. The M5.9 earthquake that occurred on May 27, 1862 took place on a structure within the Rose Canyon Fault Zone south of San Diego. The Long Beach earthquakes (M6.3 and M5.5, March 11, 1933) were associated with the Newport-Inglewood Fault and caused a large amount of damage to the Long Beach area (SCEC 2008). Interestingly, few historic earthquakes greater than M5.5 are associated with the Elsinore Fault Zone. The lone example is the M6.0 Glen Ivy Hot Springs earthquake which took place on May 15, 1910 approximately 39 miles north of Carlsbad. In contrast, a large number of historic earthquakes have occurred along the San Jacinto Fault Zone and subsidiary structures, including the Coyote Creek, Superstition Hills and Imperial Faults. Events listed on **Geology and Paleontology Table 4** include multiple San Jacinto earthquakes (M6.4, December 25, 1899 (Hemet); M6.8, April 21, 1918; M6.2 and M5.5, March 19, 1954 (Arroyo Salada)), the Terwilliger Valley (Buck Ridge) earthquake (M6.0, March 25, 1937), and the Borrego Mountain earthquake (M6.0, April 9, 1968).

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 proposed 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.

Staff reviewed existing paleontologic information and requested records searches from the San Bernardino County Museum and the Natural History Museum of Los Angeles 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 proposed CECP 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 resources would be proposed as part of the projects approval.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Ground shaking, settlement and expansive clays represent the main geologic hazards at this proposed site. These potential hazards would be effectively mitigated through facility design by incorporating recommendations contained in a project-specific geotechnical report. Proposed Conditions of Certification **GEN-1, GEN-5,** and **CIVIL-1** in the **Facility Design** section should also mitigate these impacts to a less than significant level.

No viable geologic or mineralogic resources are known to exist within 3 miles of the proposed CECP plant site or project linears. The entire CECP site, including linears, is mapped as Mineral Resource Zone 3 (CDMG 1996b). MRZ-3 refers to "areas containing mineral deposits the significance of which cannot be evaluated from available data." As of 1996, Portland concrete cement (PCC) grade aggregate was mined by South Coast Materials Company from the Carlsbad Quarry located approximately 3 miles to the northeast (CDMG 1996b). Mesozoic age metavolcanic rock is the source for the aggregate. Similar material is produced from the Vista Quarry by Wyroc, Inc. in the city of Vista located roughly 7 miles to the east.

Gold has been produced from several districts in the relatively low-lying mountain ranges east of Escondido. Escondido, which is the nearest precious metals district at roughly 15 miles east of Carlsbad, was also the site of some gold production that took place until the early 1900's (CDMG 1998). Free gold is associated with quartz-pyrite veins hosted in granitic and other igneous rocks. Some nickel, as well as gold, was extracted from quartz veins hosted in metamorphic rocks from the Julian Mining District, located another 30 miles east of Escondido. San Diego County is also famous for its gemstone mines. Many districts, including Pala, Rincon, Mesa Grande and Ramona, are located 20 to 25 miles northeast and east of the proposed CECP site. World class specimens of tourmaline, beryl, kunzite (a variety of spodumene), garnet and topaz have been produced from pegmatite dikes that occur in granitic terrains (Norris and Webb, 1990). Pink varieties of these minerals are particularly common due to the

abundance of lithium, which has also been recovered from the area. Some of these mines are currently in operation, or provide mine tours for tourists.

The CDC (2001) shows the nearest producing oil or gas fields are located in the Los Angeles Basin roughly 45 miles to the northwest of the proposed CECP site. Several abandoned oil fields, the Christianitos Creek and San Clemente, are the closest known oil deposits at 23 to 25 miles to the northwest near the coast. The discovery well at Christianitos Creek was drilled in 1959, and produced oil from upper Cretaceous age sediments (CDC 1992). The structural trap was associated with the Christianitos Fault. No geothermal fields are shown by the CDC (2001) within 70 miles of the Carlsbad area.

Pleistocene age paralic deposits, which represent all soils mapped at the surface of the proposed CECP power plant site and the linear route, are considered to have a high paleontological sensitivity. However, all fossils from terrace sediments in the area were recovered from units on older wave-cut benches at higher elevations inland from the site, so the potential to impact significant paleontological resources would be low. The Eocene age Santiago Formation, which has been mapped in the floor of the current tank farm (CECP 2007d), is also highly sensitive. Furthermore, fossil remains have been documented from the nearby Carlsbad State Beach, so, overall, potential to impact paleontological resources would be high (Randall, 2008). The nearest documented fossil locality is approximately 500 to 750 feet south of the proposed ocean-water pipeline intake and discharge locations. Any excavations for these pipelines, in particular, would have a high potential to impact paleontological resources. Fill materials are assigned a zero sensitivity rating and have no paleontological potential, because any fossils that may be discovered have been disturbed and cannot provide useful scientific information.

No important paleontological resources were observed on the proposed CECP site or at the off-site lay down area during the paleontological field survey conducted for the AFC (CECP 2007a). Since the proposed CECP site construction would include significant amounts of grading, foundation excavation, possible pile driving, and utility trenching, staff considers the probability that paleontological resources would be encountered during such activities to be high in Santiago Formation sediments, low for overlying paralic deposits and zero for fill materials. This assessment is based on SVP criteria and the confidential paleontological report appended to the AFC. Proposed Conditions of Certification **PAL-1** to **PAL-7** are designed to mitigate potential paleontological resource impacts, as discussed above, to less than significant levels. These conditions would 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 would 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, would be very low.

GEOLOGICAL HAZARDS

The AFC (CECP 2007a) provides documentation of potential geologic hazards at the proposed CECP plant site, although no site-specific subsurface information was available at the time the AFC was submitted. 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, would be low. However, geologic hazards, such as potential for expansive clay soils and settlement due to compressible soils and dynamic compaction, hydrocompaction, or dynamic compaction, would need to be addressed in a project geotechnical report per CBC (2007) requirements.

Staff's independent research included the review of available geologic maps, reports, and related data of the proposed CECP plant site. Geological information was available from the California Geological Survey (CGS), California Division of Mines and Geology (CDMG), and other governmental organizations. Since 2002, the CDMG has been known as the California Geologic Survey.

Faulting and Seismicity

Energy Commission staff reviewed the CDMG publication *Fault Activity Map of California and Adjacent Areas with Locations and Ages of Recent Volcanic Eruptions* (1994a) 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 on the proposed CECP power plant site. The fault trace of the Rose Canyon Fault Zone that is the closest major active strike-slip fault to the proposed site is located offshore approximately 2 miles to the southwest. The only other active fault within 20 miles of the plant site is the Newport-Inglewood Fault Zone, which is a northwestward continuation to the Rose Canyon Structures (Table 3).

Nearly all faults listed on **GEOLOGY AND PALEONTOLOGY Table 3** within 60 miles of the proposed CECP 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 is 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 Pinto Mountain Fault is an east-west to northeast-oriented, left-lateral strike-slip fault.

Historic surface rupture (within 200 years) associated with earthquakes on active faults has not occurred within 60 miles of the proposed CECP site (CDMG1994). The nearest is ground breakage on the Coyote Creek segment of the San Jacinto Fault associated with the M6.4 Borrego Mountain earthquake of 1968 (SCEC2008; CDMG 1994).

The Coachella, Mojave, 1857 Rupture and Cholame segments of the San Andreas Fault are categorized as Type A faults (CDMG 1994a; ICBO 1998). Other Type A faults listed in Table 3 include the Anza segment of the San Jacinto, Julian segment of the Elsinore, and Cucamonga Faults. All other faults are classified as Type B. Type A faults have slip-rates of $\geq$5 mm/yr and are capable of producing an earthquake of magnitude 7.0 or greater. Type B faults have slip-rates of 2 to 5 mm/yr and are capable of producing an earthquake of magnitude 6.5 to 7.0.

The Alquist-Priolo Earthquake Fault Zoning Act of 1993, which was preceded by the Alquist-Priolo Special Studies Zones Act of 1972, 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. Earthquake Fault Zones (formerly called Special Studies Zones) have not been established near the proposed CECP plant site or project linears. Since no active faults have been documented within the CECP power plant site, no setbacks from occupied structures from faults would be required.

Only one earthquake of Magnitude 5.5 or greater has occurred on active faults within 30 miles of the site, although a total of 34 have taken place within 80 miles (Table 4). The closest relative to the proposed CECP site are generally associated with right-lateral strike-slip faulting. The nearest earthquake presented in **Geology and Paleontology Table 3** is a M6.5 event that took place on November 22, 1800 in the vicinity of the Rose Canyon Fault just offshore from Solana Beach (Blake, 2006a), or in the vicinity of the offshore San Diego Trough Fault 30 miles to the west (CGS 2007). The M5.9 earthquake that occurred on May 27, 1862 took place on a structure within the Rose Canyon Fault Zone south of San Diego. The Long Beach earthquakes (M6.3 and M5.5, March 11, 1933) were associated with the Newport-Inglewood Fault and caused a large amount of damage to the Long Beach area (SCEC 2008). Few historic earthquakes greater than M5.5 are associated with the Elsinore Fault Zone. The lone example is the M6.0 Glen Ivy Hot Springs earthquake which took place on May 15, 1910, approximately 39 miles north of Carlsbad. In contrast, a large number of historic earthquakes have occurred along the San Jacinto Fault Zone and subsidiary structures, including the Coyote Creek, Superstition Hills and Imperial Faults. Events listed on **Geology and Paleontology Table 3** include multiple San Jacinto earthquakes (M6.4, December 25, 1899 (Hemet); M6.8, April 21, 1918; M6.2 and M5.5, March 19, 1954 (Arroyo Salada)), the Terwilliger Valley (Buck Ridge) earthquake (M6.0, March 25, 1937), and the Borrego Mountain earthquake (M6.0, April 9, 1968). The Whittier Narrows earthquake (M5.9, October 1, 1987) is associated with the Puente Hills Blind Thrust (SCEC 2008), and events on the border or within the Transverse Ranges commonly occur on reverse and thrust faults.

The soil profile for this proposed site is assumed to be Type D. However, a site-specific geotechnical report would be needed to confirm the soil profile and provide appropriate seismic design parameters per CBC (2007) requirements and proposed **Facility Design** Conditions of Certification **GEN-1**, **GEN-5** and **CIVIL-1**. The estimated peak horizontal ground acceleration for the power plant site is 0.56 times the acceleration of gravity (0.56g) for bedrock acceleration based on a 2 percent probability of exceedence in 50 years, and 0.28 times the acceleration of gravity (0.28g) based on a 10 percent probability of exceedence in 50 years.

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 depth to ground water on the proposed CECP site is not known. Assuming elevations of 30 to 31 feet amsl for building footings and 3 to 5 feet for ground water, the depth to ground water would be as close as 25 feet below the power plant (CECP 2007d). Standard penetration testing (blowcounts) in borings at the southeast end of the proposed project site and across the railroad tracks to the southwest are greater than 50 blows/foot below elevations of 15.5 to 43 feet msl. Blowcounts of 50 or greater indicate dense to very dense materials that are unlikely to liquefy during an earthquake. Blowcounts in two borings become greater than 50 at elevations of 5.5 and 9.5 feet msl; however, the collar data indicated on the boring log appears to be incorrect. The actual depth of dense blowcounts in these holes is probably 15 feet higher. In either case, soils become dense to very dense at or above the ground water table, and liquefaction potential would therefore be minimal. However, ground water levels should be confirmed, and the liquefaction potential on the proposed CECP site should be addressed in a project-specific geotechnical report, per CBC (2007) requirements and proposed **Facility Design** Conditions of Certification **GEN-1**, **GEN-5** and **CIVIL-1**.

Dynamic Compaction

Dynamic compaction of soils results when relatively unconsolidated granular materials experience vibration associated with seismic events. The vibration causes a decrease in soil volume, as the soil grains tend to rearrange into a more dense state (an increase is soil density). The decrease in volume can result in settlement of overlying structural improvements. Nearby borings advanced for the desalinization plant indicate granular soils with low blowcounts at shallow depths (CECP 2007d). Also, mechanical compaction of fill materials during placement could not be confirmed. The potential for and mitigation of the effects of dynamic compaction of proposed site native and fill soils during an earthquake should be addressed in a project-specific geotechnical report, per CBC (2007) requirements and proposed **Facility Design** Conditions of Certification **GEN-1**, **GEN-5** and **CIVIL-1**. Common mitigation methods would include deep foundations (driven piles; drilled shafts) for severe conditions, geogrid reinforced fill pads for moderate severity and over-excavation and replacement for areas of minimal hazard.

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 of the proposed CECP site suggests a low hydrocollapse potential, but it is not possible to adequately assess the potential for hydrocompaction without site-specific geotechnical exploration. The potential for and mitigation of the effects of hydrocompaction of site soils should be addressed in a project-specific geotechnical report, per CBC (2007) requirements and proposed **Facility Design** Conditions of Certification **GEN-1**, **GEN-5** and **CIVIL-1**. Typical mitigation measures would include over-excavation/replacement, mat foundations or deep foundations, depending on severity and foundation loads.

Subsidence

Local subsidence or settlement may occur when areas containing compressible soils are subjected to foundation loads. It is not possible to assess the potential for subsidence without site-specific geotechnical exploration. Compressibility testing and samples of the Santiago Formation across the railroad tracks from the proposed site are presented in the geochnical report attached to the AFC (CECP 2007d). Test results indicate a low potential for compressibility. Fill materials and Quaternary terrace deposits were not evaluated. The potential for and mitigation of the effects of subsidence due to compressible soils on the site should be addressed in a project-specific geotechnical report, per CBC (2007) requirements and proposed **Facility Design** Conditions of Certification **GEN-1**, **GEN-5** and **CIVIL-1**. Mitigation would normally be accomplished by over-excavation and replacement of the compressible soils. For deep-seated conditions, deep foundations are commonly used.

Regional ground subsidence is typically caused by petroleum or ground water withdrawal that increases the effective unit weight of the soil profile, which in turn increases the effective stress on the deeper soils. This results in consolidation or settlement of the underlying soils. The nearest known producing petroleum or gas fields are located in the Los Angeles Basin roughly 45 miles northwest of the project site (CDC 2001). Ground water levels would be unlikely to fluctuate significantly from current levels due to the proximity of the proposed CECP site to the Pacific Ocean. No subsidence resulting from fluid extraction in the area would be anticipated.

Expansive Soils

Soil expansion occurs when clay-rich soils with an affinity for water exist in-place at a moisture content below their plastic limit. The addition of moisture from irrigation, 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. It is not possible to assess the potential for expansive soils without site-specific geotechnical exploration. Tests were conducted on fill materials to southwest across the railroad tracks (CECP 2007d), and indicate low expansion potentials. Native soils were not tested. Plasticity index tests, which are also an indicator of the expansive potential and clay content in soils, were not performed as well. The potential for and mitigation of the effects of expansive soils on the proposed

site should be addressed in a project-specific geotechnical report, per CBC (2007) requirements and proposed **Facility Design** Conditions of Certification **GEN-1**, **GEN-5** and **CIVIL-1**. Mitigation would normally be accomplished by over-excavation and replacement of the collapsible 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

Landslides and slumping have been documented in the Carlsbad and Agua Hedionda lagoon areas (CDMG 1995; CDMG 1996a; CDMG 2007). Finer-grained units of the Santiago Formation are known to be particularly prone to instability (CDMG 1996a; CDMG 2007). Tan and Giffen (1995) show the proposed CECP site as lying within Landslide Susceptibility Area 2 (LSA 2), which denotes an area marginally susceptible to landsliding. “Landslides and other slope failures are rare within this area, although slope hazards are possible on some steeper slopes within the area or along its borders.” The steeper coast line that borders the peninsula on which the proposed project would be situated is mapped as LSA 3-1, which denotes areas generally susceptible to landslides. These areas “are at or within their stability limits due to a combination of weak materials and steep slopes”, and slopes “can be expected to fail, locally, when adversely modified.” The nearest mapped landslide relative to the site is on the coast of Agua Hedionda lagoon 400 feet to the southeast (CDMG 1995; CDMG 2007). The northwestern boundary of the 23-acre parcel is bordered by a LSA 3-1, although the zone is at least 400 to 600 feet from the proposed power plant footings (CDMG 1995). The Atchison, Topeka, and Santa Fe railroad tracks and the San Diego Freeway are between the power plant and nearest LSA 3-1. The minimum 400-foot setback of the building footprint from the nearest LSA 3-1 would minimize the potential effects of a slope failure along the coast near the proposed CECP site. The project-specific engineering geology report should verify that landslide potential would be 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 proposed CECP site and project linears as lying in Unshaded Zone X, which are “areas determined to be outside the 500-year flood plain” (FEMA, 1997).

Tsunamis and Seiches

Tsunamis are large-scale seismic-sea waves caused by offshore earthquakes, landslides and/or volcanic activity. The proposed CECP power plant site would lie on the inland portion of a peninsula, with Agua Hedionda lagoon on the nearest, northeast-, northwest- and west-facing shorelines. The Pacific Ocean lies approximately 1,600 feet to the southwest. 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 3 feet amsl 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 30 feet amsl and that the site would be completely surrounded by berms of varying height, a tsunami of the maximum indicated height of 11.5 feet would not likely impact the proposed CECP site.

A seiche, which may result from the same factors that trigger tsunamis, is essentially oscillation of water within an enclosed or restricted basin, such as Agua Hedionda. The elevation of the proposed CECP site would render impacts from seiches negligible as well.

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 1995; CDMG 1996a and b; CDMG 1998; CDMG 1999; CDMG 2003; CDMG 2007; McCleod, 2008; Randall, 2008; Scott, 2008; UCMP 2008). Staff did not identify any geological resources at the energy facility location or along project linears. Aggregate for PCC has been produced from 2 pits in the area, located 3 to 7 miles northeast and east of the site (CDMG 1996b; CDMG 1990). Mesozoic age metamorphic rocks, which are not present in the vicinity of the proposed power plant, are mined to produce the aggregate. The marine and transitional facies sediments at the proposed site are characterized as "containing mineral deposits the significance of which cannot be evaluated from available data" (CDMG 1996b). Given the industrialized nature of the area and the lack of metamorphic rocks suitable as a source of aggregate, there would be very low potential for this site to have economically valuable industrial mineral deposits.

Minor quantities of gold were produced until the early 1900's from small districts in the relatively low-lying mountain ranges located at least 15 miles to the east (CDMG, 1998). The gold, and occasionally nickel, was extracted from quartz veins hosted in granitic and metamorphic rocks. World class gemstones formed in pegmatite dikes associated with granitic rocks in San Diego County. Spectacular pink tourmalines, beryls and other highly-valued gemstones have, and continue to be produced from mines located 20 to 25 miles to the northeast and east. Lithium is also extracted from these areas. The potential for deposits of precious metals, base metals or gemstones is negligible at the proposed CECP site because Mesozoic granitic and metamorphic rocks are not present. No petroleum or geothermal resources are known to occur within 45 miles of the site.

Regarding paleontological resources, Energy Commission staff has reviewed the Paleontological Resources assessment in Section 5.8 and Paleontological Records Search and Literature Review (Confidential) in Appendix 5.8A of the AFC (CECP, 2007a). Staff has also reviewed paleontological literature and records searches conducted by the San Diego Natural History Museum (SDNHM) (Randall, 2008), San Bernardino County Museum (SBCM) (Scott, 2008), and the Natural History Museum of Los Angeles County (NHMLC) (McCleod, 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 proposed CECP plant site or along the project linears.

Pleistocene age paralic deposits, which represent all soils mapped at the surface of the proposed CECP power plant site and the linear route, are generally considered to have a high paleontological sensitivity. However, all fossils in the SDNHM collection from terrace sediments in the area were recovered from units on older wave-cut benches at higher elevations inland from the site, so the potential to impact significant

paleontological resources would be low (Randall, 2008). The Eocene age Santiago Formation, which has been mapped in the floor of the current tank farm (CECP 2007d), is also highly sensitive. Furthermore, fossil remains have been documented from the nearby Carlsbad State Beach, so potential for the proposed CECP to impact paleontological resources would be high (Randall, 2008). The nearest documented fossil locality is approximately 500 to 750 feet south of the ocean-water pipeline intake and discharge locations. Any excavations for these pipelines, in particular, would have a high potential to impact paleontological resources. Fill materials are assigned a zero sensitivity rating and have no paleontological potential, because any fossils that may be discovered have been disturbed and cannot provide useful scientific information.

Many paleontological sites are documented within 3 miles of the proposed CECP project area. The San Diego Natural History Museum (SDNHM) collection contains specimens from 113 localities, including 30 from Pleistocene paralic deposits and 58 from the Santiago Formation (Randall, 2008; CECPa 2007). The Quaternary fossils consist of marine invertebrates, such as worms, bryzoans, foraminifers, tusk shells, ostracods, barnacles, crabs, snails, clams, oysters, pectens, sand dollars, and sea urchins, as well as continental vertebrates, such as proboscidens (mammoths and elephants), turkeys, rodents, tapirs, horses, camels, deer, and bison (Randall, 2008). The specimens from the Santiago Formation were collected from marine, lagoonal, estuarine and fluvial siltstones and sandstones. The SDNHM collection also includes specimens from two sites at Carlsbad State Beach. The localities are approximately 1,600 feet and 4,000 feet southwest of the proposed 23-acre CECP site, and have produced vertebrate fossils of terrestrial mammals, including oreodonts (now extinct plant-eaters distantly related to pigs, hogs, peccaries and hippopotamuses). The nearest of these fossil localities is approximately 500 to 750 feet south of the proposed ocean-water pipeline intake and discharge locations. The reported source from which the fossils were recovered is fluvial sandstone of the Oligocene-age Sespe or Vaqueros Formations (Randall, 2008). Although the age and geologic unit designation is in disagreement with previous geologic mapping in the area (CDMG 1966; CDMG 1996a; CDMG 2007), the Tertiary sediments hosting the vertebrate fossils is considered to be equivalent to the marine deposits (mapped as Santiago Formation) that underlie Quaternary terrace deposits at the proposed CECP site.

Marine invertebrate fossils, including mollusks, crustaceans and echinoids, and marine vertebrates, including sharks, rays and bony fish, have been recovered by the SBCM from Pleistocene terrace deposits (Scott, 2008). No fossil locality is within one mile of the proposed CECP site, however. Terrestrial mammal remains, including camel, horse and mammoth, have been recovered from wave-cut bench sediments that are older than those on the power plant site. The Natural History Museum of Los Angeles County collection does not contain vertebrate fossil remains from the Carlsbad area (McLeod, 2008). The museum does consider the potential for encountering significant vertebrate fossils in Quaternary terrace deposits near the surface and in older sediments in deeper excavations to be low and high, respectively. The fossil records website maintained by the University of California Museum of Paleontology indicates that several gastropod specimens of Quaternary age have been recovered from the Carlsbad and Agua Hedionda lagoon areas (UCMP 2008).

Construction Impacts and Mitigation

The design-level geotechnical investigation required for the proposed project by the CBC (2007) and proposed **Facility Design** Conditions of Certification **GEN-1**, **GEN-5** and **CIVIL-1** should provide 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 3 miles of the proposed CECP construction site or linear routes, although several PCC-grade aggregate pits are present within 7 miles. Significant paleontological resources have been documented in Quaternary and Tertiary marine and transitional deposits that may be encountered during future construction of the power plant and linear facilities. The nearest vertebrate fossil locality of Tertiary age is 1,600 feet away at Carlsbad State Beach. The potential to impact significant paleontological resources in Tertiary sediments, especially in deeper excavations, would be considered to be high. However, all fossil remains from Quaternary age deposits have been recovered from older terraces located inland and east of the proposed CECP site. The potential to impact significant paleontological resources in Pleistocene sediments at the plant site would therefore be considered low. Fill materials have a negligible paleontological sensitivity. Construction of the proposed project would include grading, foundation excavation, and utility trenching. Staff would consider the probability of encountering paleontological resources to be generally high on portions of the proposed plant site and buried pipelines connecting to the plant that are at lower elevations (i.e. 30 feet amsl) near the building footings based on the soils profile, SVP assessment criteria, and the occurrence of the sensitive geologic units. The potential for encountering fossils would increase with the depth of cut and near the southwestern end of the ocean-water intake and discharge pipelines. In areas mapped as Quaternary paralic deposits or artificial fill, future excavations for ancillary facilities, new pipelines and on-site excavations deeper than 2 feet may have a high probability of encountering potentially sensitive materials, although sensitive materials could even occur nearer the surface.

Proposed Conditions of Certification **PAL-1 to PAL-7** are designed to mitigate any potential paleontological resource impacts, as discussed above, to a less than significant level. Essentially, these conditions would require a worker education program in conjunction with monitoring of proposed earthwork activities by qualified professional paleontologists (paleontologic resource specialist; PRS). Earthwork would be halted any time potential fossils are recognized by either the paleontologist or the worker. When properly implemented, the Conditions of Certification would 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 would be retained for the proposed 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 would be a request for lesser monitoring after sufficient monitoring has been performed to ascertain that there is little change 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 proposed CECP, the applicant has proposed monitoring and mitigation measures to be followed during the future construction of the CECP. 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 that might be 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; liquefaction; settlement due to compressible soils, ground water withdrawal, hydrocompaction, or 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 future operation of the facility.

CUMULATIVE IMPACTS AND MITIGATION

The proposed CECP would be 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 be subject to subsidence due to dynamic compaction, must be mitigated in accordance with a 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 proposed project and in sediments similar to those that are present on the site. However, to date, none have been found on the plant site or along project linear routes during cursory field studies of the Carlsbad Energy Center Project. 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, would be low, and that the potential for impacts to geologic, mineralogic, and paleontologic resources would be very low.

Based upon the literature and archives search, field surveys and compliance documentation for the proposed CECP project, the applicant proposes monitoring and mitigation measures for future construction of the CECP. 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 that might be encountered during construction would be mitigated to levels of less than significant.

The proposed Conditions of Certification allow the Energy Commission Compliance Project Manager (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

Future facility closure activities would not be 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 proposed 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.

CONFORMANCE WITH THE CALIFORNIA COASTAL ACT (CCA)

In a letter dated October 16, 2007, the California Coastal Commission elected to rely on the project review conducted by the CEC, rather than provide their own, independent evaluation (CCC 2007). Furthermore, Section 30253 of the California Coastal Act (CCA 2008) states, along with other things, the proposed new development shall:

1. Minimize risks to life and property in areas of high geologic, flood, and fire hazard.

2. Assure stability and structural integrity, and neither create nor significantly contribute to erosion, geologic instability, or destruction of the site or surrounding area or in any way require the construction of protective devices that would substantially alter natural landforms along bluffs and cliffs.

Furthermore, Section 30244 of the 2008 CCA states: “Where development would adversely impact archeological or paleontological resources as identified by the State Historic Preservation Office, reasonable mitigation measures shall be required.”

It is the opinion of Energy Commission staff that the applicant could comply with the requirements of the California Coastal Act, with respect to potential paleontologic and geologic hazards.

CONCLUSIONS

The applicant would be able to comply with applicable LORS, provided that the proposed Conditions of Certification are followed. The proposed 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 would be high on portions of the proposed plant site and along buried pipelines connecting to the plant. Staff wwould 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 5 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 an initial in-person PRS training during the project kick-off, for those mentioned above. Following initial training, a CPM-approved video or in-person training may be used for new employees. The training program may be combined with other training programs prepared for cultural and biological resources, hazardous materials, or 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.

Verification: The project owner shall ensure that the PRS submits the summary of monitoring and paleontological activities in the MCR. When feasible, the CPM shall be notified 10 days in advance of any proposed changes in monitoring different from the plan identified in the PRMMP. If there is 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.

Verification: 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.

Verification: 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
Carlsbad Energy Center Project (07-AFC-6)

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
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Cultural Trainer: _____ Signature:_____ Date: ___/___/____

PaleoTrainer: _____ Signature:_____ Date: ___/___/____

Biological Trainer: _____Signature:_____ Date:___/___/__

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POWER PLANT EFFICIENCY

Testimony of Shahab Khoshmashrab

SUMMARY OF CONCLUSIONS

The Carlsbad Energy Center Project (CECP), if constructed and operated as proposed, would generate approximately 520 megawatts (MW) (net output) of electricity at an overall project fuel efficiency of approximately 48 percent lower heating value (LHV) at annual average ambient site conditions (CECP 2007a, AFC Figure 2.2-5). While it would consume substantial amounts of energy, it would do so in the most efficient manner practicable while satisfying the project's objectives. 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 this project. Staff therefore concludes that this project would present no significant adverse impacts on energy resources.

INTRODUCTION

One of the responsibilities of the California Energy Commission (Energy Commission) is to make findings on whether the energy use by a power plant, including the proposed CECP power plant, would result in significant adverse impacts on the environment, as defined in the California Environmental Quality Act (CEQA). If the Energy Commission finds that CECP's energy consumption creates a significant adverse impact, it must further determine if feasible mitigation measures could eliminate or minimize that impact. In this analysis, staff addresses the inefficient and unnecessary consumption of energy.

In order to support the Energy Commission's findings, this analysis will:

- Examine whether the facility would likely present any adverse impacts upon energy resources;
- Examine whether these adverse impacts are significant; and if so,
- Examine whether feasible mitigation measures could eliminate those adverse impacts or reduce them to a level of insignificance.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

No federal, state, or local/county laws, ordinances, regulations, and standards (LORS) apply to the efficiency of this project.

SETTING

Carlsbad Energy Center, LLC (applicant), proposes to build and operate the CECP, a Siemens Rapid Response Combined Cycle (R2C2) power plant, to serve California's energy needs (CECP 2007a, AFC §1.2). The project would consist of two independent power trains. Each train would consist of one Siemens SCC6-5000F combustion gas

turbine generator with evaporative inlet air cooling and steam injection power augmentation (PAG) systems (CECP 2007a, AFC §§1.2, 2.1, 2.2), one single-pressure, fast start, heat recovery steam generator (HRSG), and one condensing steam turbine generator, arranged in a one-on-one combined cycle configuration. The total nominally rated plant output would be approximately 540 MW under International Organization for Standardization (ISO) conditions. The gas turbines and HRSGs would be equipped with ultra low-NOx combustors and selective catalytic reduction to control air emissions (CECP 2007a, AFC §§1.2, 2.2.4, 2.2.4.1, 2.2.4.2).

Natural gas would be delivered to CECP via a new 18-inch diameter gas line that would be connected to an existing Southern California Gas Company (SoCalGas) natural gas pipeline (CECP 2007a, AFC §§1.2, 2.1, 2.3.2.3).

ASSESSMENT OF IMPACTS

METHOD AND THRESHOLD FOR DETERMINING THE 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" (Title 14 CCR §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 the wasteful, inefficient, and unnecessary consumption of energy (Title 14, CCR §15000 et seq., Appendix F).

The inefficient and unnecessary consumption of energy, in the form of non-renewable fuels such as natural gas and oil, constitutes an adverse environmental impact. An adverse impact can be considered significant if it results in:

- Adverse effects on local and regional energy supplies and energy resources;
- A requirement for additional energy supply capacity;
- Noncompliance with existing energy standards; or
- The wasteful, inefficient, and unnecessary consumption of fuel or energy.

PROJECT ENERGY REQUIREMENTS AND ENERGY USE EFFICIENCY

Any power plant large enough to fall under Energy Commission siting jurisdiction (50 MW or greater) will, by definition, consume large amounts of energy. Under normal conditions, CECP would burn natural gas at a maximum rate of approximately 3,770 million British thermal units (MMBtu) per hour, LHV, during base load operation (CECP 2007a, AFC §2.3.3). This is a substantial rate of energy consumption that could potentially impact energy supplies. Under expected project conditions, electricity would be generated at a base load efficiency of approximately 48 percent LHV (CECP 2007a, AFC §2.3.3, Figure 2.2-5). This efficiency level compares favorably with the average fuel efficiency of a typical base load power plant.

ADVERSE EFFECTS ON ENERGY SUPPLIES AND RESOURCES

The applicant has described its sources of natural gas to operate the project (CECP 2007a, AFC §§1.2, 2.1, 2.3.2.3). Natural gas for CECP would be supplied from the SoCalGas natural gas transmission lines. The SoCalGas system draws from extensive supplies originating in the southwest and in Canada, and is capable of delivering the gas that CECP would require to operate. This natural gas supply is a reliable source of natural gas for this project. It therefore appears unlikely that the project would create a substantial natural gas demand increase.

ADDITIONAL ENERGY SUPPLY REQUIREMENTS

Natural gas fuel would be supplied to the project by SoCalGas via a new pipeline 18-inch diameter connection (CECP 2007a, AFC §§1.2, 2.1, 2.3.2.3). There appears to be little likelihood that CECP would require additional capacity since regional supplies are currently plentiful.

COMPLIANCE WITH ENERGY STANDARDS

No standards apply to the efficiency of CECP or other non-cogeneration projects.

ALTERNATIVES TO REDUCE WASTEFUL, INEFFICIENT, AND UNNECESSARY ENERGY CONSUMPTION

CECP could create significant adverse impacts on energy resources if alternatives are available to meet the project objectives and substantially reduce the project's fuel use. The evaluation of alternatives to the project (that could reduce wasteful, inefficient, or unnecessary energy consumption) first requires the examination of the project's energy consumption. Project fuel efficiency, and therefore its rate of energy consumption, is determined by both the configuration of the power producing system and the selection of equipment used to generate its power.

Project Configuration

CECP would be a combined cycle power plant. Electricity would be generated by two gas turbines and two steam turbines operating on heat energy recovered from the gas turbines' exhaust (CECP 2007a, AFC §§1.2, 2.1, 2.2). By recovering this heat, which would otherwise be lost up the exhaust stacks, the efficiency of any combined cycle power plant is increased considerably from that of either gas turbines or a steam turbine operating alone. This configuration is well suited to the large, steady loads met by a base load plant that generates energy efficiently over long periods of time.

The applicant proposes to install evaporative inlet air coolers, steam injection power augmentation (or PAG, as described above), single-pressure HRSGs, steam turbine units, and dry cooling systems (CECP 2007a, AFC §§1.2, 2.1, 2.2). Staff believes these features to be meaningful efficiency enhancements to CECP. The dual-train combustion turbine/HRSG/steam turbine configuration is also highly efficient during unit turndown since one train can be shut down, leaving the other fully loaded. This allows the efficient operation of one train instead of the operation of both trains operating at a less efficient 50 percent load.

The R2C2 technology (Siemens Rapid Response Combined Cycle technology, as described above) combines the fast start capability of the simple cycle gas turbine technology and the efficiency of the combined cycle technology. The CECP generating system is designed to start and ramp up to 150 MW in ten minutes and operate at an average of 37 percent efficiency during this period. This efficiency rating is comparable to the efficiency rating of a typical simple cycle plant. The CECP would normally operate in daily cycling duty (plant shut down 8 hours) (CECP 2007a, AFC §2.3.3). In this mode, the CECP would be able to reach full load and operate at a combined cycle efficiency of approximately 48 percent in approximately 45 minutes for a hot start and approximately 125 minutes for a cold start. In comparison, in daily cycling duty, a typical combined cycle power plant normally requires 160 minutes or more to reach full load and operates at an average of 30 percent efficiency during this period before finally reaching a combined cycle efficiency of approximately 55-56 at full load.

Equipment Selection

The F-class of advanced gas turbines to be installed in CECP represents one of the most modern and efficient machines available. For each power train, the applicant would install one Siemens SCC6-5000F (formerly Siemens-Westinghouse 501F) combustion gas turbine generator in a one-on-one combined cycle power train. Each train would produce approximately 260 MW (net output) at 48.0 percent net plant efficiency LHV at annual average ambient site conditions (CECP 2007a, AFC Figure 2.2-5).

One possible alternative is the General Electric's (GE) Frame 7F Rapid Response (Op-Flex) technology. In a one-on-one train combined cycle configuration, it produces approximately 270 MW at 55.5 percent efficiency LHV at annual average ambient site conditions (LEC 2008).

As seen above, the rated efficiency of the Op-Flex technology is several percentage points higher than that of the R2C2 technology. However, the Op-Flex technology can achieve only 70 MW of output within 10 minutes of startup, while the R2C2 technology can achieve 150 MW (more than twice as much power) within 10 minutes of startup (PEI 2008). Thus, although the Op-Flex technology offers a higher efficiency rating, because the CECP is expected to be capable of up to 300 startups per year (CECP 2007a, AFC §2.3.3), staff believes the R2C2 technology's faster ramping rate makes this technology a viable option to satisfy the CECP's project objectives.

Efficiency of Alternatives to the Project

CECP's objectives include the generation of electricity and ancillary services to serve energy needs throughout the San Diego region (CECP 2007a, AFC §1.2.1).

Alternative Generating Technologies

Alternative generating technologies for CECP are considered in the AFC (CECP 2007a, AFC §6.6). For purposes of this analysis, other fossil fuels, nuclear, biomass, hydroelectric, solar, wind, and geothermal technologies are all considered. Given the project objectives, location, air pollution control requirements, and the commercial availability of the above technologies, 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 fuel-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 strongly motivated to purchase fuel-efficient machinery.

Modern gas turbines represent the most fuel-efficient electric generating technology available today. Currently available large combustion turbine models can be grouped into three categories: conventional, advanced, and next generation. Advanced combustion turbines have advantages for CECP. Their higher firing temperatures offer higher efficiencies than conventional turbines. They offer proven technology with numerous installations and extensive run times in commercial operations. Emission levels are also proven, and guaranteed emission levels have been reduced based upon the operational experience and design optimization of their manufacturers.

One possible alternative to an advanced F-class gas turbine is the next generation G-class machine, such as the Siemens-Westinghouse 501G gas turbine generator, which uses partial steam cooling to allow slightly higher temperatures, yielding slightly greater efficiency. In actual operation, one would expect to see the difference in efficiency diminish, since larger-capacity G-class turbines run at less than optimum (full) output more frequently than smaller-capacity F-class turbines. (Gas turbine efficiency drops rapidly at less than full load.). Given the minor efficiency improvement promised by the G-class turbine, and since this machine would have to operate at less than optimum base load efficiency in order to meet the project load capacity requirements, staff believes the applicant's decision to purchase F-class machines is reasonable.

Another possible alternative to the F-class advanced gas turbine is an H-class next generation machine with a claimed fuel efficiency of 60 percent LHV at ISO conditions. This high efficiency is achieved through a higher pressure ratio and firing temperature, made possible by cooling the initial turbine stages with steam instead of air. This first Frame 7H application is currently under construction at the Inland Empire Energy Center in Riverside County, California. Given the lack of commercial experience with this machine and the project load requirements, staff agrees with the applicant's decision to use F-class machines.

Also, the above alternative power generating equipment do not offer the commercially available fast start capability incorporated in the Siemens' equipment selected for this project.

Capital cost is also important when 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 produced machines that both offer the lowest available fuel cost and sell at the lowest per-kilowatt capital cost.

Inlet Air Cooling

Other alternatives include gas turbine inlet air cooling methods. The two most common techniques are evaporative coolers or foggers, and chillers. Both increase power output by cooling gas turbine inlet air. A mechanical chiller offers greater power output than the evaporative cooler on hot, humid days; however, it consumes electric power to operate its refrigeration process, slightly reducing its overall net power output and overall efficiency. An absorption chiller uses less electricity but necessitates the use of a substantial amount of ammonia. An evaporative cooler or fogger boosts power output most efficiently on dry days; it uses less electricity than a mechanical chiller, possibly producing a slightly higher operating efficiency. Efficiency differences between these alternatives are relatively insignificant.

Given the climate at the project site and the relative lack of clear superiority of one system over another, staff agrees that the applicant's choice of an evaporative gas turbine inlet air cooling system would have no significant adverse energy impacts.

Steam Injection Power Augmentation

The gas turbine would be equipped with PAG (steam injection power augmentation, as described above). This feature allows each gas turbine to generate additional electricity (up to 15 MW) using the steam produced in the HRSG. The PAG system allows injection of steam into the combustion section of the gas turbine, lowering peak combustion temperature for a given output. This effect is utilized exclusively to increase power at the same peak combustion temperature.

Staff concludes that the selected project configuration (combined cycle) and generating equipment (F-class gas turbines) represent the most efficient feasible combination for satisfying the project's objectives. The two independent power trains, each consisting of a separate gas turbine/HRSG/steam turbine configuration, also allows for high efficiency during unit turndown since one power train can be shut down, leaving one fully loaded, efficiently operating train instead of having two trains operate at a less efficient 50 percent load. This offers an efficiency advantage over the larger machines during unit turndown. There are no alternatives that would significantly reduce energy consumption while satisfying the project's objectives of producing base load electricity and ancillary services.

Staff, therefore, believes that CECP would not constitute a significant adverse impact on energy resources.

CUMULATIVE IMPACTS

No nearby projects have been identified that could potentially combine with the CECP to create cumulative impacts on natural gas resources. The SoCalGas natural gas supply system is adequate to supply the CECP without adversely impacting its other customers.

Staff believes that the construction and operation of the project would not create indirect impacts (in the form of additional fuel consumption), that would not have otherwise occurred without this project. Older, less efficient power plants consume more natural

gas than new, more efficient plants such as the CECP. Natural gas is burned by the most competitive power plants on the spot market, and the most efficient plants run the most frequently. The high efficiency of the proposed CECP should allow it to compete favorably, run at high capacity, and replace less efficient power generating plants. The project would therefore not adversely impact the cumulative amount of natural gas consumed for power generation.

NOTEWORTHY PUBLIC BENEFITS

The applicant expects to increase power supply reliability in the California electricity market by both meeting the state's energy needs and contributing to regional electricity reserves. By doing so in a fuel-efficient manner, through installing the most modern F-class gas turbine generator available in a combined cycle configuration with the fast start capability of a simple cycle plant, CECP would benefit electric consumers of California.

AGENCY AND PUBLIC COMMENTS

No comments have been received from government agencies or the public.

CONCLUSIONS AND RECOMMENDATIONS

The project, if constructed and operated as proposed, would generate approximately 520 MW (net output) of electric power at an overall project fuel efficiency of approximately 48 percent LHV (CECP 2007a, AFC Figure 2.2-5). While it would consume substantial amounts of energy, it would do so in the most efficient manner practicable while satisfying the project's objectives. 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. Facility closure would not likely present significant impacts on electric system efficiency.

PROPOSED CONDITIONS OF CERTIFICATION

No conditions of certification are proposed.

REFERENCES

CECP 2007a – Carlsbad Energy Center Project/T. Hemig (tn: 42299). Application for Certification for the Carlsbad Energy Center Project. 09/11/2007.

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Power 1994. “Operating and Maintaining IPP/Cogen Facilities” Power, September 1994, p. 14.

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POWER PLANT RELIABILITY

Testimony of Shahab Khoshmashrab

SUMMARY OF CONCLUSIONS

Carlsbad Energy Center, LLC (applicant), predicts an equivalent availability factor of 92 to 98 percent, which staff believes is achievable. Based on a review of the proposal, staff concludes that the Carlsbad Energy Center Project (CECP) Application for Certification (AFC) would be built and would operate in a manner consistent with industry norms for reliable operations. This should provide an adequate level of reliability. No conditions of certification are proposed.

INTRODUCTION

In this analysis, California Energy Commission (Energy Commission) staff addresses the reliability issues of the project to determine if the power plant is likely to be built in accordance with typical industry norms for reliable power generation. Staff uses this level of reliability as a benchmark because it ensures that the resulting project would not be likely to degrade the overall reliability of the electric system it serves (see the **Setting** section, below).

The scope of this power plant reliability analysis covers:

- equipment availability;
- plant maintainability;
- fuel and water availability; and
- power plant reliability in relation to natural hazards.

Staff examined the project design criteria to determine if the project is likely to be built in accordance with typical industry norms for reliable power generation. While the applicant has predicted an equivalent availability factor of 92 to 98 percent for the CECP (see below), staff uses typical industry norms as a benchmark, rather than the applicant's projection, to evaluate the project's reliability.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

No federal, state, or local/county laws, ordinances, regulations, or standards (LORS) apply to the reliability of this project.

SETTING

In the restructured competitive electric power industry, the responsibility for maintaining system reliability falls largely to the State's control area operators, such as the California Independent System Operator (California ISO), that purchase, dispatch, and sell electric power throughout the State. 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 are two mechanisms that have been employed to ensure an adequate supply of reliable power.

In September 2005, California AB 380 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. According to the AFC, the applicant would negotiate a power purchase agreement with the regional load-serving entity in timely manner.

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 the 540 megawatt (MW) (net output) CECP -- a fast start, quick ramp, combined cycle power plant -- with maximum operating flexibility (that is, ability to start up, shut down, turn down, and provide peaking power). Accordingly, CECP operability can be readily adapted to changing conditions within the regional and state-wide energy and ancillary services markets. The CECP would generate power at a location near the electric load, increasing reliability of the regional electricity grid and reducing dependence on imported power (CECP 2007a, AFC §1.2).

The project is expected to achieve an equivalent availability factor in the range of 92 to 98 percent (CECP 2007a, AFC §2.3.2.1). Because of regional system needs, it is anticipated that the facility would normally be called upon to operate at intermediate average annual capacity factors. The facility would be designed to operate between about 25 and 100 percent of base load to support dispatch service in response to demands for electricity (CECP 2007a, AFC §2.3.2.1).

ASSESSMENT OF IMPACTS

METHOD FOR DETERMINING RELIABILITY

The Energy Commission must make findings as to how the project is designed, sited, and operated in order to ensure its safe and reliable operation (Title 20, CCR §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 a project is at least as reliable as other power plants on that system.

The availability factor of a power plant is the percentage of time it is available to generate power; both planned and unplanned outages subtract from this availability. Measures of power plant reliability are based upon both the plant's actual ability to generate power when it is considered to be available, and upon 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, the CECP is expected to operate reliably. Power plant systems must be able to operate for extended periods without shutting down for maintenance or repairs. Achieving this reliability requires 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 a project and compares them to industry norms. If they compare favorably for this project, staff would then conclude that the CECP would be as reliable as other power plants on the electric system and would not degrade system reliability.

EQUIPMENT AVAILABILITY

Equipment availability would be ensured by adopting appropriate quality assurance/quality control (QA/QC) programs during the design, procurement, construction, and operation of the plant and by providing for the adequate maintenance and repair of the equipment and systems discussed below.

Quality Control Program

The applicant describes a QA/QC program (CECP 2007a, AFC §2.3.2.5) that is typical of the power industry. Equipment would be purchased from qualified suppliers based on technical and commercial evaluations. Suppliers' personnel, production capability, past performance, QA programs and quality history would be evaluated. The project owner would perform receipt inspections, test components, and administer independent testing contracts. Staff expects that implementation of this program would result in standard reliability of design and construction. To ensure this implementation, staff has proposed appropriate conditions of certification in the section of this document entitled **Facility Design**.

PLANT MAINTAINABILITY

Equipment Redundancy

A generating facility operating in base-load service for long periods of time must be capable of being maintained while operating. A typical approach to this is to provide redundant examples of those pieces of equipment that are most likely to require service or repair.

The applicant plans to provide an appropriate redundancy of function for the project (CECP 2007a, AFC §2.3.2.2, Table 2.3-1). Because the project consists of two combustion turbine generators, operating in parallel as independent equipment trains, it is inherently reliable. A single equipment failure cannot disable more than one train, which allows the plant to continue to generate, but at reduced output. All plant ancillary systems are also designed with adequate redundancy to ensure their continued operation if equipment fails. Staff believes that this project's proposed equipment redundancy would be sufficient for its reliable operation.

Maintenance Program

Equipment manufacturers provide maintenance recommendations for their products, and the applicant is expected to base the project's maintenance program on those recommendations. The program would encompass both preventive and predictive maintenance techniques. Maintenance outages would probably be planned for periods of low electricity demand. Staff expects that the project would be adequately maintained to ensure an acceptable level of reliability.

FUEL AND WATER AVAILABILITY

The long-term availability of fuel and of process water +is necessary to ensure the reliability of any power plant. The need for reliable sources of fuel and water is obvious; lacking long-term availability of either source, the service life of the plant could be curtailed, threatening both the power supply and the economic viability of the plant.

Fuel Availability

The CECP would burn natural gas which would be delivered through a new 18-inch diameter natural gas pipeline that would be connected to an existing Southern California Gas Company (SoCalGas) natural gas transmission pipeline (CECP 2007a, AFC §§1.2, 2.1, 2.3.2.3). The SoCalGas natural gas system represents a resource of considerable capacity and offers access to adequate supplies of gas from the Southwest, the Rocky Mountains, and Canada. Staff agrees with the applicant's claim that there would be adequate natural gas supply and pipeline capacity to meet the project's needs.

Water Supply Reliability

The project would use dry cooling technology, which would eliminate the large amount of water required by wet-cooled power generation projects. The source(s) of industrial water for the project's process, evaporative cooling, and miscellaneous plant uses would be either desalinated water produced on-site by CECP's ocean water purification system, recycled water provided by the City of Carlsbad Water Recycling Facility,

and/or other water suppliers (CECP 2007a, AFC §§1.2, 1.7.14, 2.1, 2.3.2.4; SR 2008h, §2.3.2).

The applicant believes that short interruptions to the water supply can be managed by drawing down storage in an on-site, 360,000-gallon raw water storage tank to permit continuous operation regardless of the power plant's operating mode (CECP 2007a §§ 2.1, 5.15.3.5.1, SR 2008h §2.3.2). If the duration of the interruption exceeds the capacity of on-site storage, the applicant proposes to cease operating the CECP. (SR2009a).

The project owner would most likely become aware of the possibility of a long interruption at the time the plant begins drawing water from the tanks. The project owner would then have the opportunity to coordinate with the entity in charge of power dispatch to ensure the anticipated outage would not significantly impact the reliability of the electric system as a whole; if necessary, power can then be drawn from other power plants serving the electric system to compensate for the CECP's temporary outage. This situation would be similar to a typical planned maintenance outage, but with a shorter notice of unavailability. The impact of a long interruption to the water supply as described above would not likely degrade the overall reliability of the electric system it would serve.

Potable water for domestic purposes and fire protection would be supplied from the City of Carlsbad's existing water supply infrastructure. The applicant no longer proposes to use potable water as an emergency backup supply for CECP operation (SR 2009a).

Staff believes these sources represent a reliable supply of water for the project. For a further, more detailed 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) are not likely to present hazards for this project, but seismic shaking (earthquakes) and flooding could present credible threats to the project's reliable operation.

Seismic Shaking

The site lies within Seismic Zone 4 (CECP 2007a, AFC §§1.7.15, 2.3.1.1.1, 5.4.3.4; Appendix 2); see the "Faulting and Seismicity" portion of the **Geology and Paleontology** section of this document. The project would be designed and constructed to the latest appropriate LORS (CECP 2007a, AFC Appendix 2). Compliance with current seismic design LORS represents an upgrading of performance during seismic shaking compared to older facilities since these LORS have been periodically and continually upgraded. Because it would be built to the latest seismic design LORS, this project would 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 section of this document entitled **Facility Design**. In light of the general historical performance of California power plants and the electrical system in seismic

events, staff has no special concerns with the power plant's functional reliability during seismic events.

Flooding

The project site elevation is approximately 29 feet above mean sea level. This site is not in the 100-year floodplain (CECP 2007a, AFC §§2.2.9.1.4, 5.15.3.2.2).

The plant site would be graded for proper drainage to prevent onsite flooding and minimize the potential for flooding to neighboring areas. Potential adverse impacts caused by erosion and storm water flows during construction and operation would be mitigated with the development and implementation of effective Storm Water Pollution Prevention Plans and the City of Carlsbad's Storm Water Management Plan. Grading and project construction would be performed in accordance with the applicable grading standards and codes (see the section of this document entitled **Facility Design)**.

Staff believes there are no special concerns with power plant functional reliability due to flooding. For further discussion, see **Soil and Water Resources,** and **Geology and Paleontology**.

COMPARISON WITH EXISTING FACILITIES

Industry statistics for availability factors (as well as other related reliability data) are maintained by the North American Electric Reliability Corporation (NERC). NERC regularly polls North American utility companies on their project reliability through its Generating Availability Data System, and periodically summarizes and publishes those statistics on the Internet [http://www.nerc.com]. The NERC reported the following generating unit statistic for the years 2002 through 2006 (NERC 2007):

For combined cycle units (all MW sizes):

Availability Factor = 89.86 percent

The project's gas turbines have been on the market for several years now and are expected to exhibit typically high availability. The applicant's expectation of an annual availability factor of 92 to 98 percent (CECP 2007a, AFC §2.3.2.1) appears reasonable when compared with the NERC figures for similar plants throughout North America (see above). In fact, these machines can well be expected to outperform the fleet of various (mostly older and smaller) gas turbines that make up the NERC statistics. Additionally, because the plant would consist of two parallel gas turbine generating trains, maintenance can be scheduled during times of the year when the full plant output is not required to meet market demand, which is typical of industry standard maintenance procedures. The applicant's estimate of plant availability, therefore, appears to be realistic. Stated procedures for assuring the design, procurement, and construction of a reliable power plant appear to be consistent with industry norms, and staff believes they are likely to ultimately produce an adequately reliable plant.

NOTEWORTHY PROJECT BENEFITS

This project would enhance power supply reliability in the California electricity market by meeting the state's growing energy demand, contributing to electricity reserves in the region, and providing operating flexibility (that is, the ability to start up, shut down, turn down, and provide load following and spinning reserve). The fact that the project consists of two combustion turbine generators, configured as independent equipment trains, provides inherent reliability. A single equipment failure cannot disable more than one train, thereby allowing the plant to continue to generate, though at reduced output. In addition, the design of the project would utilize the Rapid Response Combined Cycle technology. Compared to the combined cycle power plants currently in the California electricity market, the CECP would be able to respond faster to changes in electricity demand.

RESPONSE TO COMMENTS

The following are staff's responses to the City's Power Plant Reliability comment submitted by letter dated January 30, 2009 (COC 2009a). The City's comments are paraphrased.

City-1 The City contends that the project's water supply is mischaracterized, and that its discussion reflect a number of factors in relation to reclaim and potable water use, and the withdraw of ocean-water from Encina Power Station's intake/outfall system.

Response: Please refer to the **Soil & Water** section of this staff assessment for a more thorough discussion and analysis of the CECP use of reclaimed, potable and desalinated water.

City-2 The City contends that no back-up connections will be provided to the CECP, and staff's assessment should reflect this revision.

Response: As detailed on page 5.4.5 of this assessment, applicant no longer proposes to use potable water from the city as an emergency backup supply for CECP operation (SR 2009a).

CONCLUSION

The applicant predicts an equivalent availability factor of 92 to 98 percent, 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

CECP 2007a – Carlsbad Energy Center Project/T. Hemig (tn: 42299). Application for Certification for the Carlsbad Energy Center Project. 09/11/2007.

COC 2009a – City of Carlsbad/J. Garuba. City of Carlsbad Comments on Preliminary Staff Assessment of Carlsbad Energy Center Project, January 30, 2009.

McGraw-Hill (McGraw-Hill Energy Information Services Group). 1994. Operational Experience in Competitive Electric Generation. Executive Report.

NERC (North American Electric Reliability Council). 2007. 2002–2006 Generating Availability Report.

SR 2008h – Stoel Rives/J McKinsey (tn: 47257). Project Enhancement and Refinement Document, July 25, 2008.

SR 2009a– Stoel Rives/J. McKenzie (tn: 49951). Applicant's Comments to Preliminary Staff Assessment, January 30, 2009.

TRANSMISSION SYSTEM ENGINEERING

Ajoy Guha, P. E. and Mark Hesters

SUMMARY OF CONCLUSIONS

The proposed interconnecting facilities including the Carlsbad Energy Center Project (CECP) 230 kV and 138 kV switchyards, and the generator tie lines to a new Encina East 230 kV switchyard and the existing 138 kV Encina switchyard and their terminations, and San Diego Gas and Electric (SDG&E) reliability network upgrades and changes are adequate in accordance with industry standards and good utility practices, and are acceptable to staff according to engineering Laws, Ordinances, Regulations and Standards (LORS).

The System Impact Study (SIS) and the Facilities Study (FS) for the CECP project indicated that there would be some adverse overload impacts on the SDG&E downstream facilities caused by the project's interconnection and operation. However, further analysis of the studies found that the identified overload impacts were not the responsibility of the CECP project and to some extent were the result of modeling assumptions in the study base cases. The impacts could be mitigated by modified SDG&E generation and import dispatch, and transmission line projects in the SDG&E annual plan.

The California Independent System Operator (California ISO) instead of issuing final approval letters would perform Operational studies/procedures examining the impacts of both the CECP projects on the grid based on the expected 2010 in-service dates or commercial operation dates (COD).

The CECP project would, therefore, conform to the applicable LORS upon satisfactory compliance of the recommended Conditions of Certification.

The CECP project will replace the aging once-through-cooled old units (by seawater) in accordance with state policies prescribed by the California Energy Commission (Energy Commission). The new efficient generation will also enhance the economics and reliability of the SDG&E network by providing local generating capacity and quick-start power to the north western load centers of San Diego region.

INTRODUCTION

The Transmission System Engineering (TSE) analysis examines whether or not the facilities associated with the proposed interconnection conforms to all applicable LORS required for safe and reliable electric power transmission. Staff's analysis evaluates the power plant switchyard, outlet line, termination and downstream facilities identified by the applicant. Additionally, under the California Environmental Quality Act (CEQA), the Energy Commission must conduct an environmental review of the "whole of the action," which may include facilities not licensed by the Energy Commission (California Code of Regulations, title 14, §15378). Therefore, the Energy Commission must identify the

system impacts and necessary new or modified transmission facilities downstream of the proposed interconnection that are required for interconnection and represent the "whole of the action." The downstream network upgrade mitigation measures that will be required to maintain system reliability for the addition of the power plant, are used to identify the requirement for any general CEQA analysis.

Energy Commission staff relies on the interconnecting authority for the analysis of impacts on the transmission grid as well as the identification and approval of required new or modified facilities downstream from the proposed interconnection that would be required as mitigation measures. The proposed CECP would interconnect to the SDG&E transmission network and requires analysis by SDG&E and approval of the California ISO.

SDG&E'S ROLE

SDG&E is responsible for ensuring electric system reliability in the SDG&E system for addition of the proposed generating plant. SDG&E will provide the analysis and reports in their System Impact and Facilities studies, and their approval for the facilities and changes required in the SDG&E system for addition of the proposed transmission modifications.

CALIFORNIA ISO'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 California ISO will review the studies of the SDG&E system to ensure adequacy of the proposed transmission interconnection. The California ISO will determine the reliability impacts of the proposed transmission modifications on the SDG&E 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 will, therefore, review the SIS performed by SDG&E and/or any third party, provide their analysis, conclusions and recommendations. On satisfactory completion of the SDG&E Facility study and in accordance with the Large Generator Interconnection Procedure (LGIP) as in the California ISO Tariff, the California ISO instead of issuing a final approval letter, would proceed for execution of the Large Generator Interconnection Agreement (LGIA) between the California ISO and the project owner and subsequently perform an Operational study/procedure examining the impacts of the project on the grid based on the expected 2010 COD. The California ISO may also provide written and verbal testimony on their findings at the Energy Commission hearings, if necessary.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

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

service and safety to persons engaged in the construction, maintenance and operation or use of overhead electric lines and to the public in general.

- California Public Utilities Commission (CPUC) General Order 128 (GO-128), “Rules for Construction of Underground Electric Supply and Communications Systems,” formulates uniform requirements and minimum standards to be used for underground supply systems to ensure adequate service and safety to persons engaged in the construction, maintenance and operation or use of underground electric lines and to the public in general.
- The National Electric Safety Code, 1999 provides electrical, mechanical, civil and structural requirements for overhead electric line construction and operation.
- NERC/WECC Planning Standards: The Western Electricity Coordinating Council (WECC) Planning Standards are merged with the North American Electric Reliability Council (NERC) Planning Standards and provide the system performance standards used in assessing the reliability of the interconnected system. These standards require the continuity of service to loads as the first priority and preservation of interconnected operation as a secondary priority. Certain aspects of the NERC/WECC standards are either more stringent or more specific than the NERC standards alone. These standards provide planning for electric systems so as to withstand the more probable forced and maintenance outage system contingencies at projected customer demand and anticipated electricity transfer levels, while continuing to operate reliably within equipment and electric system thermal, voltage and stability limits. These standards include the reliability criteria for system adequacy and security, system modeling data requirements, system protection and control, and system restoration. Analysis of the WECC system is based to a large degree on Section I.A of the standards, “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 the results of power flow and stability simulations verify defined performance levels. Performance levels are defined by specifying the allowable variations in thermal loading, voltage and frequency, and loss of load that may occur on systems during various disturbances. Performance levels range from no significant adverse effects inside and outside a system area during a minor disturbance (loss of load or a single transmission element out of service) to a level that seeks to prevent system cascading and the subsequent blackout of islanded areas during a major disturbance (such as loss of multiple 500 kV lines along a common right of way, and/or multiple generators). While controlled loss of generation or load or system separation is permitted in certain circumstances, their uncontrolled loss is not permitted (WECC 2006).
- NERC Reliability Standards for the Bulk Electric Systems of North America provide national policies, standards, principles and guidelines to assure the adequacy and security of the electric transmission system. The NERC Reliability Standards provide for system performance levels under normal and contingency conditions. With regard to power flow and stability simulations, while these Reliability Standards are similar to NERC/WECC Standards, certain aspects of the

NERC/WECC Standards are either more stringent or more specific than the NERC Standards for Transmission System Contingency Performance. The NERC Reliability Standards apply not only to interconnected system operation but also to individual service areas (NERC 2006).

- California ISO Planning Standards also provide standards, and guidelines to assure the adequacy, security and reliability in the planning of the California ISO transmission grid facilities. The California ISO Grid Planning Standards incorporate the NERC/WECC and NERC Reliability Planning Standards. With regard to power flow and stability simulations, these Planning Standards are similar to the NERC/WECC or NERC Reliability Planning Standards for Transmission System Contingency Performance. However, the California ISO Standards also provide some additional requirements that are not found in 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 when there are any impacts to the California ISO grid due to facilities interconnecting to adjacent controlled grids not operated by the California ISO (California ISO 2002a).
- California ISO/FERC Electric Tariff provides guidelines for construction of all transmission additions/upgrades (projects) within the California ISO controlled grid. The California ISO determines the "Need" for the proposed project where it will promote economic efficiency or maintain system reliability. The California ISO also determines the Cost Responsibility of the proposed project and provides an Operational Review of all facilities that are to be connected to the California ISO grid (California ISO 2007a).

EXISTING FACILITIES AND RELATED SYSTEMS

The applicant has proposed interconnection of the CECP combined-cycle Units 6 and 7 at the existing SDG&E Encina 138 kV switchyard and a new SDG&E Encina 230 kV switchyard respectively, located within the site of the Encina Generating Station (GS) and Canon 138/12 kV substation SDG&E properties. Located at the coast line of the City of Carlsbad, the Encina GS has five existing generating units with about a total 965 MW generation capacity. The Encina GS Units 1, 2, 3 and 4 with 620 MW generation output are connected to the existing SDG&E Encina 138 kV switchyard and the Unit 5 with 345 MW capacity is connected to the existing SDG&E Encina 230kV switchyard. The Units 1, 2 and 3 are vintage gas-fired steam units about 50 years old, and the Units 4 and 5 were commissioned in 1978.

The applicant has proposed to retire the old Encina GS Units 1, 2 & 3 (about 318 MW), interconnect the CECP Unit 6 with a total 260 MW output to the existing Encina 138 kV switchyard and keep the existing Unit 4 (299 MW output) connected to the existing Encina 138 kV switchyard as well. The proposed CECP Unit 7 with a total 260 MW generation output would be interconnected to a new Encina East 230 kV switchyard and the Unit 5 will remain connected to the existing Encina 230 kV switchyard at this stage.

The Encina GS power output serves the high load demands of the City of Carlsbad and north western San Diego area which includes Palomar Airport, Penasquitos, Batiquitos and Sycamore Canyon. The Encina GS is also connected through 230 kV bulk

transmission lines to the San Onofre nuclear GS, Palomar Energy GS and Penasquitos substation.

The CECP project would utilize the existing Encina GS infrastructure to reduce environmental impacts and costs of the project. The new efficient gas-fired combined-cycle Units will replace the aging once-through-cooling old Units (by seawater) in accordance with state policies prescribed by the Energy Commission. Carlsbad Energy Center, LLC (applicant) is proposing to develop the CECP to meet the power resource needs of SDG&E. The new efficient generation will also enhance the economics and reliability of the SDG&E network by providing local generating capacity and quick-start power to the north western load centers of the San Diego region.

PROJECT DESCRIPTION

The CECP plant site would be located within a 32-acre site of the existing 95-acre SDG&E Encina Power Station in the City of Carlsbad and within the San Diego County. The CECP will comprise of two new natural gas-fired combined-cycle Units 6 & 7 with a total 520 MW nominal output. Each Unit would have a 260 MW net output and would consist of a steam turbine generator (STG) rated 76.8 MVA, 13.8kV and a combustion turbine generator (CTG) rated 244 MVA, 16.5 kV.

The STG of the proposed Unit 6 would be connected through a 4,000-ampere segregated bus duct and a 4,000-ampere 15 kV breaker to the low voltage terminal of a dedicated 54/72/90 MVA, 13.8/138 kV generator step-up (GSU) transformer with a specified impedance of 8.5 percent @54 MVA. The CTG of the proposed Unit 6 would be connected through a 10,000-ampere segregated bus duct to the low voltage terminal of a dedicated 168/224/280 MVA, 16.5/138 kV GSU transformer with a specified impedance of 8.6 percent @168 MVA.

The STG of the proposed Unit 7 would be connected through a 4,000-ampere segregated bus duct and a 4,000-ampere 15 kV breaker to the low voltage terminal of a dedicated 54/72/90 MVA, 13.8/230 kV GSU transformer with a specified impedance of 8.5 percent @54 MVA. The CTG of the proposed Unit 7 would be connected through a 10,000-ampere segregated bus duct to the low voltage terminal of a dedicated 168/224/280 MVA, 16.5/230 kV GSU transformer with a specified impedance of 8.6 percent @168 MVA (CECP 2007a, AFC, Section 3.1; CH2MHILL 2007, Data Adequacy Supplement A).

CECP UNIT 6: 138 KV SWITCHYARD AND INTERCONNECTION FACILITIES

The new CECP 138 kV switchyard is proposed as a 2,000-ampere single bus arrangement with two SF6 gas-insulated (GIS) 2,000-ampere breakers and a 2, 000-ampere disconnect switch. The two breakers, each having a 40 kA interrupting capacity, would be connected by short overhead conductors to the 138 kV high voltage terminals of the respective Unit 6 GSU transformer. The disconnect switch would be used for the new 138 kV overhead interconnection line to the existing Encina 138 kV switchyard.

The new CECP 138 kV switchyard would be interconnected to the existing SDG&E Encina 138 kV switchyard bus by building a new 1,250-foot long 138 kV single circuit overhead transmission line within the fence line of the Encina generating station with a bundled 1272 kcmil steel reinforced aluminum conductor (ACSR) conductor on 57-foot to 106-foot high tubular steel poles. The applicant will build, own and operate the CECP 138 kV switchyard and the overhead tie line.

The existing Encina generating Unit Nos. 1, 2 and 3 will be retired and be disconnected from switch bays 2, 6 and 9 respectively of the Encina 138 kV switchyard. The existing generating Unit No. 4 will remain connected to switch bay 11. To accommodate termination of the 138 kV interconnecting line, the existing Encina-Cannon 138 kV transmission line (No. 13801) would be relocated from switch bay1 to adjacent switch bay 2, vacated for disconnection of old Unit No. 1, after replacing two 2,000-ampere oil breakers and four disconnect switches with 2,000-ampere SF6 GIS breakers and disconnect switches. The new interconnecting line would be terminated to the switch bay 1 previously occupied by the Encina-Cannon 138 kV line after installing a new 2,000-ampere SF6 breaker and replacing the existing breaker with a new 2,000-ampere SF6 breaker with four associated disconnect switches. The overhead line would be terminated through a 140 feet outlet to the double bus of the existing 138 kV Encina switchyard. SDG&E would build, own and operate the interconnection transmission outlet and reliability upgrades in the existing Encina 138 kV switchyard (CECP 2007a, AFC, Section 3.1; CH2MHILL 2007, Data Adequacy Supplement A).

CECP UNIT 7: 230 KV SWITCHYARDS AND INTERCONNECTION FACILITIES

The new CECP 230 kV switchyard is proposed as a 2,000-ampere single bus arrangement with two SF6 gas-insulated (GIS) 2,000-ampere circuit breakers and a 2, 000-ampere disconnect switch. The two breakers, each with a 40 kA fault interrupting capacity, would be connected by short overhead conductors to the 230 kV high voltage terminals of the respective Unit 7 GSU transformer. The disconnect switch would be used for the new 230 kV interconnection line to a new Encina East 230 kV switchyard. The new interconnection tie line is proposed as a combination of an overhead line and an underground cable. The overhead 230 kV line would be a 900-foot long single circuit line and would be built with a 1272 kcmil ACSR conductor on 73-foot to 106-foot high tubular steel poles. The overhead line would be connected to a new 900-foot long 2,500 kcmil cross-linked Polyethylene (XLPE) 230 kV cable through an H-frame cable termination structure. The applicant would build, own and operate the CECP 230 kV switchyard and the overhead line portion of the tie line.

The new Encina East 230 kV switchyard would be located on the SDG&E Canon substation property east of the existing Encina 230 kV switchyard. The new switchyard is proposed for a 3,000-ampere double bus configuration with four switch bays with a one and a half 3,000-ampere breaker arrangement suitable for terminating eight transmission outlets. The existing four 230 kV transmission line outlets (Encina-San Luis Rey, Encina-San Luis Rey-Palomer, Encina-Penasquitos #1, Encina-Penasquitos # 2) would transferred to the new switchyard from the existing Encina 230 kV switchyard with its necessary changes. Two overhead links would be built between the new and

existing Encina switchyards. One of the switch bays would be used in future for connecting the high side terminals of a new 392 MVA, 230 kV /138 kV transformer bank to be installed at a new adjacent Encina East 138 kV Switchyard. The underground tie line would be terminated to the new Encina switchyard 230 kV bus through 3,000-ampere breakers and disconnect switches. The existing Encina generating Unit No. 5 will remain connected to the existing Encina 230 kV switchyard. SDG&E would build, own and operate the transmission facilities for interconnection, and network upgrades and changes including the underground cable portion of the tie line and the new Encina East 230 kV switchyard. All facilities would be built within the fence lines of Encina GS and Canon substation SDG&E properties (CECP 2007a; AFC; CH2MHILL 2007, Data Adequacy Supplement A; CH2MHILL 2008a, Data Response set 3; SR 2008h, Project Supplements).

The configurations of the proposed new CECP 230 kV and 138 kV switchyards, the generator tie lines to a new Encina East 230 kV switchyard and the existing 138 kV switchyard and their terminations, and SDG&E network upgrades and changes including a new Encina East 230 kV switchyard are adequate in accordance with industry standards and good utility practices, and are acceptable to staff.

FUTURE OR CONCURRENT SDG&E PLANNED FACILITIES

SDG&E has prepared a comprehensive expansion plan for transmission facilities within the fence lines of the Encina GS and the existing Canon 138/12 kV substation to facilitate timely interconnection of the proposed CECP as well as SDG&E 230 kV & 138 kV network reorganization for other projects in the area. The plan would be implemented by SDG&E in coordinated phases.

In the SDG&E 13.4-acre property of the existing Canon 138/12 kV substation, in addition to building a new Encina East 230 kV switchyard for interconnection of the proposed unit 7, SDG&E has a plan to construct a new Encina East 138 kV switchyard directly north of the proposed Encina East 230 kV switchyard. The new Encina East 138 kV switchyard would have 2,000-ampere double bus configuration with eight switch bays with a double 2,000-ampere breaker arrangement suitable for six transmission lines and two transformer outlets. Initially a 392 MVA, 230/138 kV step-down transformer would be installed in the switchyard and its high side terminals would be connected to the adjacent Encina East 230 kV switchyard. The transformer addition is one of the upgrade projects for the Sunrise Powerlink Project. The new 138 kV switchyard and line rearrangements are required to connect the transformer to the transmission system. Several 138 kV existing lines within the SDG&E property would be transferred from the existing Encina 138 kV switchyard and also looped in and out of the new 138 kV switchyard to Canon and other substations. A future plan is to eliminate the existing Encina 230 and 138 kV switchyards within the Encina GS after retirement of existing Encina unit Nos. 4 & 5 and transfer CECP Unit 6 interconnection to the new Encina East 138 kV switchyard.

Additionally, the footprint of the existing Cannon substation will be expanded by about 35% within the 13.4 acre parcel surrounding Cannon substation to serve the load

addition of the Carlsbad Seawater Desalination Plant (CSDP). The proposed alterations will add 12 kV load capacity to meet CSDP energy requirements, but will not increase the existing 138 kV voltage rating of the Cannon Substation. The Cannon Substation alterations will also relocate one of the two existing 138 kV transmission lines at the existing Cannon Substation to the new Encina East 138 kV switchyard. According to SDG&E, there should be no additional system impacts for interconnection of CECP due to concurrent implementation of the aforesaid planned facilities within the SDG&E properties.

At the request of SDG&E, staff is providing the above additional information about SDG&E planned facilities to meet CEQA requirements together in the Energy Commission's AFC process for the transmission facilities for the proposed CECP project and future or concurrent related planned facilities in the same SDG&E property boundaries. This information could expedite the California Public Utility Commission (CPUC) permit(s) to the proposed facilities and thereby implement timely construction of the proposed CECP project Interconnection facilities and other SDG&E projects.

TRANSMISSION SYSTEM IMPACT ANALYSIS

For the interconnection of a proposed generating unit or transmission facility to the grid, the interconnecting utility and the control area operator are responsible for ensuring grid reliability. For the CECP, SDG&E and California ISO are responsible for ensuring grid reliability. In accordance with the FERC/California ISO/Utility Tariffs, System Impact and Facilities Studies are conducted to determine the preferred and alternate interconnection methods to the grid, the downstream transmission system impacts and the mitigation measures needed to ensure system conformance with performance levels required by the utility reliability criteria, NERC planning standards, WECC reliability criteria, and California ISO reliability criteria. Staff relies on the studies and any review conducted by the responsible agencies 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 (NERC2006, WECC 2006, California ISO 2002a and 2007a).

The System Impact and Facilities Studies analyze the grid with and without the proposed project under conditions specified in the planning standards and reliability criteria. The standards and criteria define the assumptions used in the study and establish the thresholds by which grid reliability is determined. The studies must analyze the impact of the project for the proposed first year of operation and thus are based on a forecast of loads, generation and transmission. Load forecasts are developed by the interconnected utility, which would be SDG&E in this case. Generation and transmission forecasts are established by an interconnection queue. The studies are focused on thermal overloads, voltage deviations, system stability (excessive oscillations in generators and transmission system, voltage collapse, loss of loads or cascading outages), and short circuit duties.

If the studies show that the interconnection of the project causes the grid to be out of compliance with reliability standards, the study will then identify mitigation alternatives or ways in which the grid could be brought into compliance with reliability standards. If

the interconnecting utility determines that the only feasible mitigation includes transmission modifications or additions which require CEQA review as part of the "whole of the action," the Energy Commission must analyze those modifications or additions according to CEQA requirements.

SCOPE OF SYSTEM IMPACT AND FACILITIES STUDIES

CECP UNIT 6: The October 9, 2007 SIS was prepared by the California ISO in coordination with SDG&E to evaluate the impact of the new 260 MW generation output from the CECP Unit 6 to the existing Encina 138 kV switchyard. Based on the estimated May, 2010 COD and also for future years, the study was conducted with a 2010 heavy summer peak case, a 2012 heavy summer case and a 2011-2012 light winter case. The study cases were derived from the latest 2010 heavy summer and 2011-12 light winter WECC full-loop cases. The cases were developed to include SDG&E updated transmission network, all California ISO queue generation with a position higher than the CECP, and planned SDG&E transmission projects including 230 kV Otay Metro Powerloop, Silvergate substation, and Sunrise Power Link and associated plan of service. The 2010 and 2012 summer peak base cases were prepared with and without the proposed CECP unit 6 with 1-in-10 year heat wave San Diego area load forecasts of 4,865 MW and 4,987 MW respectively, and 3,295 MW and 3,394 MW import levels respectively. The 2011-2012 light winter case has an off-peak SDG&E load forecast of 2,516 MW (50 percent of summer peak demand) and 1,326 MW import level. In all base cases the Encina Unit 4 (299 MW output) was considered on-line and the Encina Units 1, 2 and 3 were considered on-line in the pre-project cases and considered off-line in the post-project cases as they are scheduled for retirement after commercial operation of CECP Unit 6. The study included a Power Flow analysis, a Short Circuit analysis, a Transient Stability analysis, a Post-Transient Voltage analysis and a Reactive Power analysis and substation evaluations.

The July 7, 2008 FS based on October 1, 2010 in-service date and June 1, 2011COD reviewed the October 9, 2007 SIS and performed additional transient stability analysis under selected critical contingencies. The FS also determined the scope of work including identification of interconnection facilities and reliability network upgrades , and provided preliminary good faith cost estimates for the facilities required for the CECP Unit 6 interconnection to the SDG&E transmission facilities, assuming SDG&E would engineer, construct, own and maintain the interconnecting terminating facilities (except the CECP 138 kV switchyard and the 138 kV interconnection line) and the reliability upgrades in the existing Encina 138 kV switchyard (CH2MHILL 2007c, SIS & CH2MHILL 2009a, FS).

CECP UNIT 7: The June 4, 2008 FS was prepared by the California ISO in coordination with SDG&E to evaluate the impact of the new 260 MW generation output from the CECP Unit 7 to a new Encina East 230 kV switchyard. An earlier version of the June 5, 2007 SIS report based on COD of August, 2008 was issued with a net 300 MW generation output to the grid. However, due to withdrawal of a lower queue generation project, a System Impact restudy was performed analyzing a number of system configuration scenarios. Based on the estimated commercial operation date of August, 2010, the study

was conducted with a 2011 heavy summer full-loop case with and without the proposed CECP Unit 7. The restudy base case incorporated several SDG&E transmission projects approved by the California ISO including a new Miguel 230/138 kV transformer, Main Street loop-in and a second Division-Naval Station metering line. The restudy was also performed with and without the Encina-Penaquitos 230 kV line project approved by the California ISO. The Encina generating unit 5 was considered connected to the existing Encina 230 kV switchyard. The restudy included a Power Flow analysis, a Short Circuit analysis, a Transient Stability analysis, a Post-Transient Voltage analysis and a Reactive Power Deficiency analysis.

The FS also determined the scope of work including identification of interconnection facilities and reliability network upgrades, and provided estimated costs and construction time for the SDG&E facilities required for the CECP Unit 7 interconnection to a new Encina East 230 kV switchyard, assuming SDG&E would engineer, construct, own and operate the interconnecting terminating facilities (except the CECP 230 kV switchyard and the 230 kV overhead tie line) and the reliability upgrades (SR 2008h, FS).

POWER FLOW STUDY RESULTS AND MITIGATION

CECP UNIT 6: The SIS demonstrates that the CECP Unit 6 generation output considering retirement of old Encina Power Station Units 1, 2 and 3 would have some adverse impacts on the SDG&E facilities under normal (N-0) and certain emergency contingency conditions. But further analysis revealed that interconnection of the CECP Unit 6 is not responsible for the identified reliability criteria violations. The power flow study results have been tabulated in the Appendix E of the SIS (CH2MHILL 2007c, SIS).

Under 2010 summer peak system conditions, the study identified no overloads under normal and contingency conditions. However, under 2012 summer peak system conditions the study identified the following overloads and corresponding mitigation measures:

- Creelman-Sycamore 69 kV line: The addition of CECP Unit 6 would cause overloads on this line (104 percent of its normal and emergency rating) under normal (N-0) pre and post-project 2012 summer peak system conditions with all transmission facilities in service.
  Mitigation: Further investigations revealed that the line overloads are the result of a high import and low internal generation dispatch in the SDG&E system in the 2010 and 2012 system base case models. A more realistic approach with more internal generation and decreased imports eliminated the overloads in both pre and post-project cases. SDG&E concluded that CECP Unit 6 is not responsible for mitigation of these overloads. Staff considers the conclusion acceptable.

- Miguel Substation 230/69 kV Transformer Banks: Under 2012 summer peak post-project system conditions, both Miguel substation 230/69 kV transformer banks are found overloaded (116 percent of continuous ratings) for the Category C outage of the Miguel-Mission No. 1 & 2 230 kV lines.

Mitigation: Since loadings on these transformer banks are within their operating limit criteria, SDG&E concluded that no mitigation is necessary. Staff concurs with the conclusion.

CECP UNIT 7: The SIS demonstrates that the CECP Unit 7 would have some adverse impacts on the SDG&E facilities under certain emergency contingency conditions. But further analysis revealed that interconnection of the CECP unit 7 is not responsible for the identified reliability criteria violations. The power flow study results have been tabulated in the Appendix C of the FS (SR 2008h, FS).

Under 2011 summer peak system conditions, the study identified no overloads under normal (n-0) conditions. However, the study identified the following overloads under certain contingencies and corresponding mitigation measures:

- Doublet Tap-Friars 138 kV line: A new overload was identified on this line with the existing South Bay configuration and normal Path 44 flow, and without the Sunrise Powerlink project for the single (N-1) contingency of the Penasquitos 230/138 kV transformer. This overload is aggravated further with no Encina 138 kV generation dispatch. In addition, a pre-project overload was exacerbated under outage of the Penasquitos-Old Town for the interconnection of the CECP Unit 7 with high Path 44 flow, the proposed South bay configuration and high Encina 138 kV generation.
  Mitigation: A realistic dispatch of minimal Encina 138 kV generation mitigates the new overload. According to SDG&E annual transmission plan, the Encina-Penaquitos 230 kV line project also relieves the new overload. For the aggravated pre-project overload, SDGE&E is currently addressing this matter in their annual transmission plan and considers that the CECP Unit 7 addition is not responsible for the mitigation of this overload. Staff concurs with the conclusions acceptable.
- Penasquitos-Old Town 230 kV line: The overload was identified for the double (N-2) contingencies of the Mission-San Luis Rey Nos. 1 & 2 230 kV lines without Sunrise Powerlink project in service and with a 2,500 MW path 44 flow. In addition, the line overload is also observed as a pre-project exacerbation in the case with high Path 44 flow and the proposed 230 South Bay configuration.
  Mitigation: According to WECC reliability criteria, the line overload for the Category C outages would be mitigated by planned generation dropping or controlled load shedding. Staff considers the mitigation acceptable.

SHORT CIRCUIT STUDY RESULTS AND SUBSTATION EVALUATION

For both the Encina Peaking projects for the proposed CECP Units 6 & 7, the short circuit analyses were separately performed in their respective SIS or FS. Three lines-to-ground (3LG) and single line-to-ground (SLG) faults were simulated with and without the proposed new generating Unit (6 or 7) to determine if there are any overstressed circuit breakers in the selected substations for addition of the new generating unit. The study results for the addition of the CECP Unit 6 are included in the Appendix G of the SIS report.

The substation evaluation identified no overstressed circuit breakers or other equipment attributable to the addition of the CECP Unit 6 or Unit 7. SDG&E concludes that the project is not responsible for mitigating any pre-existing overstressed circuit breakers. SDG&E has various projects planned to replace overstressed circuit breakers identified before interconnection of the proposed CECP Units. Staff concurs with the evaluation (CH2MHILL 2007c, SIS, Appendix G).

TRANSIENT STABILITY STUDY RESULTS

For both the Encina Peaking projects for the proposed CECP Units 6 & 7, Transient Stability studies were performed to determine whether the transmission system would remain stable with the addition of the new generators. According to October 9, 2007 SIS and July 7, 2008 FS reports, the study for the addition of the CECP Unit 6 was performed with a 2010 summer peak case under selected category critical B & C contingencies. The analysis concluded that the transmission system would remain stable with the addition of CECP unit 6 for all contingency simulations studied (CH2MHILL 2009a, FS).

According to June 4, 2008 FS report, the study for the addition of CECP Unit 7 was conducted with a 2011 heavy summer case under selected critical contingencies and the study results indicated that the transmission system would remain stable with the addition of CECP unit 7 for all contingency simulations studied (SR 2008h, FS, Section 3).

POST-TRANSIENT VOLTAGE ANALYSIS RESULTS

For both the proposed CECP Units 6 & 7, the Post-Transient voltage analyses were performed separately in their respective SIS or FS. Post-Transient voltage analyses with the 2010 and 2011 summer peak cases did not identify any voltage criteria violations at SDG&E buses for category B and C selected contingencies.

REACTIVE POWER DEFICIENCY ANALYSIS

For both the proposed CECP Units 6 & 7, the Transient Stability studies were performed separately in their respective SIS or FS. Reactive Power Deficiency analyses determined that the addition of the CECP Unit 6 or Unit 7 does not contribute to any reactive power margin violations at SDG&E buses following selected contingencies.

CALIFORNIA ISO REVIEW

In accordance with the provisions of LGIP as in the California ISO Tariff, the October 9, 2007 SIS and July 7, 2008 FS were prepared by the California ISO in coordination with SDG&E to evaluate the impact of the 260 MW generation output from the CECP Unit 6 to the existing Encina 138 kV switchyard and determined the scope of work for the interconnection transmission facilities and reliability network changes.

In accordance with the provisions of LGIP, the June 4, 2008 FS was also prepared by the California ISO in coordination with SDG&E. The study evaluated the system impacts of the proposed 260 MW net generation output from the CECP Unit 7 to a new Encina East 230 kV switchyard and determined the scope of work for the interconnection transmission facilities and reliability network upgrades. The California ISO suggested

that in order for SDG&E to get exemption from the California Public Utility Commission's (CPUC) GO 131-D permit and expedite the process to proceed early for construction of the reliability network upgrades, the applicant has the option as a part of their AFC to submit an Environmental analysis report with a mitigation plan to the Energy Commission to meet requirements of the CEQA review for scope of work for the network upgrades. A finding of no significant or unmitigated environmental impacts in the CEQA process will allow SDG&E to file an advice letter with the CPUC for an expedited CPUC permit.

In order to expedite schedule for an earlier in-service date of the CECP, the California ISO proposed that per section 9 of the LGIP, the applicant may consider signing an Engineering & Procurement (E&P) agreement with SDG&E. An E & P agreement would authorize SDG&E to commence engineering and procurements for the project with long lead-time prior to execution of the LGIA (CH2MHILL 2007c, SIS; SR 2008h, FS)

Further the California ISO instead of issuing final approval letters would proceed for execution of the LGIAs between the California ISO and the project owner, and subsequently perform Operational studies/procedures examining the impacts of the CECP project on the grid based on the expected 2010 in-service dates or current CODs. The California ISO may also provide written and verbal testimony on their findings at the Energy Commission hearings, if necessary.

Performance of the Operational studies/procedures for both CECP Units 6 and 7 based on 2010 or current CODs and execution of the LGIAs would ensure system reliability in the California ISO grid and compliance with WECC/NERC and California ISO Planning standards (WECC 2006, NERC 2006, California ISO 2002a and 2007a).

DOWNSTREAM FACILITIES

For the proposed CECP Unit 6, besides the interconnection facilities which include the new CECP 138 kV switchyard and the proposed new single circuit 138 kV line between the CECP 138 kV switchyard and the existing Encina 138 kV switchyard, accommodating the interconnection of the CECP Unit 6 at the Encina 138 kV switchyard would require installation of a new 2,000-ampere 138 kV breaker with two disconnect switches at switch bay 1. The Encina- Cannon 138 kV line would be relocated from switch bay 1 to 2 after replacing two 2,000-ampere oil breakers and four disconnect switches with 2,000-ampere SF6 GIS breakers and disconnect switches at bay 2. The construction for changes would be done by SDG&E within the existing fence line of the Encina 138 kV switchyard.

For the proposed CECP unit 7, besides the proposed interconnection facilities which include the new CECP 230 kV switchyard, the interconnection 230 kV overhead line and underground cable, accommodating the interconnection would need SDG&E reliability network upgrades which would include building a new Encina East 230 kV switchyard with transfer of four transmission outlets from the existing Encina 230 kV switchyard with its necessary changes and two overhead 230 kV link lines between the

existing and new switchyards. All construction would be done within the fence line of the Encina Generating station.

CUMULATIVE IMPACTS

Since the commercial operation of the proposed CECP Unit 6, planned for interconnection to the SDG&E 138 kV system, would replace about equal MW output of the existing Encina Power Station vintage generating Units 1, 2 and 3 (total 300 MW output), which are scheduled for retirement from the same network, staff believes that the CECP Unit 6 project may have some marginal cumulative effects in the area network only due to rapid load growth in the SDG&E system. Since the existing Encina Power Station Unit 5 (315 MW output) is considered to remain on-line after commercial operation of the new 260 MW CECP Unit 7, and in view of pending SDG&E bulk transmission projects, staff believes that the CECP Unit 7 project would have some cumulative impacts in the 230 kV and 138 kV area network until the transmission upgrade projects are implemented.

However, the cumulative marginal impacts due to the CECP Units 6 and 7, as identified in the SIS or FS, would be mitigated. Staff also believes that there would be some positive impacts because the new efficient CECP generation will replace the old vintage steam units, thereby enhance the economics and reliability of the SDG&E network by providing local generating capacity to the north western load centers of the San Diego region.

ALTERNATIVE TRANSMISSION ROUTES

The new CECP 230 kV switchyard would be interconnected to a new SDG&E Encina East 230 kV switchyard bus by building a combination of a new 900-foot long 230 kV overhead line and a 900-foot long underground cable line. The new CECP 138 kV switchyard would be interconnected to the existing SDG&E Encina 138 kV switchyard bus by building a new 1,250-foot long 138 kV overhead transmission line. Both the tie lines would follow the shortest and economic route within the fence line of the Encina generating station. As such, no alternate route or line was considered by the applicant and this is permissible under the provisions of CEQA (CECP 2007a, AFC, Sections 3 & 6).

CONFORMANCE WITH LORS AND CEQA REVIEW

The proposed new interconnecting facilities, the CECP 230 kV and 138 kV switchyards, the generator tie lines to a new Encina East 230 kV switchyard and the existing 138 kV switchyard and their terminations, and SDG&E reliability network upgrades and changes would be built according to the NESC standards, GO-95 & GO-128 Rules within the existing fence line of the Encina Generating station. The new facilities and changes would be in accordance with industry standards and good utility practices, would conform to engineering LORS and are acceptable to staff.

The October 9, 2007 SIS and July 7, 2008 FS demonstrate that the new 260 MW CECP Unit 6 generation output considering retirement of Encina Power Station Units 1, 2 and

3 would have some adverse impacts on the SDG&E facilities for overload criteria violations under certain normal (N-0) and emergency contingency conditions. The June 4, 2008 FS demonstrates that the new 260 MW CECP Unit 7 generation output would have some adverse impacts on the SDG&E facilities for overload criteria violations under certain emergency contingency conditions. But further analysis revealed that interconnection of CECP Units 6 and 7 are not responsible for the identified overload reliability criteria violations, which would not occur under more realistic study assumptions.

The CECP project would, therefore, meet the requirements and standards of all applicable LORS and CEQA review upon satisfactory compliance of the Conditions of Certifications.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

The City of Carlsbad, in their letter of January 30, 2009 (COC 2009a), stated that the COD of the CECP units would be no sooner than 2012/2013 and "would require an update to the SIS to identify if this change in on-line date will have an impact to grid reliability." In response, staff would refer to the "Transmission System Impact Analysis" section and the "Introduction" section (viz. California ISO's Role) of this TSE staff assessment, and inform as follows:

a) The California ISO is responsible for ensuring system reliability for interconnection of generators in all participating transmission owners' (PTO) system, in this case SDG&E system. According to provisions of the LGIP as in the California ISO Tariff, the California ISO in coordination the PTO performs the SIS and FS under appropriate system conditions based on initial estimated COD. In this case based on the estimated October 1, 2010 in-service date and June 1, 2011 COD, the SIS and FS for the CECP unit 6 (260 MW output) were performed by the California ISO in coordination with SDG&E under 2010 summer peak, 2012 summer peak and 2011-2012 light winter system conditions. For the CECP unit 7 (260 MW output) the FS was conducted with a revised SIS under 2011 summer peak system conditions based on the estimated August, 2010 COD. The SISs and FSs did not identify any downstream impacts in the SDG&E network for which the addition of CECP is responsible.
b) Since the studies were performed under 2011 and 2012 system conditions, the deferral of the COD to 2011 or 2012 are already covered. Since the existing Encina GS units 1, 2 & 3 (318 MW) are scheduled for retirement with commencement of operation of the new CECP units, staff believes that deferral of the COD to 2013 should not have any additional significant impacts requiring modified or new downstream facilities.
c) Moreover, according to the provisions of the LGIP, the California ISO would perform an operational study based on current COD (may be 2011 to 2013) to mitigate current operational reliability concerns, if any. The Condition of Certification **TSE-5** f) iii) includes also such compliance requirement from the applicant.

Staff, therefore, believes that the current SISs and FSs are complete and adequate, and deferral of the COD to 2012/2013 does not warrant any update to the SISs or FSs for interconnection of the new CECP units (COC 2008k, Letter dated 10-22-08).

CONCLUSIONS AND RECOMMENDATIONS

1. The proposed new interconnecting facilities, the CECP 230 kV and 138 kV switchyards, the generator tie lines to a new Encina East 230 kV switchyard and the existing 138 kV Encina switchyard and their terminations, and SDG&E reliability network upgrades and changes would be built according to the NESC standards, GO-95 and Go-128 Rules within the existing fence line of the Encina Generating station. The new facilities and changes are adequate in accordance with industry standards and good utility practices, and are acceptable to staff according to engineering LORS.
2. As proposed by the California ISO in their June 4, 2008 FS report and in order to meet the requirements of the CEQA review, the applicant submitted an Environmental Analysis report as a part of their AFC process to the Energy Commission for construction of SDG&E's interconnection and reliability network upgrade facilities and changes within the Encina GS and Canon 138/12 kV substation in order to accommodate interconnection of the proposed CECP. The report would expedite CPUC permit to the proposed SDG&E facilities.

The California ISO instead of issuing final approval letters would perform Operational studies/procedures examining the impacts of both the CECP projects on the grid based on the expected 2010 or current COD.

Performance of the Operational studies/procedures for both the CECP Units 6 and 7 based on the expected 2010 in-service date or current COD and execution of the LGIAs would ensure system reliability in the California ISO grid and compliance with WECC/NERC and California ISO Planning standards.
3. The October 9, 2007 SIS and July 7, 2008 FS demonstrate that the new 260 MW CECP Unit 6 generation output considering retirement of Encina GS Units 1, 2 and 3 would have some minor adverse impacts on the SDG&E facilities for overload criteria violations under normal (N-0) and certain emergency contingency conditions. The June 4, 2008 FS demonstrates that the new 260 MW CECP Unit 7 generation output would have some adverse impacts on the SDG&E facilities for overload criteria violations under certain emergency contingency conditions. But further analysis revealed that interconnection of the CECP Units 6 and 7are not responsible for the identified overload reliability criteria violations which could be mitigated by more realistic SDG&E's generation dispatch and imports, and transmission projects in the SDG&E annual plan.

4. The CECP project would, therefore, conform to the applicable LORS and CEQA review upon satisfactory compliance of the recommended Conditions of Certifications.

5. The CECP project would utilize the existing Encina GS infrastructure to reduce environmental impacts and costs of the project. The new efficient gas-fired CECP generating Units will replace and modernize the aging once-through-cooling old Units (by seawater) in accordance with state policies prescribed by the Energy Commission. The generation project will enhance the economics and reliability of the SDG&E network by

providing local generating capacity and quick-start power to the north western load centers of San Diego region.

RECOMMENDATIONS

If the Energy Commission approves the project, staff recommends the following Conditions of Certification to ensure system reliability and conformance with LORS.

CONDITIONS OF CERTIFICATIONS FOR TRANSMISSION SYSTEM ENGINEERING

TSE-1 The project owner shall furnish to the CPM and to the CBO a schedule of transmission facility design submittals, a Master Drawing List, a Master Specifications List, and a Major Equipment and Structure List. The schedule shall contain a description and list of proposed submittal packages for design, calculations, and specifications for major structures and equipment. To facilitate audits by Energy Commission staff, the project owner shall provide designated packages to the CPM when requested.

Verification: At least 60 days (or a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of construction, the project owner shall submit the schedule, a Master Drawing List, and a Master Specifications List to the CBO and to the CPM. The schedule shall contain a description and list of proposed submittal packages for design, calculations, and specifications for major structures and equipment (see a list of major equipment in **Table 1: Major Equipment List** below). Additions and deletions shall be made to the table only with CPM and CBO approval. The project owner shall provide schedule updates in the Monthly Compliance Report.

Table 1: Major Equipment List
Breakers
Step-up Transformer
Switchyard
Busses
Surge Arrestors
Disconnects and Wave-traps
Take off facilities
Electrical Control Building
Switchyard Control Building
Transmission Pole/Tower
Insulators and Conductors
Grounding System

TSE-2 Prior to the start of construction the project owner shall assign an electrical engineer and at least one of each of the following to the project: A) a civil engineer; B) a geotechnical engineer or a civil engineer experienced and knowledgeable in the practice of soils engineering; C) a design engineer, who is

either a structural engineer or a civil engineer fully competent and proficient in the design of power plant structures and equipment supports; or D) a mechanical engineer. (Business and Professions Code Sections 6704 et seq., require state registration to practice as a civil engineer or structural engineer in California.)

The tasks performed by the civil, mechanical, electrical or design engineers may be divided between two or more engineers, as long as each engineer is responsible for a particular segment of the project (e.g., proposed earthwork, civil structures, power plant structures, equipment support). No segment of the project shall have more than one responsible engineer. The transmission line may be the responsibility of a separate California registered electrical engineer. The civil, geotechnical or civil and design engineer assigned in conformance with Facility Design condition **GEN-5**, may be responsible for design and review of the TSE facilities.

The project owner shall submit to the CBO for review and approval, the names, qualifications and registration numbers of all engineers assigned to the project. If any one of the designated engineers is subsequently reassigned or replaced, the project owner shall submit the name, qualifications and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer. This engineer shall be authorized to halt earthwork and to require changes if site conditions are unsafe or do not conform with predicted conditions used as a basis for design of earthwork or foundations.

The electrical engineer shall:

1. Be responsible for the electrical design of the power plant switchyard, outlet and termination facilities; and
2. Sign and stamp electrical design drawings, plans, specifications, and calculations.

Verification: At least 30 days (or a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of rough grading, the project owner shall submit to the CBO for review and approval, the names, qualifications and registration numbers of all the responsible engineers assigned to the project. The project owner shall notify the CPM of the CBO's approvals of the engineers within five days of the approval.

If the designated responsible engineer is subsequently reassigned or replaced, the project owner has five days in which to submit the name, qualifications, and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer within five days of the approval.

TSE-3 If any discrepancy in design and/or construction is discovered in any engineering work that has undergone CBO design review and approval, the

project owner shall document the discrepancy and recommend corrective action. (1998 CBC, Chapter 1, Section 108.4, Approval Required; Chapter 17, Section 1701.3, Duties and Responsibilities of the Special Inspector; Appendix Chapter 33, Section 3317.7, Notification of Noncompliance). The discrepancy documentation shall become a controlled document and shall be submitted to the CBO for review and approval and shall reference this condition of certification.

Verification: The project owner shall submit a copy of the CBO's approval or disapproval of any corrective action taken to resolve a discrepancy to the CPM within 15 days of receipt. If disapproved, the project owner shall advise the CPM, within five days, the reason for disapproval, and the revised corrective action required to obtain the CBO's approval.

TSE-4 For the power plant switchyard, outlet line and termination, the project owner shall not begin any increment of construction until plans for that increment have been approved by the CBO. These plans, together with design changes and design change notices, shall remain on the site for one year after completion of construction. The project owner shall request that the CBO inspect the installation to ensure compliance with the requirements of applicable LORS. The following activities shall be reported in the Monthly Compliance Report:

a) receipt or delay of major electrical equipment;
b) testing or energization of major electrical equipment; and
c) the number of electrical drawings approved, submitted for approval, and still to be submitted.

Verification: At least 30 days (or a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of each increment of construction, the project owner shall submit to the CBO for review and approval the final design plans, specifications and calculations for equipment and systems of the power plant switchyard, outlet line and termination, including a copy of the signed and stamped statement from the responsible electrical engineer attesting to compliance with the applicable LORS, and send the CPM a copy of the transmittal letter in the next Monthly Compliance Report.

TSE-5 The project owner shall ensure that the design, construction and operation of the proposed transmission facilities will conform to all applicable LORS, including the requirements listed below. The project owner shall submit the required number of copies of the design drawings and calculations to the CBO as determined by the CBO.

a) The power plant switchyard and outlet line shall meet or exceed the electrical, mechanical, civil and structural requirements of CPUC General Order 95 or National Electric Safety Code (NESC), Title 8 of the California Code and Regulations (Title 8), Articles 35, 36 and 37 of the "High Voltage Electric Safety Orders", California ISO standards, National Electric Code (NEC) and related industry standards.

b) Breakers and busses in the power plant switchyard and other switchyards, where applicable, shall be sized to accommodate full output from the project and to comply with a short-circuit analysis.

c) 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.

d) The project conductors shall be sized to accommodate the full output from the project.

e) Termination facilities shall comply with applicable SDG&E interconnection standards.

f) The project owner shall provide the following for both for the CECP Units 6 and 7 to the CPM:

   i) The Special Protection System (SPS) sequencing and timing if applicable,
   ii) A letter stating that the mitigation measures or projects selected by the transmission owners for each criteria violation are acceptable, if applicable,
   iii) The Operational study report based on 2010 in-service date or current Commercial Operation Date (COD) system conditions from the California ISO and/or SDG&E.
   iv) A copy of the executed LGIA signed by the California ISO and the project owner.

Verification: At least 60 days prior to the start of construction of transmission facilities (or a lesser number of days mutually agree to by the project owner and CBO), the project owner shall submit to the CBO for approval:

a) Design drawings, specifications and calculations conforming with CPUC General Order 95 or NESC, Title 8, Articles 35, 36 and 37 of the "High Voltage Electric Safety Orders", NEC, applicable interconnection standards and related industry standards, for the poles/towers, foundations, anchor bolts, conductors, grounding systems and major switchyard equipment.

b) For each element of the transmission facilities identified above, the submittal package to the CBO shall contain the design criteria, a discussion of the calculation method(s), a sample calculation based on "worst case conditions"[1] and a statement signed and sealed by the registered engineer in responsible charge, or other acceptable alternative verification, that the transmission element(s) will conform with CPUC General Order 95 or NESC, Title 8, California Code of Regulations, Articles 35, 36 and 37 of the, "High Voltage Electric Safety Orders", NEC, applicable interconnection standards, and related industry standards.

c) Electrical one-line diagrams signed and sealed by the registered professional electrical engineer in responsible charge, a route map, and an engineering description

[1] Worst case conditions for the foundations would include for instance, a dead-end or angle pole.

of equipment and the configurations covered by requirements **TSE-5** a) through f) above.

d) The Special Protection Scheme (SPS) sequencing and timing if applicable shall be provided concurrently to the CPM.

e) A letter stating that the mitigation measures or projects selected by the transmission owners for each criteria violation are acceptable, if applicable.

f) The Operational study report for the CECP units 6 and 7 based on 2010 in-service date or current COD system conditions from the California ISO and/or SDG&E.

g) A copy of the executed LGIA for the CECP units 6 and 7 signed by the California ISO and the project owner.

TSE-6 The project owner shall inform the CPM and CBO of any impending changes that may not conform to requirements **TSE-5** a) through f), and have not received CPM and CBO approval, and request approval to implement such changes. A detailed description of the proposed change and complete engineering, environmental, and economic rationale for the change shall accompany the request. Construction involving changed equipment or substation configurations shall not begin without prior written approval of the changes by the CBO and the CPM.

Verification: At least 60 days prior to the construction of transmission facilities, the project owner shall inform the CBO and the CPM of any impending changes that` may not conform to requirements of **TSE-5** and request approval to implement such changes.

TSE-7 The project owner shall provide the following Notice to the California Independent System Operator (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
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. The project owner shall contact the California ISO Outage Coordination Department, Monday through Friday, between the hours of 0700 and 1530 at (916) 351-2300 at least one business day prior to synchronizing the facility with the grid for testing. A report of conversation with the 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-8 The project owner shall be responsible for the inspection of the transmission facilities during and after project construction, and any subsequent CPM and CBO approved changes thereto, to ensure conformance with CPUC GO-95 or NESC, Title 8, CCR, Articles 35, 36 and 37 of the, "High Voltage Electric Safety Orders", applicable interconnection standards, NEC and related industry standards. In case of non-conformance, the project owner shall inform the CPM and CBO in writing, within 10 days of discovering such non-conformance and describe the corrective actions to be taken.

Verification: Within 60 days after first synchronization of the project, the project owner shall transmit to the CPM and CBO:

a) "As built" engineering description(s) and one-line drawings of the electrical portion of the facilities signed and sealed by the registered electrical engineer in responsible charge. A statement attesting to conformance with CPUC GO-95 or NESC, Title 8, California Code of Regulations, Articles 35, 36 and 37 of the, "High Voltage Electric Safety Orders", and applicable interconnection standards, NEC, related industry standards, and these conditions shall be provided concurrently.

b) An "as built" engineering description of the mechanical, structural, and civil portion of the transmission facilities signed and sealed by the registered engineer in responsible charge or acceptable alternative verification. "As built" drawings of the electrical, mechanical, structural, and civil portion of the transmission facilities shall be maintained at the power plant and made available, if requested, for CPM audit as set forth in the "Compliance Monitoring Plan".

c) A summary of inspections of the completed transmission facilities, and identification of any nonconforming work and corrective actions taken, signed and sealed by the registered engineer in charge.

REFERENCES

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COC 2008k– City of Carlsbad /J Garuba (tn: 47691). Project Inconsistency with City of Carlsbad Land use Ordinances and Policies. 8/22/2008

COC 2009a– City of Carlsbad /J Garuba (tn: 50009). PSA Comments.1/30/2009

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NERC (North American Electric Reliability Council) 2006. Reliability Standards for the Bulk Electric Systems of North America, May 2 2006.

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DEFINITION OF TERMS

ACSR
Aluminum cable steel reinforced.

AAC
All Aluminum conductor.

Ampacity
Current-carrying capacity, expressed in amperes, of a conductor at specified ambient conditions, at which damage to the conductor is nonexistent or deemed acceptable based on economic, safety, and reliability considerations.

Ampere
The unit of current flowing in a conductor.

Kiloampere
(kA) 1,000 Amperes

Bundled
Two wires, 18 inches apart.

Bus
Conductors that serve as a common connection for two or more circuits.

Conductor
The part of the transmission line (the wire) that carries the current.

Congestion Management
Congestion management is a scheduling protocol, which provides that dispatched generation and transmission loading (imports) would 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. 1,000 Volts.

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
Megavolt Ampere-Reactive. One million Volt-Ampere-Reactive. Reactive power is generally associated with the reactive nature of motor loads that must be fed by generation units in the system.

Megavolt ampere (MVA)
A unit of apparent power, equals the product of the line voltage in kilovolts, current in amperes, the square root of 3, and divided by 1000.

Megawatt (MW)
A unit of power equivalent to 1,341 horsepower.

Normal Operation/ Normal Overload
When all customers receive the power they are entitled to without interruption and at steady voltage, and no element of the transmission system is loaded beyond its continuous rating.

N-1 Condition
See Single Contingency.

Outlet
Transmission facilities (circuit, transformer, circuit breaker, etc.) linking generation facilities to the main grid.

Power Flow Analysis
A power flow analysis is a forward looking computer simulation of essentially all generation and transmission system facilities that identifies overloaded circuits, transformers and other equipment and system voltage levels.

Reactive Power
Reactive power is generally associated with the reactive nature of inductive loads like motor loads that must be fed by generation units in the system. An adequate supply of reactive power is required to maintain voltage levels in the system.

Remedial Action Scheme (RAS)
A remedial action scheme is an automatic control provision, which, for instance, would trip a selected generating unit upon a circuit overload.

SSAC

Steel Supported Aluminum Conductor.

SF6
Sulfur hexafluoride is an insulating medium.

Single Contingency
Also known as emergency or N-1 condition, occurs when one major transmission element (circuit, transformer, circuit breaker, etc.) or one generator is out of service.

Solid dielectric cable
Copper or aluminum conductors that are insulated by solid polyethylene type insulation and covered by a metallic shield and outer polyethylene jacket.

Switchyard
A power plant switchyard (switchyard) is an integral part of a power plant and is used as an outlet for one or more electric generators.

Thermal rating
See ampacity.

TSE
Transmission System Engineering.

TRV
Transient Recovery Voltage

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 Mike Monasmith, Dave Vidaver, Negar Vahidi, and Scott Debauche

SUMMARY OF CONCLUSIONS

The location of the proposed Carlsbad Energy Center Project (CECP or proposed project) is on the site of the existing Encina Power Station (EPS). Carlsbad Energy Center, LLC (applicant) proposes to permanently retire EPS Units 1, 2, and 3 (circa 1950 steam boilers that provided the initial electrical generation) once the CECP is approved and operational. This analysis evaluates five alternative sites as possible locations for the proposed project. California Energy Commission staff (staff) has determined that the CECP is better from an environmental standpoint when compared to the alternative sites evaluated based on the analysis presented within this section. Primarily, the location of the proposed CECP at the existing EPS uses existing industrial infrastructure within an area that contains an existing power plant land use. Furthermore, siting the CECP at the alternative site locations would result in the addition of another power plant to otherwise non-industrial landscapes nearby. The use of the existing EPS site would not cause any significant impacts that would be avoided by an alternative location; moreover, use of the existing site has lower environmental impacts and is thus preferable. A full identification of project conclusions is included at the end of this section.

Alternative technologies (geothermal, solar, wind, biomass, hydroelectric) are not feasible alternatives to the proposed project because they do not accomplish critical project objectives, including providing dispatchable generation that would allow the displacement or retirement of aging once through cooling (OTC) facilities. As discussed below, while these alternative technologies will continue to be pursued as a vital component of the renewable electrical generation supply and implemented to the greatest extent feasible, they are not feasible alternatives to the proposed CECP. In addition, the “No Project” alternative would likely result in other energy projects needed to provide generating capacity and displace aging OTC generation, and such projects would not make use of the existing EPS infrastructure. Thus, the “No Project” alternative would require the existing EPS units to continue to operate. In addition, the “No Project” alternative would likely result in other projects similar to the CECP that would be constructed elsewhere in the San Diego area, with a resulting increase in environmental impacts from the siting and operation of additional power plants that likely would not use existing industrial and transmission infrastructure.

INTRODUCTION

This section considers potential alternatives to the construction and operation of the proposed CECP. The purpose of this section is to provide an analysis of a reasonable range of feasible alternatives that could substantially reduce or avoid any potentially significant adverse impacts of the proposed project while obtaining the basic project objectives pursuant to the California Environmental Quality Act (CEQA) (Cal. Code Regs., tit. 14, §15126.6; Cal. Code Regs., tit. 20, §1765). In this section staff identifies basic project objectives and the potentially significant impacts of the proposed project, and analyzes different technologies and alternative sites that may reduce or avoid significant impacts. Staff has also analyzed the impacts that may be created by locating the project at alternative sites.

The Energy Commission may only license facilities for which it has received applications. The applicant submitted an Application for Certification (AFC) to the Energy Commission on September 11, 2007, to build and operate a 558-megawatt (MW) gross combined cycle generating facility on a 23-acre site in the incorporated city of Carlsbad, California. Should this

analysis identify an alternative site preferable to that proposed by the applicant, licensing of that site would require that the applicant submit a new AFC, including revised engineering and environmental analyses. This new AFC would require a more rigorous analysis and could reveal environmental impacts; non-conformity with laws, ordinances, regulations, and standards; or potential mitigation requirements that were not identified during the more general alternatives analysis presented herein.

PROJECT DESCRIPTION AND SETTING

The CECP is being developed to meet regional electrical resource needs anticipated by the California Energy Commission for the San Diego region (CEC 2007). The CECP will contribute significant electricity energy and capacity to an identified "load pocket", as well as local and regional electrical transmission grid support in San Diego County and the greater Southern California region. The proposed project would connect its nominal 540 MWs of electricity to the existing Encina 138-kilovolt (kV) switchyard and to a proposed new 230-kV switchyard to be built on SDG&E's Canon substation property, located immediately south and adjacent to the EPS. Transmission interconnection would be comprised of an overhead line from CECP Unit 6 to the 138-kV switchyard and an underground/overhead cable from CECP Unit 7 to the proposed new 230-kV switchyard. Natural gas would be provided through a new 1,100-foot interconnection to an existing Southern California Gas Company high pressure natural gas line located adjacent to the CECP site. The existing natural gas pipeline currently fuels all EPS units. A summary of the additional features/facilities that would be developed as part of the proposed project is listed below.

- Ocean-water purification system and industrial wastewater discharge: An ocean-water purification system (reverse osmosis) is proposed as an alternative source of industrial water for CECP (proposed alternative to the use of reclaimed water). An alternative discharge industrial wastewater path through the existing EPS ocean-water discharge system is offered, in addition to the plan to discharge CECP industrial wastewater through the city's system. The ocean water purification system and industrial water discharge would be located within the EPS boundaries;
- Tank Demolition and Remediation: Demolition of EPS fuel oil tanks 5, 6, and 7 (i.e., EPS Tanks 5, 6, and 7);
- Retirement of existing EPS units: Upon the successful commercial operation of the new CECP generating units, the existing EPS Units 1, 2, and 3 would be retired, and the associated seawater needed for once-through-cooling would cease;
- New SDG&E Switchyard: Construction of a new SDG&E 230-kV switchyard which would be located on SDG&E property south of the CECP site on APN 210-010-42. The 230-kV electrical interconnection from CECP to the new SDG&E 230-kV switchyard would be via a combined underground and above ground cable; and
- Natural Gas Interconnection Pipeline: Natural Gas would be provided from the existing Southern California Gas Company (SoCalGas) transmission pipeline (Line TL 2009, "Rainbow line"), which is located immediately adjacent to the CECP site, on the west side parallel to the existing rail line via a 1,100 foot long interconnection pipeline.

The new CECP units would operate exclusively on natural gas, with no fuel oil emergency backup capability. The new CECP facility would be air-cooled, eliminating the daily need of large quantities of once-through cooling seawater. The minimal water necessary for CECP's industrial steam purposes is approximately 700,000 gallons per day, during peak generation. This water would be made available by purifying 4.32 million gallons of ocean water per day through an on-site desalination system (SR 2008h).

The 23-acre CECP site would be located within the 95-acre EPS property currently occupied by large above-ground storage tanks. The CECP site has a city of Carlsbad General Plan Land Use designation Public Utility ("U") and a zoning designation of Public Utility ("PU"). According to the city of Carlsbad Zoning Ordinance, this specific zoning designation allows for electrical generation and transmission facilities (COC 2009a). The CECP would be built immediately west of Interstate 5, east of the Atchison Topeka and Santa Fe Railroad corridor, south of the Agua Hedionda lagoon, and north of Canon Road in Carlsbad.

DETERMINING THE SCOPE OF THE ALTERNATIVES ANALYSIS

The purpose of staff's alternatives analysis is to identify potential significant impacts of the CECP project and then focus on alternatives that are capable of reducing or avoiding these impacts while meeting the basic project objectives.

To prepare the analysis of alternatives, staff used the methodology summarized below:

- Describe the basic objectives of the proposed project;
- Identify any potential significant environmental impacts of the proposed project;
- Identify and evaluate feasible alternatives, including alternative locations or sites, to determine whether such alternatives would avoid project impacts identified as significantly adverse, and determine whether such alternatives would result in impacts that are the same, less than, or greater than those of the proposed project;
- Identify and evaluate technology alternatives to the project that would avoid or mitigate impacts; and
- Evaluate the impacts of not constructing the project to determine whether the "no project" alternative is superior to the project, a CEQA requirement that the option of not building the project must be analyzed and compared against the proposed project.

Since alternatives must consider the underlying objectives of the proposed project, staff confined the geographic area for site alternatives to the city of Carlsbad. These location alternatives are generally but not entirely consistent with CECP's project objectives and siting criteria, including: proximity to the SDG&E Canon substation and switchyard; location in an area appropriate for industrial development and potentially compatible with city general plan and zoning ordinance; proximity to infrastructural demands, including transmission lines and natural gas and water pipelines; and the ability to have less-than-significant impacts on the environment with implementation of reasonable mitigation measures.

Alternative generation technologies, as discussed in this analysis, include alternative methods to generate electricity and are analyzed accordingly.

BASIC OBJECTIVES OF THE PROJECT

The CECP's primary objective is to provide a reliable source of electrical generation to an energy-dependent region of California. Staff has determined the project's basic objectives to include the following:

- Meets the expanding need for new, highly efficient, reliable electrical generating resources that are dispatchable by the CAISO, and are located in the "load pocket" of the San Diego region;
- Improves San Diego regional electrical system reliability through fast starting generating technology, creating a rapid responding resource for peak demand situations, and providing a dependable resource to backup intermittent renewable resources like wind generation and solar;

- Allows the retirement of existing EPS Units 1, 2, and 3, and assists in the retirement of the South Bay power plant and the eventual retirement of existing EPS Units 4 and 5;
- Modernize existing aging electrical generation infrastructure in north coastal San Diego County, which includes the retirement of aging once-through cooling (OTC) facilities. Retiring the use of OTC is an objective shared by the energy and environmental agencies in California, including the California Public Utilities Commission (CPUC), California Energy Commission (CEC), CAISO, and publicly owned utilities;
- Utilize existing infrastructure to accommodate replacement generation and reduce environmental impacts and costs; and
- Meet the commercial qualifications for long-term power contract opportunities in southern California.

POTENTIAL SIGNIFICANT ENVIRONMENTAL IMPACTS

Staff's environmental analysis has identified no significant environmental impacts that would result as a consequence of the CECP. As discussed in the **Executive Summary** section, staff has identified no environmental impacts from the project that are significant in a CEQA context that cannot be mitigated to a less than significant level.

SITE ALTERNATIVES TO THE PROJECT

This section evaluates alternative sites identified, proposed, and discussed by parties to the proceeding over the past several years, including the applicant, the city of Carlsbad, interveners, and members of the public. Staff considered the following criteria in identifying potential alternative sites:

- Avoid or substantially lessen one or more of the potential significant effects of the proposed project;
- Satisfy the following criteria:
    - Site suitability, including size (at least 23 acres are required for the power plant equipment, plus laydown and construction set-aside space);
    - Availability of infrastructure—the site should be within a reasonable distance of transmission, natural gas and water supply networks, as well as immediately accessible by roads capable of transporting large equipment and supplies;
    - Location that precludes significant noise, public health, and/or visual impacts to adjacent residential areas or sensitive receptors (such as day care centers, nursing homes, schools, and public recreation areas);
    - Compliance with local land use and zoning designations;
    - Site control—the site should be void of any site encumbrances (physical or administrative obstructions to long-term use of property) and should be available for sale or long-term lease; and
    - Attainment of basic project objectives.

SITES IDENTIFIED AND SUGGESTED FOR EVALUATION

Participation by the city of Carlsbad in the pursuit of alternative CECP sites resulted in considerable public and media attention. The city of Carlsbad dedicated efforts in this regard due to the Carlsbad City Council's public opposition to the proposed CECP site (COC 2008o). In

response to the proposed project AFC alternate site analysis, on June 11, 2008 and November 18, 2008, the city notified staff that it had asked the applicant to identify any alternative location(s) for the CECP that they felt would meet the needs of both the applicant and city. The city took upon itself within these letters to identify, analyze, and submit to staff possible alternative sites for the CECP. Accordingly, staff analyzed these four non-coastal alternative site locations, as depicted in Alternatives Figure 1.

SITES NOT MEETING SCREENING CRITERIA

While staff was periodically kept abreast of several site location alternatives under consideration by the city of Carlsbad, the various proposals were nonetheless preliminary and inconclusive in nature, making it difficult to fully compare alternative site locations in this analysis. One such potential alternate location — unofficially suggested by the city of Carlsbad, but not specifically filed with the Energy Commission for review and evaluation by staff, the applicant, or other parties to the proceeding — did not meet basic criteria for evaluation of alternative sites. Furthermore, one additional site evaluated within the proposed project AFC was determined to be infeasible for further analysis (see below). The following provides the rationale for eliminating these two alternative sites from further consideration.

Carlsbad Safety Center Site

The Carlsbad Safety Center Alternative is a 25-acre site located at 2560 Orion Way in Carlsbad. The site is owned by the city of Carlsbad and is located adjacent to a natural gas line. The site is currently zoned for Open Space (non-habitat designation) and the city would have to rezone this site in order to meet the needs of CECP. Access to reclaimed water is adjacent to the property, and the street/right-of-way to the property is owned by the city. Residential homes are 2,000-feet from this site. At this alternative site, interconnection distances to SDG&E transmission lines would be significant: 9,000-feet to the 138 kV transmission line and 8,500-feet to the 230 kV transmission line, and potentially farther.

Based on site reconnaissance, staff observed that the development of this site would require the relocation of both existing recreational and public service (police and fire) facilities. Furthermore, access and circulation to the safety center facility would be significantly affected by this alternative, resulting in potentially significant impacts to police and fire response time.

On January 8, 2009, Federal Aviation Administration (FAA) Aviation Safety Inspector Mr. David Butterfield of the Western-Pacific Region Flight Standards Division presented a flight standards assessment workshop for the CECP Preliminary Staff Assessment (PSA) workshop held in Carlsbad. During his presentation, Mr. Butterfield presented June 2008 air traffic counts and overflight pattern data from within the McClellan-Palomar Airport Flight Activity Zone (see Alternatives Figure 2) and the city of Carlsbad area. Based on the FAA findings presented at the PSA workshop, due to the volume of low flying aircraft occurring over the Carlsbad Safety Center site, development at this alternative site poses the highest potential risk for aviation safety (FAA 2009a). As this alternative assumes an identical project would be constructed at this site, thermal plumes might pose significant aviation impacts due to the high volume of low-flying aircraft over the site and the inability for mitigating this impact. A description of thermal plume impacts is provided in the **Transportation and Traffic** section.

Based on potential for significant unmitigable aviation impacts coupled with potentially significant land use compatibility impacts and the lack of nearby associated electric infrastructure (transmission lines) development concerns, this alternative does not meet staff's screening criteria, and is thus eliminated from further consideration.

Encina Wastewater Authority Site

In the AFC, the applicant evaluated whether there are other sites for the CECP that could

potentially attain most of the basic project objectives (CECP 2007a, AFC §6.4.2). The AFC evaluation was supplemented by the applicant's April 2008 filing entitled, Offsite Alternative Analysis (CECP 2008a). The AFC identified only one site that might meet the criteria of Public Utility (PU) designation in the General Plan: 28 acres owned by the Encina Wastewater Authority (EWA) two miles south of the EPS. However, the applicant surmised that this site does not meet its screening criteria and withdrew it from consideration. After review of the site, staff discovered that there are three lots owned by EWA that total 25.23 acres (APN 211-030-6 and 8 and 214-010-95). Although the site is zoned PU, all 25.23 acres are fully developed with the existing Encina Wastewater Treatment Plant and the Carlsbad Water Reclamation Plant. Therefore, because the EWA site lacks sufficient acreage, this alternative does not meet staff's screening criteria, and is thus eliminated from further consideration.

ALTERNATIVE SITES EVALUATED

Two proposals that were evaluated by the applicant in its April 2008 Offsite Alternatives Analysis (CECP 2008a), and therefore available and subject to review by all parties, are the sites referred to as Maerkle and Carlsbad Oaks North. Carlsbad Oaks North is the alternative location preferred by the city of Carlsbad, as indicated in its November 18, 2008 filing with the Energy Commission, "Proposed Alternative Project Locations" (COC 2008o). In addition, the CATO site proposed by the city of Carlsbad provided sufficient acreage and was analyzed by staff along with the Maerkle and Carlsbad Oaks North sites.

Maerkle Alternative

The Maerkle site is a 55-acre greenfield site (i.e., not developed with existing industrial uses) located at the northern border of the city of Carlsbad approximately 500-feet south of residential neighborhoods that are located within the bordering city of Oceanside. The city of Carlsbad Municipal Water District owns the site, which is zoned Open Space (non-habitat designation). The city owns the street/right-of-way to the property; however no roadways currently exist within the site. Distance from the site to reclaimed water is 5,700 feet, and distance to transmission line connections is over 2,000 feet to 138 kV lines and 16,000 feet to a 230 kV transmission line, and potentially longer (4.5-miles to the SDG&E Cannon substation). The site is approximately 2,800 feet from a natural gas line.

Short-Term and Temporary Construction-Related Impacts

Construction of the Maerkle alternative would result in greater temporary construction-related air quality emissions compared to that generated by CECP construction due to the significant grading increase, the overall amount of construction activities required, and associated longer schedule required to build the longer transmission line and recycled water connections (as discussed below). Furthermore, due to the site's proximate location to residential development, there would be a significant increase in temporary noise and traffic impacts during construction when compared to construction of the CECP. The site is currently vacant open space that would require biological screening to determine if any sensitive species are present. As the routes of the required transmission line right-of-way (ROW) are unknown, an increase in potentially significant temporary impacts (noise, land use compatibility, and biological resources) could occur when compared to construction of the CECP, as required ROW routes could be located in close proximity to residential neighborhoods and biological resources.

Long-Term and Operational-Related Impacts

Due to the immediate proximate location of neighboring residential receptors to the site, staff observed that visual and noise impacts to these receptors would be significant and unavoidable. The site is currently greenfield undeveloped open space that generates no ambient man-made noise. Therefore, operation of a power plant at this site would result in a significant permanent

noise increase to nearby residential receptors over existing conditions. Furthermore, required stacks and large-scale development required of a power plant would significantly impact southern views from existing city of Oceanside residential receptors that currently have unobstructed views of open space land. As the CECP site contains the existing EPS and the associated stack, the development of the Maerkle site would have significantly increased visual impacts to viewers as compared to the CECP. Therefore, both operational noise and visual impacts would be greater for this alternative when compared to development of the CECP.

As noted above, because the site is not zoned for utilities or industrial development such as a power plant, the city would need to rezone this property to meet the needs of the project. Therefore, this site would generate an increase in land use compatibility impacts when compared to the CECP, which is currently zoned for and contains a power plant. Furthermore, the site would result in the permanent conversion of greenfield land to a heavy industrial development, resulting in an additional land use impact not associated with the CECP.

Staff also observed that access to the site would be limited through residential neighborhoods within the city of Oceanside, thus resulting in a potential increase in traffic and safety impacts along residential streets as compared to the CECP. This fact prompted a number of residents from Oceanside to contact the Energy Commission in opposition to this site's development. Staff observed difficulty in creating a permanent access route to this site that would not be routed through residential neighborhoods. Therefore, pedestrian safety impacts associated with this alternative would be increased when compared to development of the CECP.

The FAA Feasibility Study (FAA 2008a) addressed allowable stack height requirements within the Maerkle site area, but additional information and analysis would be necessary in regard to thermal plume impacts. June 2008 air traffic counts and overflight pattern data provided by the FAA at the PSA workshop indicated a similar volume of air traffic over the Maerkle site as compared to the CECP site. However, overflight data did indicate an increase in the number of low flying aircraft occurring over the site as compared to the CECP. Due to the elevated topography of the Maerkle site as compared to the CECP site, a potential increase in aviation safety impacts due to thermal plumes is possible when compared to development of the CECP and would warrant further investigation.

Distance from the site to reclaimed water is 5,700 feet, and distance to a 138-kV transmission line connection is over 2,000 feet, and it is at least 16,000 feet to a 230 kV transmission line (this distance is potentially 4.5 miles if the line is required to go to the Canon Substation, as may be required by the CAISO). The site is approximately 2,800 feet from a natural gas line. Alternatives Table 1 provides a comparative analysis of the Maerkle site and its linear distance to utilities as compared to the proposed CECP. The necessary construction of a transmission interconnection would result in a significant increase in potential environmental impacts (i.e., visual, noise, biological resources, land use) over the CECP dependant on the routing available. It is likely that the project applicant would need to obtain easement rights (or franchise rights) within this area to accommodate transmission line rights-of-way (of which the availability is unknown) to connect to the SDG&E electric system. It is likely that this alternative would require land use and zoning designation changes within the required rights-of-way to "Transportation Corridor" by the Carlsbad City Council in order to accommodate the required transmission line route, per the city of Carlsbad summary of zoning requirements (COC 2009a). As the CECP would be located on the same property as the existing EPS, and all its associated infrastructure would be on-site at the existing EPS, this alternative would result in a significant increase in potential environmental impacts from development of the required utility connections when compared to development of the CECP.

Summary

Due to the site's immediate location to residential development, the required increase in

construction of the site and linear infrastructure, the visual impacts associated with the elevated topography of the site and required project stacks, the required conversion of a greenfield site to brownfield development, the necessary change in zoning designations, the uncertainty on aviation safety, and the need for significant construction and routing of required utility connections, this alternative would result in an increase in potential environmental impacts when compared to the CECP. Furthermore, development of this site could potentially involve considerable time for securing required utility ROWs. Therefore, staff concludes that the Maerkle site fails to substantially lessen environment impacts when compared to the proposed CECP, and may actually have impacts that are worse that could make the site infeasible.

Carlsbad Oaks North Alternative

The Carlsbad Oaks North site is a 414-acre (divisible) site on Whiptail Loop that is privately owned and currently for sale. The site is zoned Planned Industrial. The nearest residential homes are located 2,500 feet east of the site. The site is located 4,800 feet from a natural gas line, while reclaimed water is adjacent to the property. However, the distance to power lines is considerable, at 6,000-feet to a 138 kV transmission line and 12,500 feet to a 230 kV transmission line, and potentially farther (to the Canon Substation).

Short-Term and Temporary Construction-Related Impacts

Construction of the Oaks North alternative would result in an increase in temporary construction-related air quality emissions over that generated by CECP construction due to the overall amount of construction activities required and associated longer schedule required to build the longer transmission line connections (as discussed below). Furthermore, as the routes of the required transmission line ROW are unknown, an increase in potentially significant temporary impacts (noise, land use compatibility, and biological resources) could occur when compared to construction of the CECP, as ROWs required to interconnect to the SDG&E electric system could be located in close proximity to more dense commercial development in the city, sensitive receptors, and biological resources.

Long-Term and Operational-Related Impacts

The Carlsbad Oaks North site is a planned corporate business park allowing for office, corporate headquarters, light manufacturing, research/development, and open space uses (TechBuilt Company 2009). As the majority of the site is still available for purchase, staff observed that lot subdivision, level pad grading, and basic utility connections have been installed. While the site is zoned for Planned Industrial uses, those marketed for development within the Oaks North site (including 220-acres of planned open space) would not necessarily make Oaks North a brownfield site, as the planned uses would be more business oriented than heavy industrial uses such as a power plant. Therefore, development of the site with this alternative could result in a permanent conversion of a currently undeveloped site with heavy industrial uses that would contribute to a potential shift in the general land uses of the area. Furthermore, the Oaks North site zoning designation would have to be changed from Planned Industrial to Public Utility by the city of Carlsbad City Council in order to accommodate the CECP, per the city of Carlsbad summary of zoning requirements (COC 2009a). Therefore, developing a power plant within the Oaks North site could result in increased land incompatibility and conversion impacts as compared to the CECP, which would develop a power plant within an existing industrial site currently occupying a power plant.

Due to the elevated topography of both the Oaks North site and the presence of residential receptors located within hillside developments north and east of the site, receptors located within these areas currently have unobstructed views through the Oaks North viewshed. The

construction of required stacks (of similar height to those proposed as part of the CECP) at this site would likely result in a significant visual impact to those nearby residential receptors. While zoning of the Oaks North site allows for industrial use, and it is possible that future development could contain visually obstructing structures, staff believes that use of this site would result in increased impact to viewers, including residential viewers, compared to siting CECP at the EPS site. This is because the CECP site already contains the existing EPS and the associated stack, with no current plan for removal of such infrastructure, and only incremental additional visual features form the proposed project.

While the FAA's Feasibility Study (FAA 2008a) indicates preliminary approval of a proposed stack height within the Oaks North site area, thermal plume aviation impact concerns remain, even though the site is located outside the Palomar-McClellan Airport Flight Activity Zone (see Alternatives Figure 2). June 2008 air traffic counts and overflight pattern data provided by the FAA at the PSA workshop indicated a similar volume of air traffic over the Oaks North site as the CECP site. However, due to the elevated topography of the Oaks North site when compared to the CECP, a potential increased risk of aviation safety impacts due to thermal plumes could occur when compared to development of the CECP and would warrant further investigation.

The site is located 4,800 feet from a natural gas line and reclaimed water is adjacent to the property. However, the distance to power lines is considerable, at 6,000-feet to a 138 kV transmission line and 12,500 feet to a 230 kV transmission line, and potentially farther (absent a System Impact Study from CAISO, transmission could be required to the Canon Substation approximately four-miles away). Alternatives Table 1 provides a comparative analysis of the Oaks North site and its linear distance to utilities as compared to the proposed CECP. The necessary construction of transmission connections would result in a significant increase in potential environmental impacts (visual, noise, biological resources, land use) over the CECP dependant on the routing available. It is likely that the project applicant would need to obtain large easement rights (or franchise rights) within this area to accommodate a transmission line, of which the availability is unknown. It is also likely that transmission line ROW associated with this alternative may require zoning designation changes within "Transportation Corridor" by the Carlsbad City Council in order to accommodate the required transmission line route, per the city of Carlsbad summary of zoning requirements (COC 2009a). By comparison, the CECP would be located on the existing EPS and all of its associated infrastructure would be on-site. Thus, the Carlsbad Oaks North alternative would result in a significant increase in potential environmental impacts from required utility connections when compared to development of the proposed CECP.

Summary

Due to the visual impacts associated with the elevated topography of the site and required project stacks, the possible conversion of the site with heavy industrial development, the necessary change in zoning designations, the uncertainty on aviation safety, and the need for significant construction and routing of required utility connections, this alternative would result in an increase in potential environmental impacts when compared to the CECP. Furthermore, development of this site could potentially involve considerable time in terms of securing the site and required utility ROWs. Therefore, staff concludes that the Oaks North site fails to substantially lessen environment impacts when compared to the proposed CECP, and may have impacts that are worse or render the alternative site infeasible.

CATO Alternative

The CATO site is a 73-acre site (greenfield) property that is privately owned and currently for sale, and is zoned Open Space (non-habitat designation). Due to the rural location of the CATO site, staff observed that vehicular access to the site is currently limited, with significant roadway

improvements needed for access to allow for project construction and operation. The site is located approximately 300 feet from the nearest residential receptor, and is near a large amount of residential development located immediately north. There would be long distances between the site and needed infrastructure (reclaimed water is 3,500 feet away; 138 kV and 230 kV transmission lines are 3,500 feet and 12,000-feet away, respectively; and absent a System Impact Study from CAISO, transmission could be nearly four-miles away, back to the SDG&E Canon substation). The site is located within 500 feet of a 30-inch natural gas line.

Short-Term and Temporary Construction-Related Impacts

Due to the existing topography of the site, substantial grading would be required to create a level surface area for the project. In addition, due to the sites limited access, substantial access road construction would be required. Therefore, construction of the CATO alternative would result in an increase in temporary construction-related air quality emissions over that generated by CECP construction due to the significant grading increase, the overall amount of construction activities required, and associated longer schedule required to build the longer transmission line and recycled water connections (as discussed below). Both the access roadways leading to the site and the site itself are located in close proximity to residential development, thus resulting in a significant increase in temporary noise and traffic impacts during construction as compared to the CECP project. The site is currently vacant open space that would require biological screening to determine if any sensitive species are contained within and would be disturbed.

Long-Term and Operational-Related Impacts

Due to the immediate proximate location of neighboring residential receptors to both the site and access roads requiring major upgrades to accommodate the site, staff observed that both visual and noise impacts to these receptors would be significant. The site is currently greenfield undeveloped open space that generates no ambient man-made noise. Therefore, operation of a power plant at this site would result in a significant permanent noise increase to nearby residential receptors over existing conditions, resulting from both on-site activities and vehicles accessing the site. Furthermore, required stacks and large-scale development required of a power plant would significantly impact southern views from northern receptors that currently have unobstructed views of open space land and viewsheds through the site. As the CECP site contains the existing EPS and associated stacks, the development of the CATO site would have significantly increased visual impacts to receptors as compared to the CECP. Therefore, staff finds that both operational noise and visual impacts would be greater for this alternative than compared to the CECP.

While the city indicated the FAA's Feasibility Study shows preliminary approval of a 139-foot stack height (FAA 2008a) within this site, staff has not verified this approval, nor has that approval addressed staff's concern beyond mere stack height, namely, the impacts caused by thermal plumes. June 2008 air traffic counts and overflight pattern data provided by the FAA at the PSA workshop indicated a similar volume of air traffic over the CATO site as compared to the CECP site. However, the data did indicate an increase in low flying aircraft occurring over the site as compared to the CECP site. Due to the elevated topography of the CATO site as compared to the CECP, a greater risk for significant aviation safety impacts due to thermal plumes than that of the CECP is possible and would warrant further investigation.

The CATO site zoning designation would have to be changed by the Carlsbad City Council in order to accommodate the CECP. Staff also observed agricultural use on the site that would require further examination to determine any potential agricultural land conversion impacts. Furthermore, the site would result in the permanent conversion of greenfield land to brownfield development, thus increasing land use impacts over the CECP.

There would be long distances between the site and needed infrastructure (reclaimed water is

3,500 feet away; 138 kV and 230 kV transmission lines are 3,500 feet and 12,000-feet away, respectively; and depending on the result of a System Impact Study from CAISO, transmission could be nearly four-miles away to the SDG&E Canon substation). The site is however located in close proximity to a 30-inch natural gas line. Alternatives Table 1 provides a comparative analysis of the CATO site and its linear distance to utilities as compared to the proposed CECP. It is likely that the project applicant would need to obtain large easement rights (or franchise rights) within this area to accommodate the necessary transmission line interconnection. The availability of such ROWs is unknown at this time. It is also likely that this alternative would require zoning designation changes within the required transmission line ROW to "Transportation Corridor" by the Carlsbad City Council in order to accommodate the required transmission line route. The CECP would be located on the same property as the existing EPS, and all of its associated infrastructure would be on-site at the existing EPS. Therefore, staff finds this alternative would result in an increase in potential environmental impacts (visual, noise, biological resources, land use) from the necessary construction of transmission line interconnection when compared to development of the proposed CECP.

Summary

Due to the sites immediate adjacency to residential development, the required increase in construction of the access roads, the visual impacts associated with the elevated topography of the site and required project stacks, the required conversion of a greenfield site to brownfield development, the necessary change in zoning designations, the uncertainty on aviation safety, and the need for significant construction and routing of required utility connections, this alternative would result in an increase in environmental impacts when compared to the CECP. Furthermore, development of this site could potentially involve considerable time in terms of securing the site and required utility ROW resulting in time delays involved in project licensing. Therefore, staff concludes that the CATO site fails to substantially lessen environmental impacts when compared to the proposed CECP, and may actually have impacts that are worse and render the alternative site infeasible.

Alternatives Table 1 - Comparison of Approximate Interconnection Distances to Linear Facilities (and Residences), in feet

	CECP Site[1]	Maerkle Alternative[2]	Carlsbad Oaks North Alternative[2]	CATO Alternative[2]
Distance to 138-kV Power Line	On-Site	2,000+	6,000+	5,300+
Distance to 230-kV Power Line	150	16,000+	14,000+	12,000+
Natural Gas Line	1,100	2,800	4,800	500
Distance to Reclaimed Water	N/A (desal)	5,700	150	3,500
Nearest Residential Units	1,700	1,500	2,500	2,000

Note: [1] Linear distances provided by AFC PEAR (SR 2008h) supplement and independent research;

[2] linear distances provided by the City of Carlsbad via communications in 2008 and 2009

Summary of Alternatives Evaluated

Staff appreciates the extensive involvement by the city of Carlsbad in providing alternative proposals and suggestions. The city's involvement with the alternatives to the CECP (and the applicant's response and own alternatives analysis) gave this issue a high degree of public discussion. The alternatives issue was also covered extensively in the local print media. Staff has welcomed the involvement of all parties in discussing alternatives, as well as the press coverage and healthy public participation.

As the EPS site contains an existing power plant development and related thermal stack, the direct project site visual impacts resulting from development of the CECP at this site would be significantly less than developing the CECP at any alternative location without adjacent heavy industrial land uses. Furthermore, no alternative assumes the shutdown and removal of existing EPS facilities or existing plume stack, thus development of the CECP at any alternative site location would contribute to the overall amount of heavy industrial development viewed within the city.

After reviewing all the public input provided regarding the alternatives, and based on the analysis presented above, staff provides a comparative analysis of impacts in Alternatives **Table 2**. As shown and discussed in the analysis presented above, the alternatives do not achieve the CEQA requirement that the alternative avoid or substantially lessen environmental impacts when compared to the proposed CECP. Therefore, staff concludes that the proposed CECP is the environmentally superior alternative.

Alternatives Table 2 - Comparison of Impacts to the Proposed CECP

Issue Area	Maerkle Alternative	Carlsbad Oaks North Alternative	Cato Alternative
Air Quality/Public Health	**Greater than proposed site.** Site would require substantial increase in construction activities on-site as well as from required utility connections. Site is closer to residential receptors.	**Greater than proposed site.** Site would require substantial increase in construction activities due to required transmission line connections.	**Greater than proposed site.** Site would require substantial increase in construction activities on-site as well as from required utility connections. Site is closer to residential receptors.
Land Use/Site Control	**Greater than proposed site.** Nearest residential receptor is 500-feet. Site would require rezoning to accommodate project and would require proper zoning and ROW acquisition for utility connections. Site is closer to residential receptors.	**Greater than proposed site.** Nearest residential receptor is 2,500-feet. Site would require rezoning to accommodate project and would require proper zoning and ROW acquisition for utility connections.	**Greater than proposed site.** Nearest residential receptor is 1,100-feet. Site would require rezoning to accommodate project and would require proper zoning and ROW acquisition for utility connections. Site is closer to residential receptors.

Issue Area	Maerkle Alternative	Carlsbad Oaks North Alternative	Cato Alternative
Biological Resources	**Greater than proposed site.** Site is currently open space and would require substantial land disturbance from both project and required utility ROW construction.	**Greater than proposed site.** Would require land disturbance from required transmission line ROW construction.	**Greater than proposed site.** Site is currently open space and would require substantial land disturbance from both project and required utility ROW construction.
Traffic and Transportation	**Greater than proposed site.** Construction and operation would route traffic through residential streets. Possible increase in aviation impacts from thermal plumes due to elevated topography of the site.	**Similar to proposed site.** In the absence of a plume analysis, it cannot be accurately determined at this time any possible increase in aviation impacts from thermal plumes would occur. However, due to the elevated topography of the site, an increase in thermal plume impacts that cannot be mitigated is possible at this site.	**Greater than proposed site.** Construction and operation would route traffic through residential streets. Substantial access road construction would be required. Possible increase in aviation impacts from thermal plumes due to elevated topography of the site.
Noise	**Greater than proposed site.** Site is closer to residential receptors. Site would require substantial increase in construction activities on-site as well as from required utility connections.	**Greater than proposed site.** Site would require substantial increase in construction activities from required utility connections that could impact receptors due to unknown ROW route.	**Greater than proposed site.** Site is closer to residential receptors. Site would require substantial increase in construction activities on-site as well as from required utility connections.
Waste Management	**Similar to proposed site.** Increased construction activities may generate slightly more waste, however once operational it is assumed that similar waste would be generated.	**Similar to proposed site.** Increased construction activities may generate slightly more waste, however once operational it is assumed that similar waste would be generated.	**Similar to proposed site.** Increased construction activities may generate slightly more waste, however once operational it is assumed that similar waste would be generated.

Issue Area	Maerkle Alternative	Carlsbad Oaks North Alternative	Cato Alternative
Water Resources (construction)	**Greater than proposed site.** Site would require substantial increase in necessary water infrastructure to accommodate project.	**Similar to proposed site.** Reclaimed water available on-site.	**Greater than proposed site.** Site would require substantial increase in necessary water infrastructure to accommodate project.
Visual Resources	**Greater than proposed site.** Site is closer to residential receptors and is currently open space. Due to topography of the site, stacks would be a new prominent visual impact.	**Greater than proposed site.** Site is closer to residential receptors. Due to topography of the site, stacks would be a new prominent visual impact.	**Greater than proposed site.** Site is closer to residential receptors and is currently open space. Due to topography of the site, stacks would be a new prominent visual impact.
Transmission Line Construction	**Greater than proposed site.** Site would require substantial increase in construction activities from required utility connections.	**Greater than proposed site.** Site would require substantial increase in construction activities from required transmission line connections.	**Greater than proposed site.** Site would require substantial increase in construction activities from required utility connections.
Worker Safety and Fire Protection	**Similar to proposed site.** Once operational it is assumed that identically designed power plants would occur. This conclusion assumes required new transmission line routes include adequate ROW for brush clearance.	**Similar to proposed site.** Once operational it is assumed that identically designed power plants would occur. This conclusion assumes required new transmission line routes include adequate ROW for brush clearance.	**Similar to proposed site.** Once operational it is assumed that identically designed power plants would occur. This conclusion assumes required new transmission line routes include adequate ROW for brush clearance.

Note: shaded cells identify impacts greater than the CECP.

GENERATION TECHNOLOGY ALTERNATIVES

CONSERVATION AND DEMAND-SIDE MANAGEMENT

One alternative way to meet California's electricity demand with new generation is to reduce the demand for electricity. Such "demand side" measures include programs that increase energy efficiency, reduce electricity use, or shift electricity use away from "peak" hours of demand.

In California there is a considerable array of demand-side programs. At the federal level, the Department of Energy adopted national standards for appliance efficiency for most appliances and building standards to reduce the use of energy in federal buildings and at military bases.

At the state level, the Energy Commission adopted comprehensive energy efficiency standards for most buildings, appliance standards for specific items not subject to federal appliance standards, and load management standards. These building and appliance standards are generally considered the most stringent in the nation. The Energy Commission also provides grants for energy efficiency development through the Public Interest Energy Research (PIER) program.

The CPUC, along with the Energy Commission, oversees investor-owned utility demand-side management programs financed by the utilities and their ratepayers. At the local level, many municipal utilities administer demand-side management and energy conservation programs. These include subsidies for the replacement of older appliances through rebates, building weatherization programs, and peak load management programs. In addition, many local governments have adopted building standards that exceed the state standards for building efficiency or have, by ordinance, set retrofit energy efficiency requirements for older buildings. New buildings may combine the need for heat and power through a single fuel source, or a common source that may supply heating and/or heating and cooling to a number of adjacent buildings, thereby increasing overall efficiency.

Even with this great variety of federal, state, and local demand-side management programs, the state's electricity use is still increasing as a result of population growth and business expansion. Current demand-side programs alone are not sufficient to satisfy future electricity needs, nor is it likely that even much more aggressive demand-side programs could accomplish this at the economic and population growth rates that are projected for the state. Therefore, although it is likely that federal, state, and local demand-side programs will receive even greater emphasis in the future, both new generation and new transmission facilities will be needed in the immediate future and beyond in order to maintain adequate supplies.

In its decisions approving long-term procurement plans submitted biennially by the state's investor-owned utilities (e.g., D.07-12-052, December 20, 2007), the CPUC imposes the loading order established in the state's Energy Action Plan upon the utilities. This takes the form of requiring that the utilities meet energy efficiency and demand-side management targets established by the Commission prior to procuring fossil resources. In authorizing the utilities to procure sufficient new generation capacity on behalf of all service area customers to meet system and local reliability needs, the CPUC also assumes that these targets will be met. As such, the amount of new fossil capacity deemed necessary to retire the aging Encina power plant assumes that SDG&E will satisfy requirements for the procuring energy efficiency and establishing demand-side management programs that are derived from state policy goals.

RENEWABLE RESOURCES

SDG&E is planning to connect to the proposed Stirling Energy System Solar Two Project (08-AFC-5) and other renewable energy sources in the Imperial Valley through the Sunrise Powerlink Project, a transmission line project that was approved by the CPUC and the United States Bureau of Land Management in January 2009. The United States Department of Agriculture Forest Service must still approve the project.

Staff compared various alternative technologies with the proposed CECP. Technologies examined were those principal electricity generation technologies that do not burn fossil fuels such as natural gas: solar, wind, and biomass. There are no geothermal resources in the project vicinity, making this technology an infeasible alternative to the CECP. Both solar and wind generation can be credited with an absence or reduction in air pollutant emissions and need for related controls. In the case of biomass, however, emissions can be substantially greater.

Solar and wind resources require large land areas in order to generate electricity. Specifically, central receiver solar thermal projects require approximately five acres per MW, or roughly 200 times the amount of land area needed for the proposed CECP site and linear facilities. Parabolic trough solar thermal technology requires similar acreage per MW. Photovoltaic (PV) arrays mounted on buildings generally require about 4 acres per MW, and wind generation generally requires about 4.5 acres per MW. Accordingly, the need for extensive acreage would add to the complexities of local discretionary actions for land use modifications and likely result in significant land disruption and conversion impacts.

While there would not be visible plumes associated with solar and wind energy projects, other impacts of the large-scale solar arrays and windfarm generators must be considered, since many of these power generation sources currently under review within the San Diego and Imperial County regions are proposed to be sited on publicly-owned, open space, desert lands that have high scenic, recreational, and biologic values. SDG&E is currently pursuing biomass generation, particularly at landfills in the region. While these biomass facilities usually use wood chips or other sources from agricultural operations, several companies are developing technologies that would focus on “gasification combustion” to meet the low emission standards mandated by the state. However, traditional biomass plants are typically sized to generate less than 20 MW, which is considerably less than the capacity of the proposed CECP. A traditional biomass facility would require significantly more land than needed for the CECP and several hundred acres could be required for the feedstock.

Furthermore, alternative electricity generation that is intermittent by nature (dependent on the sun or the wind) requires natural gas generation that is dispatchable for periods when the intermittent resource is unavailable. In areas where there is heavy “load” or demand for electricity, natural gas generation must be available for system reliability. Because alternative generation technologies may not be available on demand, and often may not be called on to support system reliability, they do not fulfill a critical objective of CECP: the ability to provide quick start capability to respond to unexpected changes in regional electricity demands.

While the technical potential for rooftop solar in the San Diego local reliability area is sufficient to meet all of the area’s peak energy needs – it is estimated to reach almost 4,700 MW by 2020 (Anders and Bialek 2006) – the market potential, as evidenced by estimates of capacity resulting from currently funded programs, is substantially less. The $3.35B Go Solar California campaign’s major components, the California Solar Initiative (CSI) and the New Solar Homes Partnership (NHSP), were expected to yield 180 MW and 35 MW of nameplate capacity, respectively, in the SDG&E Service area by 2016. Since the programs were initiated in January 2007, the CSI has resulted in 21 MW of installed residential capacity and another 16 MW of applications. The NHSP has resulted in less than one MW of installed capacity. The Energy Commission’s staff’s current estimate of the nameplate capacity from these programs in 2016 is 194 MW (CEC 2009a). As peak capacity value for rooftop solar in the San Diego area is 50 percent of nameplate capacity (Anders and Bialek 2006), these programs are estimated by staff to reduce peak loads in San Diego by 97 MW. While 2007 staff estimates of capacity from these programs were somewhat lower, they were embodied in the 2007 Integrated Energy Policy Report (IEPR) demand forecast and thus are accounted for in CAISO estimates of the capacity needed for local reliability in the San Diego area.

A second indicator of market potential for distribution-level solar is the proposed SDG&E Solar Project. As proposed in July, 2008, the project would hope to develop 52 MW (77 MW DC

equivalent) of 1 – 2 MW projects in open spaces by 2013, two-thirds of which would be utility-owned. Opposition to this project has led to a yet-to-be approved settlement, proposed in March, 2009, that would entail dividing the project into two phases; the first of which would be capped at 17 MW (26 MW DC equivalent) or $125 million, whichever comes first. The cost of individual components of the project will be capped at the per-kW cost of installations under the California Solar Initiative.

Jointly, the Go Solar California and San Diego Gas & Electric Solar Projects do not represent enough peak capacity to markedly reduce, much less obviate, the need for dispatchable capacity in the San Diego area to retire the existing units at EPS. Expansion of the Go Solar Initiative would require additional funding above current levels as it relies on subsidies to install capacity. The fact that it could only be expanded to do so with additional funding calls into question whether rooftop solar is indeed an alternative to the CECP. Clearly, the developer of the CECP could not realistically have chosen to finance and develop distribution-level solar projects in lieu of the CECP. The Legislature and regulatory agencies, notably the CPUC, have set targets and funding levels for preferred resources (energy efficiency, demand-side management programs, and renewable energy), and imposed these targets upon utilities and other load-serving entities under CPUC jurisdiction. Even after these programs yield their expected results and the broader targets for utility procurement of preferred resources are met, there will remain a need for new dispatchable generation in San Diego in order to allow the retirement of existing EPS Units 1, 2, and 3 and assist in the retirement of the South Bay power plant and the eventual retirement of existing EPS Units 4 and 5, while ensuring continually reliable service.

The cost of energy from rooftop PV is currently not on a par with that from the CECP. Levelized energy costs from a combined cycle are sensitive to assumptions about the natural gas price and the capacity factor at which the unit will be operated; Energy Commission staff, using a nominal gas price that escalates from just under $7/MMBtu in 2010 to $12/MMBtu in 2020 estimates a levelized cost of energy for an advanced combined cycle of $105 - $117/MW, depending on ownership (CEC 2009b). Based on the assumption that the installed cost of a rooftop solar unit is $8/W (it is currently slightly higher for 1-3 kW units in California);, using a 25% capacity factor and 6% cost of capital, and ignoring the tax incentives that subsidize installation, the resulting levelized cost of energy is roughly $300/MWh (Wiser, et al 2009).

It has been argued that the price of solar PV can be expected to fall in the future, leading to increased installation of rooftop PV in the San Diego basin. The CSI, however, ratchets down the incentives provided to participants over the ten-year life of the program. For example, the $/watt incentive for residential and commercial participants declines from $2.50 in the second of the program's ten steps to $0.20 in the final step. This will offset – to a greater or lesser extent – cost reductions arising from technological advance in the design and manufacture of solar PV, leaving the relevant cost – that faced by the consumer deciding whether or not to install a solar unit – perhaps unchanged. It should also be noted that a more enthusiastic adoption of solar PV over time is assumed by the CSI program designers: the amount of capacity assumed to result from the $0.20/watt incentive in the final step of the program is 350 MW across the state's three investor-own utilities, five times the 70 MW resulting from the $2.50/watt incentive in the second step. In sum, the projected impact of the CSI, which is considered in determining the need for new dispatchable generation capacity in the San Diego area, embodies the assumption that the costs of solar PV will fall and parties will more willingly install solar units as a result.

TECHNOLOGY ALTERNATIVES SUMMARY

Alternative generating technologies for CECP are considered in the AFC (CECP 2007a, AFC §6.6). Given the project objectives, location, air pollution control requirements, and the commercial availability of the above technologies, the AFC analysis indicates that only natural gas-burning technologies are feasible and meet the CECP critical project objectives as stated above. Staff agrees with this conclusion.

Looking outside the San Diego area, the development uncertainties and the potential for impacts at remote resource areas are significant constraints of renewable resources as a feasible alternative to the CECP. Furthermore, because alternative generation technologies may not be available on demand, they do not fulfill a critical objective of the CECP: to improve San Diego electrical system reliability through fast starting generating technology, creating a rapid responding resource for peak demand situations and providing a dependable resource to backup.

While these alternative technologies would continue to be pursued as a vital component of the electrical generation supply and implemented to the greatest extent feasible, they are not alternatives to having dispatchable gas-fired backup in the electrical load pocket to provide system reliability and integration of these renewable resources. Consequently, staff does not believe that geothermal, hydroelectric, solar, wind, or biomass technologies present feasible alternatives to the proposed project (580 MW) and do not meet the following two critical project objectives of the CECP:

- Meets the expanding need for new, highly efficient, reliable electrical generating resources that are dispatchable by the CAISO, and are located in the “load pocket” of the San Diego region; and
- Improves San Diego electrical system reliability through fast starting generating technology, creating a rapid responding resource for peak demand situations and providing a dependable resource to backup intermittent renewable resources like wind generation and solar.

THE “NO PROJECT” ALTERNATIVE

The “no project” alternative under CEQA assumes that the project is not constructed. In the CEQA analysis, the “no project” alternative is compared to the proposed project and determined to be superior, equivalent, or inferior to it. 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. § 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-action alternative provides a baseline against which the effects of the proposed action may be compared. In short, the site-specific and direct impacts associated with the CECP would not occur at this site if the project does not go forward. It is assumed for this analysis that current operations of the EPS are considered baseline conditions, and would likely continue to occur if the CECP was not implemented, as described below. However, absence of the proposed project may lead to other energy actions that are predictable.

If the proposed CECP were not built, certain environmental benefits from the new power plant would not be realized. For instance, all five EPS units would continue to operate “as is" into the foreseeable future, and retirement of the EPS circa 1950’s Units 1 through 3 would be indefinitely delayed. The result would be relatively inefficient electrical generation utilizing over 220 million gallons of ocean water per day for once-through cooling that would otherwise cease to occur. This once-through cooling feature of the old coastal facilities has been found to have high and adverse impacts on marine biota. CAISO has stated that California has a commitment in the shutdown of all older once-through cooling units (CA Assembly 2009). The existing EPS Units 1 through 3, which are based on boilers that must be kept in heated standby status, would consume more fuel and emit more air pollutants per megawatt-hour generated than that of the cleaner and more efficient new turbine CECP units and EPS Units 4 and 5 operating together. Although the identification of a definite No Project Alternative development scenario is not

possible, “No Project” would almost certainly result in efforts to find new sites for dispatchable gas-fired generation that would meet similar project objectives to those of the CECP – providing load pocket reliability and reducing OTC with ocean water. To meet such objectives, the new generation sites would have to be in the San Diego urban area. Any such new generation facility would likely have higher environmental impacts than CECP, particularly if built at a greenfield site.

SDG&E has to physically connect to renewable projects in order to get renewable power supply (RPS) credit for them. Currently, the CAISO has approved adding system capacity. This assumption is considered part of the No Project alternative baseline conditions, as well as those project identified in the June 9, 2009 SDG&E Request For Offer (RFO) (SDG&E 2009). Because of limited availability of repowering potential, like the EPS, such new generation resources (whether renewable or gas fired) would likely be greenfield sites, which generally have greater environmental and community impacts than brownfield redevelopment projects like the CECP. Potential environmental impacts from the No Project alternative would result in greater fuel consumption and air pollution because the CECP would not be brought into operation in a timely manner to displace production from the older, less efficient EPS that has higher polluting air emissions. Furthermore, the existing facilities/features on-site at the EPS allow the CECP to utilize the plant’s infrastructure, thereby avoiding offsite construction of linear facilities or other infrastructure.

Based on the above, the No Project alternative, while required for analysis by CEQA, does not meet the requirements of the CEQA Guidelines as being an alternative to the CECP “…which would feasibility attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives.” (14 CCR. 15126.6(a).) CECP will produce electricity for the SDG&E service area while consuming less fuel and discharging fewer air emissions for each energy unit generated when compared to other existing, older fossil fuel generation facilities. The No Project alternative would not the following two critical project objectives of the CECP:

- Meets the expanding need for new, highly efficient, reliable electrical generating resources that are dispatchable by the CAISO, and are located in the “load pocket” of the San Diego region; and
- Improves San Diego electrical system reliability through fast starting generating technology, creating a rapid responding resource for peak demand situations and providing a dependable resource to backup intermittent renewable resources like wind generation and solar.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Staff received comments and input from the city of Carlsbad regarding alternatives to the CECP prior to the publication of the PSA. Written public comments on the Alternatives section of the PSA from the public were limited to the city of Carlsbad and are summarized below based on the types of issues raised in the comments.

Comment: The city of Carlsbad believes that the PSA Alternatives section lacks sufficient analysis and insufficient comparison between provided alternatives and the proposed project in order to allow the decision makers to make informed decisions in regards to the proposed project in comparison to evaluated alternatives.

Response: On June 11, 2008 and November 18, 2008, the city of Carlsbad notified staff of several alternative locations for the CECP that they felt would meet the needs of both the applicant and city. The city took upon itself within these letters to identify, analyze, and submit to staff possible alternative sites for the CECP. The PSA evaluated all city of Carlsbad recommended alternative site locations.

During preparation of this FSA Alternatives section, staff began by reviewing the PSA alternatives section and all city of Carlsbad and applicant identified alternatives to the CECP. Staff then evaluated the screening criteria and methodology of those alternatives eliminated from further consideration and those carried forward for analysis and evaluation in this section. Staff conducted site visits on May 13, 2009 of each identified alternative site, taking into account field observations of potential environmental impacts and issues associated with each alternative site proposed for CECP construction. Upon review of all CECP alternatives data sources and field surveys, staff then further evaluated each CECP alternative in detail within the Alternatives FSA section. Upon the further analysis presented within this section, staff's conclusion that the proposed project would result in less environmental impacts than the analyzed alternatives remains unchanged from the PSA.

CEQA does provide direction regarding the methodology of alternatives comparison. Specifically, under CEQA the focus of alternatives analysis is on avoiding or minimizing the significant environmental impacts of the proposed project. In order to achieve this, when conducting alternatives analysis in accordance with CEQA, each alternative must be compared to the proposed project to determine whether the significant impacts of the proposed project are reduced or avoided completely with implementation of the alternative. Each project must be evaluated for the issues and impacts that are most important (i.e., significant environmental impacts); this will vary depending on the project type and the environmental setting. Staff has analyzed each proposed project alternative submitted to staff by the city of Carlsbad.

Comment: According to the city, the PSA Alternatives section provides an inadequate range of alternatives because the basic project objectives defined by CEC staff were narrowly defined.

Response: CEQA Guidelines Section 15124(b) states an EIR must contain: "A statement of the objectives sought by the proposed project. A clearly written statement of objectives will help the lead agency develop a reasonable range of alternatives to evaluate in the EIR and will aid the decision makers in preparing findings or a statement of overriding considerations, if necessary. The statement of objectives should include the underlying purpose of the project." The proposed project applicant provided detailed project objectives within the AFC. The project objectives identified within the PSA Alternatives section were a summarized version of those presented within the AFC. The project objectives are now provided in more detail within this section, but do not differ from those presented within the AFC. Consistent with the guidance provided by CEQA, staff conclusion is that the project objectives are structured broadly enough and are not prescriptive or narrowly defined as to limit the range of alternatives evaluated.

The alternative sites provided to staff by the city of Carlsbad are evaluated in detail within this section. CEQA Guidelines Section 15126.6(a) requires an evaluation of the comparative merits of "a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project."

Environmental analysis of each site alternative is provided in the **Site Alternatives to the Project** subsection, with a summary of environmental impacts of each analyzed alternative compared to the CECP provided in **Alternatives Table 2**. A comparative analysis of the predicted environmental impacts of each evaluated project alternative to that of the CECP is presented. Furthermore, the staff conclusion remains unchanged from that presented in the PSA. Specifically, the alternatives do not achieve the CEQA requirement that the alternative avoid or substantially lessen significant environmental impacts when compared to the proposed CECP.

Comment: The PSA Alternatives section lacks a meaningful discussion regarding the environmentally superior alternative.

Response: CEQA Guidelines Section 15126.6[e][2] states: "If the environmentally superior alternative is the "no project" alternative, the EIR shall also identify an environmentally superior

alternative among the other alternatives." It is likely that if the proposed CECP is not implemented at the existing EPS, then a similar power generation facility would need to be developed to meet the electricity needs of the San Diego region and the north county. Therefore, as discussed in the No Project Alternative subsection, the No Project alternative would likely result in development of new generating resources in San Diego to meet that need beyond planned projects by SDG&E. In the event the CECP were not constructed, all five EPS units would continue to operate "as is" into the foreseeable future. The clear result from the No Project alternative would be greater fuel consumption and air pollution from EPS's obsolete and inefficient units, as well as continued impacts to the marine environment caused by EPS reliance on OTC with ocean water. It is assumed that under the No Project Alternative, the EPS would continue to operate under existing conditions until additional projects similar to the CECP would be constructed elsewhere in the San Diego area. Building a new major power plant at an alternative site would increase environmental impacts, as San Diego would have an additional power plant.

Detailed environmental analysis of each site alternative is provided in the Site Alternatives to the Project subsection, with a summary of environmental impacts of each analyzed alternative compared to the CECP provided in **Alternatives Table 2**. As analyzed in this subsection, the alternatives do not achieve the CEQA requirement that the alternative substantially lessen environment impacts when compared to the proposed CECP. In accordance with CEQA Guidelines Section 15126.6[e][2], staff identifies the CECP as the environmentally superior alternative.

Comment: The PSA Alternatives section should have included analysis of an alternative intake design for the proposed project water supply. The city recommends this based on the following specific comments:

- The proposed use (electrical generation) is not coastal dependent.
- Location of the Facility at a non-coastal site would avoid not only impacts on marine organisms, but would avoid other impacts on coastal resources such as visual resources and public access.
- The desalination component of the CECP would result in withdrawals of seawater in excess of the regulatory thresholds of the Clean Water Act (CWA).
- Feasible alternatives to desalination exist.

Response: With regard to Coastal Act Consistency and Coastal Dependent Uses, please refer to the detailed discussion under the section entitled California Coastal Commission within the **Land Use** section. As stated in the **Land Use** section, staff concludes that the proposed CECP would be considered a coastal dependent use and is consistent with the Coastal Act.

As discussed in the **Biological Resources** and **Visual** sections, the proposed CECP would not result in significant unmitigable impacts on marine organisms or project-specific visual resources, respectively. Furthermore, as project alternatives do not assume closure of the EPS and development of the site with a non-power plant use, no alternative would reduce impacts on coastal resources such as visual resources and public access.

With regards to the desalination component of the CECP, the proposed project applicant is required to provide water for the project. As the applicant has not been able to secure the water supply through it negotiations with the city of Carlsbad, the project applicant has provided a solution to the required water to operate the proposed CECP. For a discussion regarding the proposed CECP desalination component's compliance with the CWA, please refer to the **Water Resources** section. However, the comment does not identify what "regulatory thresholds" (a complex statute with an even more complex regulatory infrastructure) it believes are exceeded, which makes it impossible to meaningfully respond to the comment.

With regards to feasible alternatives to desalination, in lieu of the City's decision to not supply the proposed CECP with adequate water supply, no alternatives to desalination exist for the proposed CECP site. Furthermore, as discussed earlier in the subsection entitled **Site Alternatives to the Project**, environmental impacts regarding required infrastructure interconnections at analyzed alternatives site locations would be far greater than those associated with the proposed CECP.

The FSA Alternatives section evaluates all alternative sites provided to staff by the city of Carlsbad. Staff concludes that all feasible alternatives to the site have been evaluated.

Comment: The PSA Alternatives section conclusion should be held pending analysis of the impacts of the CECP in conjunction with the I-5 widening project.

Response: The future Caltrans I-5 freeway widening project is included as a component of the cumulative project analysis for all sections of the PSA and FSA. Any impact to which the CECP project could contribute was considered and where required mitigation is presented to reduce impacts to a less than significant level. As discussed in the **Executive Summary** section, staff has identified no environmental impacts from the proposed project that are significant in a CEQA context that cannot be fully mitigated to a level that is less than significant. Furthermore, staff has identified no significant impacts associated with the proposed CECP deemed 'cumulatively considerable' in a CEQA context that could not be mitigated. As discussed earlier in the subsection entitled **Laws, Ordinances, Regulations, and Standards**, this alternatives analysis includes "feasibility of available site and facility alternatives to the applicant's proposal which substantially lessen the significant adverse impacts of the proposal on the environment" per CEQA (Cal. Code Regs., tit. 20, §1765). A comparison of analyzed alternatives impacts to the proposed CECP is presented above in Table 2.

CONCLUSIONS AND RECOMMENDATIONS

Staff's environmental analysis has not identified any environmental impacts from the CECP that are significant in a CEQA context and cannot be mitigated to a level that is less than significant.

Pursuant to CEQA Section 15126.6(a), alternatives to the proposed project that were evaluated would themselves have significant adverse impacts, some of which are so great that they might render the alternative infeasible. Site alternatives reviewed and analyzed by staff were found to pose similar or greater environmental impacts when compared to the CECP. Greater environmental impacts of the evaluated CECP site alternatives include the following:

- As the EPS site contains an existing power plant development and related thermal stack, the direct project site visual impacts would be significantly less as compared to developing the CECP at any undeveloped alternative location. Furthermore, due to the elevated topography of all alternative sites, visual prominence of power plant development within these sites would result in increased visual impacts when compared to the CECP, which located within the existing EPS;
- The CECP is better from an environmental standpoint when compared to all location alternatives because it uses existing industrial infrastructure. All of the proposed alternative sites would require significant infrastructure upgrades, including extensive transmission line development with its associated additional construction and operational impacts.
- All evaluated site alternatives pose potential land use impacts and implementation conflicts due to the unknown availability of required utility ROW.
- The alternatives sites, and likely the required transmission line ROWs, would require zoning changes, with two sites (including the city's preferred alternative site at Carlsbad Oaks North) raising potential problems associated with site control.

- All evaluated alternatives would result in the addition of another power plant and lengthy utility interconnections and ROWs to the city of Carlsbad landscape;
- Evaluated alternative sites would result in the conversion of sites not currently developed with industrial uses with heavy industrial development associated with a power plant. Staff determines that the use of the existing EPS site does not cause any significant impacts;
- Evaluated alternative sites pose potentially unmitigable aviation safety concerns requiring further study, or have been determined to pose significant aviation safety impacts.

Staff does not believe that alternative technologies (geothermal, solar, wind, biomass, hydroelectric) present feasible alternatives to the proposed project, due to the reliability needs of the load pocket for dispatchable generation. As discussed above, while these alternative technologies are being pursued as a vital component of the electrical generation supply and implemented to the greatest extent feasible, they are not alternatives to the proposed CECP. Therefore, alternative technologies would not achieve critical project objectives.

Under the No Project Alternative, the EPS would continue for the time being to operate under existing conditions until additional projects similar to the CECP would be constructed elsewhere in the San Diego area resulting in an increase to environmental impacts from the siting and operation of additional power plants. Furthermore, the No Project alternative would not achieve critical project objectives.

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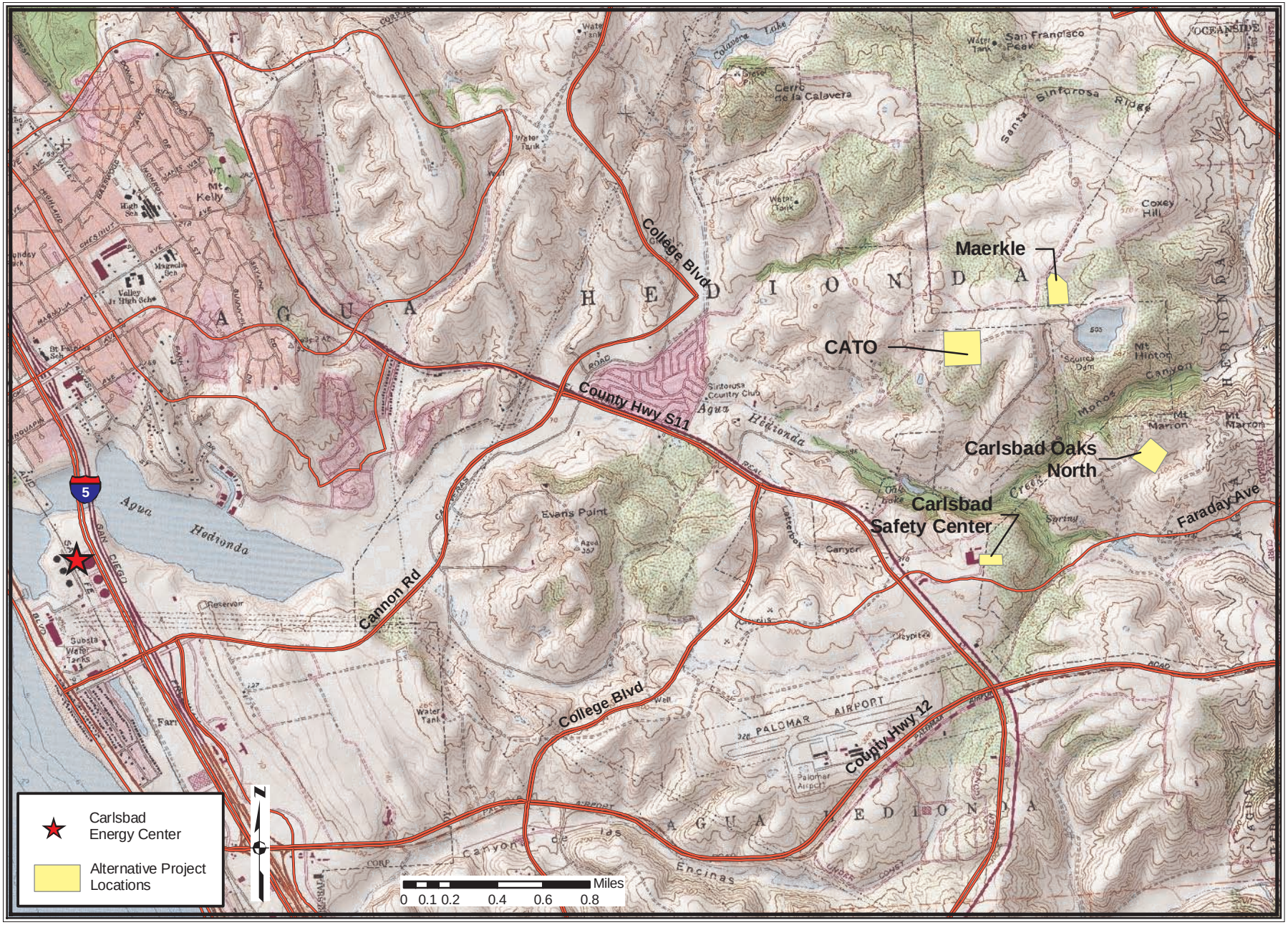
ALTERNATIVES - FIGURE 1

Carlsbad Energy Center Project - Alternative Project Locations



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

SOURCE: California Energy Commission Statewide Power Plant Maps 2008, Tele Atlas 2008, National Geographic Topo Maps, City of Carlsbad

GENERAL CONDITIONS
INCLUDING
COMPLIANCE MONITORING AND CLOSURE PLAN

Testimony of Angelique Juarez-Garcia

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:

Compliance Project Manager
(07-AFC-6C)
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 only those conditions that must be fulfilled before the start of construction shall be submitted by the project owner to the CPM. This matrix will be included with the project owner's first compliance submittal or prior to the first pre-construction meeting, whichever comes first. It will be 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. The amount of the fee for FY2007-2008 was $17,676. 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, that are compliant with laws, ordinances, regulations and standards and will not have significant environmental impacts 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.

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

CARLSBAD ENERGY CENTER PROJECT
PREPARATION TEAM

Executive Summary ..... Mike Monasmith

Introduction ..... Mike Monasmith

Project Description ..... Mike Monasmith

Air Quality..... William Walters, P.E.

Air Quality, GHG/Appendix..... Matt Layton, P.E.

Biological Resources..... Heather Blair

Cultural Resources..... Dorothy Torres and Beverly Bastian

Hazardous Materials Management..... Alvin J. Greenberg, Ph.D.

Land Use..... Negar Vahidi

Noise and Vibration..... Steve Baker

Public Health..... Alvin J. Greenberg, Ph.D.

Socioeconomic Resources ..... Marie McLean

Soils and Water Resources..... Richard Latteri/Paul Marshall

Traffic and Transportation ..... Scott DeBauche

Transmission Line Safety and Nuisance ..... Obed Odoemelam, Ph.D.

Visual Resources ..... William Kanemoto

Waste Management ..... Ellie Townsend-Hough

Worker Safety and Fire Protection ..... Alvin J. Greenberg, Ph.D.

Facility Design..... Erin Bright

Geology and Paleontology ..... Dal Hunter, Ph.D.

Power Plant Efficiency..... Shahab Khoshmashrab, P.E.

Power Plant Reliability..... Shahab Khoshmashrab, P.E.

Transmission System Engineering..... Ajoy Guha, P.E. and Mark Hesters

Alternatives ..... M. Monasmith, D Vidaver,N.Vahidi, S. DeBauche

General Conditions..... Angelique Juarez-Garcia

Project Assistant ..... Mineka Foggie

DECLARATION OF
Mike Monasmith

I, Mike Monasmith, 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.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Alternatives** for Carlsbad Energy Center 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: 11-4-09 Signed: Mike Monasmith

At: Sacramento, California

J. MIKE MONASMITH

6951 Pocket Road
Sacramento, CA 95831
916-412-8589

WORK HISTORY:

CALIFORNIA ENERGY COMMISSION, Sacramento
Siting, Transmission & Environmental Protection
Project Manager (2007 – present) --

CALIFORNIA ENERGY COMMISSION, Sacramento
Associate Public Adviser (2003 - 2007) --

CALIFORNIA RESOURCES AGENCY, Sacramento
Special Assistant to the Secretary, Policy & Planning (2003) --

CALIFORNIA DEMOCRATIC PARTY, Los Angeles
Director of Communications (2002) --
Coordinated Campaign, Gore/Lieberman Deputy Director (2000) --
Press Secretary, Coordinated Campaign, Californians for Feinstein (1994) --

U.S. CONGRESSWOMAN JANE HARMAN, Washington DC
Chief of Staff (1997 - 1998) --
Deputy Campaign Manager, Harman for Governor (1998) --
Political Director (2001) --

STATE CONTROLLER KATHLEEN CONNELL, Los Angeles
Chief Deputy Controller (2000 - 2001) --
Assistant Deputy Controller, External Affairs (1995 - 1996) --

VERIZON COMMUNICATIONS, Thousand Oaks, CA
Director, Los Angeles Government Affairs (1999 - 2000) --
Company's Registered Lobbyist for L.A. City Council / L.A. Board of Supervisors

U.S. DEPARTMENT OF THE INTERIOR, Washington DC
Special Assistant, Assistant Secretary for Water & Science, (1997) --

CLINTON/GORE '96 GENERAL COMMITTEE, Los Angeles
California Deputy State Director (Southern California Political Lead) (1996)
California Desk Co-Director, Presidential Inaugural Committee (1997)

SHEILA JAMES KUEHL FOR ASSEMBLY, Los Angeles
Campaign Manager / Candidate Spokesman (1994)

LOS ANGELES MAYOR RICHARD RIORDAN, Los Angeles
Deputy Press Secretary / Mayoral Assistant / Advance Co-Lead (1993-94)
Deputy Field Director / Deputy Director, Advance (**Riordan for Mayor** 1993)

DEMOCRATIC PARTY OF ORANGE COUNTY, Santa Ana
Office Manager / Chief Assistant, Chairman Adler (1991-92)

UNIVERSITY OF CALIFORNIA, Santa Cruz
Federal Work-study Program Manager, UCSC Student Employment (1990 – 1991)

ICICLE SEAFOODS, Inc., Seward, AK
Production Supervisor, Towa Eggroom (Summers, 1988-1991)

EDUCATION: **University of California at Santa Cruz** (College VIII)
B.A., Environmental Studies/Politics (Policy & Planning), 1990
(Thesis Honors: Resource Management, Tongass National Forest, Alaska)

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 assisted in the preparation of the **Traffic and Transportation** and **Visual Resources** staff testimony, for the **Carlsbad Energy Center Project** based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: October 26, 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

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
Matthew S Layton, P.E.

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 Supervising Mechanical Engineer.

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 **Air Quality, Appendix AIR-1, Greenhouse Gas Emissions** for the Carlsbad Energy Center 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: 11/4/09 Signed: Matthew S Layton

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
Heather Blair

I, Heather Blair declare as follows:

1. I am presently employed as a consultant to the California Energy Commission in the Environmental Protection Office of the Energy Facilities Siting Division.

2. I prepared staff testimony on Biological Resources for the Carlsbad Energy Center 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.

3. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

4. 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: 11/2/09 Signed: _____

At: Sacramento, California

Aspen
Environmental Group

HEATHER BLAIR

Environmental Scientist

ACADEMIC BACKGROUND

M.S., Conservation Biology, Sacramento State University, In Progress
B.S., Ecology, San Diego State University, 2004

PROFESSIONAL EXPERIENCE

Heather Blair is an Environmental Scientist experienced in a range of natural resource investigations and environmental impact analysis including botanical and wildlife research, inventory, and survey techniques; technical writing; and data analysis. She has experience preparing environmental documents pursuant to the California Environmental Quality Act (CEQA) and/or the National Environmental Policy Act (NEPA), and the Endangered Species Act (ESA), as well as other federal and state regulations.

Aspen Environmental Group — 2004 to present

Selected project experience at Aspen includes the following:

- **North Area ROW Maintenance Project**. Under contract to Western Area Power Administration (Western), Ms. Blair is currently providing project support to prepare an Environmental Assessment and Operation and Maintenance Program associated with the operation and maintenance procedures along Western's transmission line ROWs between Sacramento (Sutter/Yuba County line) and the Oregon border. This project also includes a detailed survey of the biological and cultural resources along 434 miles of North Area ROW, 342 miles of COTP ROW, and several hundred miles of access and maintenance roads. Ms. Blair is working closely with project management and resource specialists to coordinate and execute over 800 miles of surveys. She conducted wildlife inventory and surveyed portions of ROW for sensitive species and recorded habitat types, jurisdictional waters and infrastructure using a Trimble GeoXT GPS unit. Additionally, Ms. Blair was integrally involved in the management and development of the North Area O&M GIS database.
- **Categorical Exclusions for Routine Operation and Maintenance.** Under contract to Western, Aspen has prepared multiple CXs for routine maintenance activities along Western's CVP, PACI, and COTP transmission line ROWs and access roads. Aspen has developed a streamlined and highly efficient system to use the results and analysis for the North Area ROW Maintenance project to complete these documents.
- **Sacramento Area Voltage Support Project.** Under contract to Western, Aspen is preparing a SEIS and EIR for a double-circuit 230 kV circuit between Western's O'Banion/Sutter Power Plant and Elverta Substation/Natomas Substation. Ms. Blair assisted in the preparation of the land use section, which includes an analysis of potential impacts to recreation and agricultural resources. In addition she assisted in the development of the project description and alternatives and performed biological resource surveys of each alternative.
- **Sunrise Powerlink Transmission Line Project.** Under contract to the California Public Utilities Commission (CPUC), Aspen is preparing an EIR/EIS for a 150-mile proposed transmission line from Imperial Valley Substation, near El Centro, California, to Peñasquitos Substation in northwestern San Diego County. The Proposed Project would potentially deliver renewable resources from the Imperial Valley via a 500 kV transmission line to a new 500/230 kV substation, and from the new substation to

western San Diego via 230 kV overhead and underground transmission lines. Ms. Blair is analyzing the impacts to wilderness, recreation and agriculture. Additionally, she is writing the project description and coordinating the biological resources analysis.

- **Rare Plant Surveys for the East Branch Extension Pipeline Project.** Ms. Blair conducted rare plant surveys of the endangered Santa Ana River wooly star (*Eriastrum densifolium* ssp. *sanctorum*) and the state and federally endangered slender horned spine flower (*Dodecahema leptoceras*) in response to the proposed construction of a water pipeline through San Bernardino and Riverside Counties.

- **Least Tern Monitoring for the Montezuma Slough Tidal Wetlands Restoration Project**. Under contract to EcoBridges Environmental, Ms. Blair is monitoring the nesting success of three nesting colonies of the federally and State endangered least tern. This effort involves counting and mapping the nest sites and tern chicks once a week.

- **Hazardous Fuels and Vegetation Management for Angeles National Forest.** Under contract to the U.S. Forest Service, Ms. Blair conducted botanical and wildlife surveys at approximately 100 sites ranging from one to 2500 acres throughout the Angeles National Forest. Surveys included identification and mapping of potential habitat for listed species, and submittal of listed species occurrence information to the California Natural Diversity Database. She is currently writing 75 Biological Evaluations/Biological Assessments that assess the impacts of proposed fuel management practices throughout the forest.

- **Atlantic–Del Mar Reinforcement Project Mitigated Negative Declaration**. Ms. Blair served as an assistant environmental monitor during the construction of 4 miles of overhead transmission towers and lines and approximately 1.3 miles of underground lines. The project involved trenching, horizontal drilling and blasting and requires avoidance of several wetlands, seasonal pools and T and E species.

- **Diablo Canyon Power Plant Steam Generator Replacement Project.** Ms. Blair supported the management team in preparing the project description, alternatives and supporting sections of the Draft and Final EIR.

- **Miguel-Mission 230 kV #2 Project EIR Addendum**. Ms. Blair helped to prepare a detailed addendum associated with engineering design changes for the Miguel-Mission 230 kV #2 Project.

- **California Energy Commission.** Aspen has a multi-year contract to provide support to the Energy Facility Planning and Licensing Programs. Under this contract Ms. Blair has participated in the following projects:

  - **Biological Resources Assessment for the Panoche Energy Center.** Ms. Blair is currently serving as the lead technical staff for the analysis of impacts to biological resources from the 1600 MW PEC. Required coordination with USFWS and CDFG regarding impacts to the State and federally listed San Joaquin kit fox.

  - **Biological Resources Assessment for the Starwood-Midway Power Plant.** Ms. Blair is currently serving as the lead technical staff for the analysis of impacts to biological resources from the 120 MW Starwood Project. Required coordination with USFWS and CDFG regarding impacts to the State and federally listed San Joaquin kit fox.

  - **Biological Resources Assessment for the Chevron Richmond Power Plant Replacement Project.** Ms. Blair is currently serving as the lead technical staff for the analysis of impacts to biological resources from the 60 MW Chevron Richmond PPRP.

  - **LNG Interagency Working Group Fact Sheets.** Ms. Blair researched information on operational and safety issues associated with new LNG facilities. These fact sheets, intended for public distribution, include Biological Resource Impacts of LNG, air and water quality impacts of LNG and others.

- **Natural Gas Supply and Demand Report.** Ms. Blair researched recent natural gas supply and demand developments throughout the United States for incorporation into an Energy Commission report on the potential need for expanded natural gas supplies in California.

PREVIOUS EXPERIENCE

Soil Ecology and Restoration Group — January to May 2004

- **Research Assistant.** Ms. Blair assisted in managing the greenhouse where native seeds were germinated and raised. In this role, she collected seeds from native plants and analyzed the composition of the soil present in their native habitat to ensure seedling viability. The plants were subsequently used in the restoration of degraded habitat as contracted by the U.S. Army Corps of Engineers and others.

DECLARATION OF
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 assisted in the preparation of the staff testimony on **Cultural Resources** for the Carlsbad Energy Center, 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: November 4, 2009 Signed: Beverly E. Bastian

At: Sacramento, California

Beverly E. Bastian
1516 Ninth Street MS 40
Sacramento, CA 95814-5504
(916) 654-4840 email: bbastian@energy.state.ca.us

Education

School	Field	Degree	Year
University of California, Davis	Anthropology	B.A	1967
University of California, Davis	Anthropology	M.A	1969
Tulane University	Anthropology	A.B.D.	1975
University of Mississippi	American History	(courses only)	1989
University of California, Santa Barbara	Public (American) History and Historic Preservation	A.B.D.	1996

Experience

State of California, California Energy Commission *2005 to present*
Planner II, Energy Facilities Siting Division, Environmental Office, Biological and Cultural Unit,
All tasks related to the production of the cultural resources sections of CEQA-equivalent (California Environmental Quality Act) documents for the environmental review of proposed power plants in California, including: Evaluating data in applications; writing data requests to applicants and doing independent research to compile an inventory of and evaluate the historical/cultural significance of cultural resources subject to significant impacts from proposed projects; providing and receiving information in public hearings on applications; analyzing all pertinent data; writing Staff Assessments of impacts; developing mitigation measures to reduce to insignificant any impacts to significant cultural resources; providing expert testimony on my analyses and findings in public hearings; and reviewing compliance with mitigation measures during the construction, operation, and decommissioning of certified power plants. Additional tasks include: providing prefiling assistance to applicants, reviewing the CEQA documents of sister state agencies; consulting and advising cultural resources specialists in sister state agencies; coordinating and reviewing the work of Commission cultural resources consultants; and developing internal procedures and guidelines to improve cultural resources review of applications.

State of California, Department of Parks and Recreation *2001 to 2005*
Historian 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
National Council on Public History
Vernacular Architecture Forum
Society for California Archeology
California Council for the Promotion of History

Risk Science Associates

121 Paul Dr., Suite A, San Rafael, Ca. 94903-2047
415-479-7560 fax 415-479-7563
e-mail agreenberg@risksci.com

Name & Title: **Alvin J. Greenberg, Ph.D., FAIC, REA, QEP**
Principal Toxicologist

Dr. Greenberg has had over two decades of complete technical and administrative responsibility as a team leader for hazardous waste site characterization, preparation of human and ecological risk assessments, air quality assessments, interaction with regulatory agencies in obtaining permits, hazardous materials handling and risk management prevention, infrastructure vulnerability assessments, conducting lead surveys and studies, with particular expertise in the assessment of dioxins, lead, diesel exhaust, petroleum hydrocarbons, mercury, and the intrusion of subsurface contaminants into indoor air. Dr. Greenberg's expertise in risk assessment has led to his appointment as a member of several state and federal advisory committees, including the California EPA Advisory Committee on Stochastic Risk Assessment Methods, the US EPA Workgroup on Cumulative Risk Assessment, the Cal/EPA Peer Review Committee of the Health Risks of Using Ethanol in Reformulated Gasoline, the California Air Resources Board Advisory Committee on Diesel Emissions, the Cal/EPA Department of Toxic Substances Control Program Review Committee, and the DTSC Integrated Site Mitigation Committee. Dr. Greenberg is the former Chair of the Bay Area Air Quality Management District Hearing Board, a former member of the State of California Occupational Health and Safety Standards Board (appointed by the Governor), and former Assistant Deputy Chief for Health, California OSHA. And, since the events of 9/11, Dr. Greenberg has been the lead person for developing vulnerability assessments, power plant security programs, and conducting safety and security audits of power plants for the California Energy Commission. In addition to providing security expertise to the State of California, Dr. Greenberg is Team Leader and main consultant to the State of Hawaii on the updating of their Energy Emergency Preparedness Plan.

Years Experience: 25

Education:

B.S. 1969 Chemistry, University of Illinois Urbana

Ph.D. 1976 Pharmaceutical/Medicinal Chemistry, University of California, San Francisco

Postdoctoral Fellowship 1976-1979 Pharmacology/Toxicology, University of California, San Francisco

Postgraduate Training 1980 Inhalation Toxicology, Lovelace Inhalation Toxicology Research Institute, Albuquerque, NM

Professional Registrations:

Board Certified as a Qualified Environmental Professional (QEP)
California Registered Environmental Assessor - I (REA)
Fellow of the American Institute of Chemists (FAIC)

Professional Affiliations:

Society for Risk Analysis
Air and Waste Management Association
American Chemical Society
American Association for the Advancement of Science
National Fire Protection Association

Technical Boards and Committee Memberships - Present:

Squaw Valley Technical Review Committee
(appointed 1986)

Technical Boards and Committee Memberships - Past:

July 1996 – March 2002
Member, Bay Area Air Quality Management District Hearing Board
(Chairman 1999-2002)
September 2000 – February 2001
Member, State Water Resources Control Board Noncompliant Underground Tanks Advisory Group
January 1999 – June 2001
Member, California Air Resources Board Advisory Committee on Diesel Emissions
January 1994 - September 1999
Vice-Chairman, State Water Resources Control Board Bay Protection and Toxic Cleanup Program Advisory Committee
September 1998
Member, US EPA Workgroup on Cumulative Risk Assessment
April 1997 - September 1997
Member, Cal/EPA Private Site Manager Advisory Committee
January 1986 - July 1996
Member, Bay Area Air Quality Management District Advisory Council
(Chairman 1995-96)
January 1988 - June 1995
Member: California Department of Toxic Substance Control Site Mitigation Program Advisory Group
January 1989 - February 1995
Member: Department of Toxics Substances Control Review Committee, Cal-EPA

October 1991 - February 1992
Chair: Pollution Prevention and Waste Management Planning Task Force of the Department of Toxics Substances Control Review Committee, Cal-EPA

September 1990 - February 1991
Member: California Integrated Waste Management Board Sludge Advisory Committee

September 1987 - September 1988
ABAG Advisory Committee on Regional Hazardous Waste Management Plan

March 1987 - September 1987
California Department of Health Services Advisory Committee on County and Regional Hazardous Waste Management Plans

January 1984 - October 1987
Member, San Francisco Hazardous Materials Advisory Committee

March 1984 - March 1987
Member, Lawrence Hall of Science Toxic Substances and Hazardous Materials Education Project Advisory Board

Jan. 1, 1986 - June 1, 1986
Member, Solid Waste Advisory Committee, Governor's Task Force on Hazardous Waste

Jan. 1, 1983 - June 30, 1985
Member, Contra Costa County Hazardous Waste Task Force

Sept. 1, 1982 - Feb. 1, 1983
Member, Scientific Panel to Address Public Health Concerns of Delta Water Supplies, California Department of Water Resources

Present Position

January 1983- present
Owner and principal with Risk Sciences Associates, a Marin County, California, environmental consulting company specializing in multi-media human health and ecological risk assessment, air pathway analyses, hazardous materials management-infrastructure security, environmental site assessments, and litigation support for toxic substance exposure cases.

Previous Positions

Jan. 2, 1983 - June 12, 1984
Member, State of California Occupational Safety and Health Standards Board (Cal/OSHA), appointed by the Governor

Aug. 1, 1979 - Jan. 2, 1983
Assistant Deputy Chief for Health, California Occupational Safety and Health Administration

Feb. 1, 1979 - Aug. 1, 1979
Administrative Assistant to Chairperson of Finance Committee, Board of Supervisors, San Francisco

Jan. 1, 1976 - Feb. 1, 1979
Research Pharmacologist and Postdoctoral Fellow, Department of Pharmacology and Toxicology, School of Medicine, University of California, San Francisco

Jan. 1, 1975 - Dec. 31, 1975
Acting Assistant Professor, Department of Pharmaceutical Chemistry, University of California, San Francisco

Experience

General

Dr. Greenberg has been a consultant in Human and Ecological Risk Assessment, Occupational Health, Toxicology, Hazardous Materials Management and Security, Hazardous Waste Site Characterization and Toxic Substances Control Policy for over 25 years. He has broad experience in the identification, evaluation and control of health and environmental hazards due to exposure to toxic substances. His experience includes Community Relations Support and Risk Communication through experience at high-profile sites and presentations at professional society meetings.

He has considerable experience in the review and evaluation of exposure via the air pathway - particularly to emissions from power plants and diesel exhaust - and a thorough knowledge of the regulatory requirements through his experience at Cal/OSHA, the BAAQMD Hearing Board, as a consultant to the California Energy Commission, and in preparing such assessments for local government and industry. He has assessed exposures to diesel exhaust during construction and operations of stationary and mobile sources and has testified at evidentiary hearings numerous times on this subject.

He served for over five years as the Vice-chair of the California State Water Resources Control Board Advisory Committee convened to address toxic substances in sediments in bays, rivers, and estuaries. He has also conducted numerous ecological risk assessments and characterizations, including those for marine and terrestrial habitats.

Since the events of 9/11, Dr. Greenberg has taken the lead for the California Energy Commission in developing a power plant vulnerability assessment methodology and model power plant security plan. He also assisted the CEC in the preparation of a "background" report on the risks and hazards of siting LNG terminals in California and consulted for the City of Vallejo on a proposed LNG terminal and storage facility at the former Mare Island Naval Shipyard. In August 2004, a team of experts led by Dr. Greenberg was awarded an 18-month contract by the State of Hawaii to update and improve the state's Energy Emergency Preparedness Plan and make recommendations for increased security of critical energy infrastructure on this isolated group of islands.

Dr. Greenberg has extensive experience in data collection and preparation of human and ecological risk assessments on numerous military bases and industrial sites with Cal/EPA DTSC and RWQCB oversight. He has also been retained to provide technical services to the Cal/EPA Department of Toxic Substances Control (preparation of human health risk assessments) and the

Office of Environmental Health Hazard Assessment (review and evaluation of air toxics health risk assessments and preparation of profiles describing the acute and chronic toxicity of toxic air contaminants). He has also conducted several surveys of sites containing significant lead contamination from various sources including lead-based paint, evaluated potential occupational exposure to lead dust and fumes in industrial settings, prepared numerous human health risk assessments of lead exposure, and prepared safety and health plans for remedial investigation of lead oxide contaminated soil at DOD facilities.

Dr. Greenberg is also a recognized expert on the requirements of California's Proposition 65 and has served as an expert on Prop. 65 litigation.

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 **Carlsbad Energy 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: Oct. 29, 2009 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

DECLARATION OF
Testimony of Negar Vahidi

I, **Negar Vahidi,** 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 Project Manager/Senior Land Use Technical Specialist**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Land Use** and **Alternatives** for the **Carlsbad Energy Center Project** based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: October 26, 2009 Signed: _____

At: Agoura Hills, California

NEGAR VAHIDI
Senior Associate

ACADEMIC BACKGROUND

Master of Public Administration, University of Southern California, 1993
B.A., Political Science, University of California, Irvine, 1991

Ms. Vahidi is a planner with more than nine years experience in socioeconomic, land use, and public policy analysis for major infrastructure, development, flood control, and institutional projects throughout the State of California. Her expertise lies in demographic data assessment and technical studies, identification and categorization of existing land uses, policy consistency analysis and policy development, evaluation of physical socioeconomic and land use impacts, and development of land use alternatives. A brief list of relevant projects for which she has conducted socioeconomic and land use assessments, or managed the preparation of the environmental document, is provided below:

Land Use Assessment for Industrial Projects:

- Pacific Pipeline EIS/SEIR Project
- Alturas Transmission Line EIR/S Project
- Santa Fe Pacific Pipeline EIR Project
- Six Flags Substation and Power Line Project
- Calnev Substation and Power Line Project
- Yellowstone Pipeline Reroute EIS Project
- CPUC Hydroelectric Plant Divestiture Project - ongoing

Environmental Studies

- MTA Mid-City/Westside Corridor Study
- St. Francis Medical Hospital Focused EIR
- Santa Monica College Parking Structure B EIR
- Berkeley Manor Condominium Technical Reports
- Huntington Beach Waterfront Development Project Section 108 Loan Guarantee Funds EA
- Imperial Beach Shore Protection EIR/EIS
- U.S. Food and Drug Administration Laboratory EIR/EIS
- National Guard Armory Building EA
- EA for Area Lighting, Fencing, and Roadways at the International Border
- Border Patrol Checkpoint Station EA

Specific Plans, Residential and Mixed-Use Development, and Redevelopment Projects

- Wes Thompson Ranch Development Project EIR
- Cabrillo Plaza Specific Plan EIR
- Culver City Redevelopment Plan and Merger EIR
- Dana Point Headlands Specific Plan EIR
- Seaview Court Condominiums IS/MND
- Pico Union Block 6 Residential Development Revised EIR
- Four-Story Hotel IS/MND, City of Santa Monica
- Santa Monica College Parking Structure B Replacement EIR
- Huntington Beach Blocks 104/105 Redevelopment Project EIR
- Berkeley Manor Condominiums EIR
- Santa Monica North Main St. Mixed-Use Development Project EIR

Water and Wastewater Facilities

- San Antonio Dam EIS
- Whitewater/Thousand Palms Flood Control Project
- San Antonio Creek Bridges Project at Vandenberg Air Force Base
- Lower Santa Ana River Operations and Maintenance EA

Resource Management

- Upper Newport Bay Environmental Restoration Project
- Rio Salado Environmental Restoration EIS

Miscellaneous Studies

- Pacific Pipeline Mitigation Monitoring, Compliance and Reporting Program
- Technical Support to NEPA Lawsuit
- Industry-wide Survey for the South Coast Air Quality Management District

Professional Affiliations

- American Planning Association, Los Angeles Chapter Board Member

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 **Noise and Vibration**, and supervised preparation of the staff testimony on **Power Plant Efficiency, Power Plant Reliability**, **Facility Design** and **Geology and Paleontology**, for the Carlsbad Energy Center 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: 2/26/09 Signed: Steve Baker

At: Sacramento, California

STEVE BAKER, P.E.
Senior Mechanical Engineer

Experience Summary

Thirty-two years experience in the electric power generation field, including mechanical design, QA/QC, construction/startup and business development/licensing of nuclear, coal-fired, hydroelectric, geothermal and windpower plants; and engineering and policy analysis of thermal power plant regulatory issues.

Education

- California State University, Long Beach--Master of Business Administration
- California State Polytechnic University, Pomona--Bachelor of Science, Mechanical Engineering
- Registered Professional Engineer (Mechanical), California — No. M27737 expires 6/30/06

Professional Experience

1990 to Present--Senior Mechanical Engineer, Facilities Siting Division - California Energy Commission

Technical lead person for the analysis of generating capacity, reliability, efficiency, noise, geology, paleontology and the mechanical, civil/structural and geotechnical engineering aspects of power plant siting cases. Key contributor to Commission's investigation into market impediments to the deployment of advanced high-efficiency generating technologies.

1987 to 1990--Generation Systems/Facility Design Unit Supervisor, Siting & Environmental Division - California Energy Commission

Responsible for supervising the analysis of generating capacity, reliability, efficiency, safety, and mechanical, civil/structural, and geotechnical engineering aspects of power plant siting cases.

1981-1986--Operations Manager, Alternate Energy - Santa Fe Pacific Realty Corporation

Participated in and supervised identification, evaluation and feasibility analysis, licensing and permitting of hydroelectric, geothermal, windpower and biomass power projects.

1974-1981--Mechanical Engineer, Quality Engineer - Bechtel Power Corporation and Bechtel National, Inc.

Wrote equipment specifications, drew flow diagrams and P&ID's, performed system design and safety analysis for nuclear power plants and nuclear fuel processing plant. Wrote and implemented QA/QC procedures for nuclear power plant. Participated in construction/startup of large coal-fired power plant.

DECLARATION OF
Marie McLean

I, Marie McLean, 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 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 Visual Resources for the Final Staff Assessment for the Carlsbad Energy Center Project (07-AFC-06) 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: October 27, 2009 Signed: Marie McLean

At: Sacramento, California

MARIE McLEAN

QUALIFICATIONS SUMMARY

Twenty years experience in the field of environmental research, analysis, and planning, with specific emphasis on the economics of water, energy, and land use and its social, visual, and cultural ramifications. Specific projects involved (1) assessing economic costs and benefits of water delivery contracts and energy sales; (2) conducting and presenting visual analyses of historic and other local, state, and federal resources; (3) preparing local, state, and federal resource assessment forms; (4) determining and communicating benefits and costs of proposed development projects (housing, energy, and water) on the social and economic life of communities in which they are located; and (5) as member of local design review, historic preservation, and housing boards, recommended programs and policies and monitored their implementation.

RECENT PROFESSIONAL EXPERIENCE

California Energy Commission, Planner II, Environmental Office-Facilities Siting, January 2008—present.

Conduct technical analyses for complex facility siting cases and planning studies in the area of socioeconomics and visual resources.

Electricity Oversight Board; June 1, 2007—December 31, 2008.

Developed, conducted, and presented economic studies on energy markets and transmission projects; California Independent System Operator (CAISO) market redesign and technology upgrade program; and investigated, analyzed, and reported the effects of existing and proposed energy programs on supply, demand, and rates.

California Department of Water Resources, State Water Project Analysis Office, June 2001—July 31, 2007.

Developed and implemented complex analyses of the social, economic, and financial ramifications of contracted and proposed water deliveries and transfers and changes to valuation methods for selling energy in deregulated markets. Researched, identified, and reported on market activities in energy and water and their economic effects on ratepayers.

EDUCATION

Bachelor of Arts, Economics, California State University, Sacramento, 1983

DECLARATION OF
Paul Marshall

I, Paul Marshall, declare as follows:

1. I am presently employed by the California Energy Commission in 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 **Soils & Water** for the Carlsbad Energy Center 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: 11/4/09 Signed: Paul Marshall

At: Sacramento, California

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 **Transportation and Traffic and Alternatives Technical Specialist**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Transportation and Traffic** and **Alternatives** for the **Carlsbad Energy Center Project** based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: October 26, 2009 Signed: _____

At: Agoura Hills, California

Aspen
Environmental Group

SCOTT DEBAUCHE

Environmental Planner

ACADEMIC BACKGROUND

B.S., Urban & Regional Planning, University of Minnesota, 1994

PROFESSIONAL EXPERIENCE

Mr. Debauche is an environmental planner with over 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 evaluating Transportation/Traffic, Noise, Socioeconomics and Environmental Justice, Air Quality, and Alternatives analyses.

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 analyses. 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.
- **Littlerock Reservoir Sediment Removal Project EIS/EIR, Palmdale, CA.** Mr. Debauche is the Technical Specialist in charge of preparation of the Transportation/Traffic, Noise, and Socioeconomics analyses 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.
- **Alta Wind Project EIR, Kern County, CA.** Mr. Debauche is the Technical Specialist in charge of preparation of the Transportation/Traffic, Noise, and Air Quality analyses 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.

- **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.
- **Topaz Solar Project EIR, San Luis Obispo County, CA.** Mr. Debauche is the Technical Specialist in charge of preparation of the Transportation/Traffic and Air Quality sections of this EIR for this 500 MW solar photovoltaic project in the Carrizo Plain area. This project requires the conversion of approximately 6,000 acres of open space (60 percent of which are under land preservation contracts) to an industrial use.
- **California Valley Solar Ranch EIR, San Luis Obispo County, CA.** Mr. Debauche is the technical specialist in charge of preparation of the Air Quality analysis of this EIR for this 250 MW solar photovoltaic project in the Carrizo Plain area. This project requires the conversion of approximately 4,000 acres of open space to an industrial use.
- **Long Beach LNG Import Project EIR/EIS, 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 LNG 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 EIR, Banning, CA.** Mr. Debauche served as the Technical Specialist in charge of preparation of the Transportation/Traffic, Noise, Socioeconomics, and Alternatives analyses 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.
- **MARS EIR/EIS, Monterey, CA.** Mr. Debauche served as the Technical Specialist in charge of preparation of 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 Environmental Justice analysis evaluated the potential for any disproportionate project impacts to both land-based populations and fisheries workers.
- **Diablo Canyon Power Plant (DCPP) Steam Generator Replacement Project EIR, San Luis Obispo County, CA.** Mr. Debauche served as the Technical Specialist in charge of preparation of the Socioeconomics and Alternatives analyses sections 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. Land use issues of concern include impacts to agricultural lands, recreational resources, and potential Coastal Act inconsistencies.

- **Lake Canyon Dam and Detention Basin Project EIR, Ventura County, CA.** Mr. Debauche served as the Technical Specialist in charge of preparation of the Transportation/Traffic, Noise, Air Quality, and Hazardous Materials analyses for this CEQA document. The proposed project would include an earthfill dam and detention basin located in an unincorporated area of Ventura County, California. It would operate in conjunction with the existing Arundell Dam and Detention Basin, which is located an estimated 600 feet south-southwest and downstream of the proposed project site, to detain peak storm flows and capture the associated debris expected from a 100-year storm event.
- **Colton Substation Project IS/MND, Colton, CA.** Mr. Debauche served as the Technical Specialist in charge of preparation of the Transportation/Traffic, Noise, Air Quality, and Hazardous Materials analyses for this CEQA document. The City of Colton proposes to construct the 1.9 acrea North Substation and supporting 1.7 miles of 69 kV subtransmission and distribution facilities necessary to interconnect with the existing city-owned subtransmission and distribution systems.
- **San Antonio Creek Giant Reed Removal Project IS/MND, Ventura County, CA.** Mr. Debauche served as the Technical Specialist in charge of preparation of a number of technical issues area analyses for this CEQA document including: Transportation/Traffic, Noise, Air Quality, and Hazardous Materials. The purpose of the project is to remove giant reed within the upper reaches of the San Antonio Creek watershed and several tributaries to support other existing efforts to remove this invasive plant species along the main stem of the Ventura River and its watershed.

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 in charge of preparation of the 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.

- **El Casco System Project EIR, Riverside, CA.** Mr. Debauche served as the Technical Specialist in charge of preparation of the Transportation/Traffic, Noise, Socioeconomics, and Alternatives analyses 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 prepared by the CPUC, Mr. Debauche served as the Technical Specialist in charge of preparation of the 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.
- **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. PG&E owns and operates the largest private hydroelectric power system in the nation. Situated in the Sierra Nevada, Southern Cascade, and Coastal mountain ranges of California, this system is strung along 16 different river basins and annually generates approximately five percent of the power consumed each year in California. The proposed sale of assets also includes approximately 140,000 acres of land proposed for sale with the hydroelectric system. The EIR analyzes the range of operational changes that could occur under new ownership, including complex integrated models that analyze power generation and water management.
- **Viejo System Project IS/MND, Orange County, CA.** Mr. Debauche served as the Technical Specialist in charge of preparation of the 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. Mr. Debauche served as the Technical Specialist in charge of preparation of the Transportation/Traffic, Noise, Socioeconomics, and Alternatives evaluation for the project's CEQA documentation.

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 in charge of preparation of the Transportation/Traffic and Alternatives Staff Assessments 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.
- **Hydrogen Energy California Power Plant Project, Kern County CA.** Technical Specialist in charge of preparation of the Transportation/Traffic and Socioconomics/Environmental Justice Staff Assessments for Hydrogen Energy International, LLC integrated gasification combined cycle (IGCC) power generating facility called Hydrogen Energy California (HECA) in Kern County, California. The proposed project will gasify petroleum coke (or blends of petroleum coke and coal, as needed) to produce hydrogen to fuel a combustion turbine operating in combined cycle mode. The gasification component would produce 180 million standard cubic feet per day (MMSCFD) of hydrogen to feed a 390 megawatt (MW) gross combined cycle plant providing California with low-carbon baseload power to the grid.
- **CPV Vaca Station Power Plant Project, Vacaville, CA.** Technical Specialist in charge of preparation of the Transportation/Traffic Staff Assessment prepared for 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.
- **Ivanpah Solar Electric Generating System Project, San Bernardino County, CA.** Technical Specialist in charge of preparation of the Socioeconomics/Environmental Justice 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.
- **Abengoa Mojave Solar Power Project, San Bernardino County, CA.** Technical Specialist in charge of preparation of the Socioeconomics/Environmental Justice Staff Assessment for a nominal 250 megawatt (MW) solar electric generating facility to be located near Harper Dry Lake in an unincorporated area of San Bernardino County. The project will implement well-established parabolic trough technology to solar heat a heat transfer fluid (HTF) technology.
- **Rice Solar Energy Generating System Project, Riverside County, CA.** Technical Specialist in charge of preparation of the Transportation/Traffic Staff Assessment/BLM EIS for a 50,000 megawatt hours (MWh) of renewable energy annually, with a nominal net generating capacity of 150 megawatts (MW) located in an unincorporated area of eastern Riverside County, California. The proposed facility will use concentrating solar power (CSP) technology, with a central receiver tower and an integrated thermal storage system.
- **Blythe Solar Power Project, Riverside County, CA.** Technical Specialist in charge of preparation of the Socioeconomics/Environmental Justice Staff Assessment/BLM EIS for a 1,000 MW solar thermal electric generating facility in Riverside County. The project will utilize solar parabolic trough technology to generate electricity. With this technology, arrays of parabolic mirrors collect heat energy from the sun and refocus the radiation on a receiver tube located at the focal point of the parabola.
- **GWF Henrietta Peaker Project, Kings County, CA.** Technical Specialist in charge of preparation of 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.

- **Palen Solar Power Project, Riverside County, CA.** Technical Specialist in charge of preparation of the Socioeconomics/Environmental Justice Staff Assessment/BLM EIS for a 500 MW solar thermal electric generating facility in Riverside County. The Project will utilize solar parabolic trough technology to generate electricity. With this technology, arrays of parabolic mirrors collect heat energy from the sun and refocus the radiation on a receiver tube located at the focal point of the parabola.
- **Watson Cogeneration Steam and Electric Reliability Project, Carson, CA**. Technical Specialist for the Transportation/Traffic Staff Assessment for a nominal 85 MW combustion turbine generator (CTG), with a single-pressure heat recovery steam generator (HRSG) to provide additional process steam to the BP Carson refinery, to the existing cogeneration facility owned by Watson. The project site is a 2.5-acre brown field site located within the boundary of the existing Watson Cogeneration Facility, which is a 21.7-acre area within BP's existing Carson Refinery (BP Refinery), in the City of Carson, Los Angeles County.
- **Oakley Generating Station Project, Oakley, CA.** Technical Specialist in charge of preparation of the Transportation/Traffic Staff Assessment for a natural gas-fired, combined-cycle electrical generating facility rated at a nominal generating capacity of 624 megawatts (MW). The proposed project would be located in the City of Oakley, in Contra Costa County.
- **Canyon Power Plant Project, Anaheim, CA.** Technical Specialist in charge of preparation of the Socioeconomics/Environmental Justice 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.
- **GWF Tracy Combined Cycle Power Plant Project, San Joaquin County, CA.** Technical Specialist in charge of preparation of 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.
- **Lodi Energy Center Project, Lodi, CA.** Technical Specialist in charge of preparation of the Socioeconomics/Environmental Justice Staff Assessment for a natural gas-fired, combined-cycle electrical generating facility rated at a nominal 225-megawatt (MW). The Lodi Energy Center is proposed for a site parcel of approximately 4.4 acres adjacent to the City of Lodi's White Slough Water Pollution Control Facility (WPCF)
- **Kings River Conservation District Community Peaker Power Plant Project, Fresno County, CA.** Technical Specialist in charge of preparation of 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.
- **Valero Cogeneration Project, Benicia, CA.** Technical Specialist in charge of preparation of the Socioeconomics/Environmental Justice 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 in charge of preparation of the Socioeconomics/Environmental Justice 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 in charge of preparation of the Socioeconomics/Environmental Justice 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 in charge of preparation of the Socioeconomics/Environmental Justice Staff Assessments for a 600-megawatt combined cycle electrical generating facility, and associated linear facilities.

- **Inland Empire Energy Center Project, Riverside County, CA.** Technical Specialist in charge of preparation of the Socioeconomics/Environmental Justice 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 in charge of preparation of the Socioeconomics/Environmental Justice 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 in charge of preparation of the Transportation/Traffic, Noise, Socioeconomics, and Alternatives analyses 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 in charge of preparation of the Transportation/Traffic, Noise, Socioeconomics, and Alternatives analyses 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 in charge of preparation of the Transportation/Traffic, Noise, Socioeconomics, and Alternatives analyses 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 in charge of preparation of the Transportation/Traffic, Noise, Socioeconomics, and Alternatives analyses 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 in charge of preparation of the Transportation/Traffic, Noise, Socioeconomics, and Alternatives analyses 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:

- **Prado Basin/Norco Bluffs/Reach 9 of the Santa Ana River Dikes Supplemental EAs, Riverside County, CA.** Debauche served as the Technical Specialist in charge of preparation of the Transportation/Traffic analysis of two structural alternatives for the Norco Bluffs Toe Stabilization project as well as the No Action/No Project Alternative. Aspen developed the alternatives analyzed in this Supplemental NEPA Environmental Assessment document, a description of the alternatives' physical, construction, and operational characteristics, and a discussion of the potential environmental impacts.
- **Northeast Phoenix Drainage Area Alternatives Analysis Report, Phoenix and Scottsdale, AZ.** Mr. Debauche served as a Technical Specialist in charge of preparation of the 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 Specialist in charge of preparation of the 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 IS/MND, northern Los Angeles County.** 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 Specialist in charge of preparation of the Initial Study Transportation/Traffic, Noise, Socioeconomics, and Alternatives analyses for the proposed project.
- **Pyramid Lake Repairs and Improvements Project IS/MND and EA, northern Los Angeles County.** Mr Debauche served as Technical Specialist in charge of preparation of the Initial Study Transportation/Traffic, Noise, Socioeconomics, and Alternatives analyses for the proposed project, which DWR and the Department of Boating and Waterways (DBW) conducted repairs and improvements at various recreational sites at Pyramid Lake, which is located on the border between Los Padres National Forest and Angeles National Forest; recreation is managed by Angeles National Forest. In addition to the CEQA documentation and preparation of permit applications, Aspen coordinated DWR and DBW's efforts with the USFS, and the permitting agencies (i.e., CDFG, RWQCB, and USACE). Through coordination with the USAC, Aspen prepared the NEPA EA for Corps 404 permit process, and reviewed and coordinated revisions to the 1602 with CDFG.

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.** Served as a Technical Specialist in charge of preparation of the social science issues, including Socioeconomics, Noise, Transportation/Traffic, and Alternatives analyses 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.
- **East Valley Middle School No. 2 EIR.** Served as a Technical Specialist for this middle school project proposed to be located at the previous Van Nuys Drive-In site, preparing the Transportation/Traffic and Noise analyses. 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 the Technical Specialist in charge of preparation of the IS/MND for 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 Served as the Technical Specialist in charge of preparation of the IS/MND 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 the Technical Specialist in charge of preparation of the Socioeconomics, Hydrology, Public Services and Utilities, and Recreational analyses 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 Specialist in charge of preparation of the IS/MND for a proposed addition to the Wonderland Avenue Elementary School, located in the City of Los Angeles.
- **Pio Pico Elementary School Playground Expansion IS/MND**. Technical Specialist in charge of preparation of the 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.
- **Fairfax Senior High School Portable Classroom Addition IS/MND**. Served as Technical Specialist in charge of preparation 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 Technical Specialist in charge of preparation 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**. Technical Specialist in charge of preparation 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 Technical Specialist in charge of preparation 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, the Section 4(f) Parklands discussion, Transportation/Traffic, and the Land Use sections of the EIS/EIR.

Wes Thompson Ranch Development Project EIR. Served as Technical Specialist 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 the Transportation/Traffic and Alternatives analyses.

City of Santa Monica Environmental Assessments. Was key Technical Specialist in charge of preparation 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 the Transportation/Traffic, Noise, and Alternatives analyses 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 project'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 Technical Specialist for Transportation/Traffic, Socioeconomics, Noise, Hazardous Materials, Air Quality, and Public Services/Utilities, Mr. Debauche conducted analyses and prepared these environmental sections 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

Dr.Obed Odoemelam

I, **Obed Odoemelam** declare as follows:

1. I am presently employed by the California Energy Commission in the Facilities 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 helped prepare the staff testimony on **Transmission Line safety and Nuisance** for the Carlsbad Energy Center 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: 10/27/09 Signed: O Odoemelam

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
William D. Kanemoto

I, William Kanemoto, declare as follows:

1. I am presently under contract with Aspen Environmental Group to provide environmental technical assistance to the California Energy Commission. Under Contract No. 700-05-002, I am serving as a Visual Resource Specialist to provide Peak Workload Support for the Energy Facility Siting Program and for the Energy Planning Program.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the final staff testimony for the Carlsbad Energy Center Staff Assessment based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: October 26, 2009 Signed:

At: Oakland, California

William Kanemoto

Visual Resource/Aesthetics Analyst

Academic Background:

M. Landscape Architecture, University of Michigan, Ann Arbor, 1982
B.A. Liberal Arts (Honors), University of California, Santa Cruz, 1973

Professional Experience:

Principal
William Kanemoto & Associates, Oakland, California, 1993 - Present

William Kanemoto is Principal of William Kanemoto & Associates, an environmental consulting practice specializing in visual analysis and computer visualization in the context of environmental review. In this capacity he has served as principal investigator for visual analysis and simulation on a wide range of major infrastructure and development projects, including the High Desert Power Project AFC, Port of Oakland Expansion EIS, Route 4 East/Pittsburg BART EIS, FMC Substation and Transmission Line PEA, and numerous other infrastructure and transportation projects. Mr. Kanemoto received recognition from the California Association of Environmental Professionals for visual analysis, computer simulation, animation, and video production for the Stanford Sand Hill Road Projects EIR, prepared by EIP Associates and judged 'Best State-Wide EIR of 1997'.

Associate Director
Environmental Simulation Laboratory,
Institute of Urban and Regional Development,
Center for Environmental Design Research
University of California, Berkeley, 1994 - 2000

Instructed graduate students in the College of Environmental Design, U.C. Berkeley, served as consultant on various major planning projects in the San Francisco Bay Area, and conducted design collaborations with counterparts at Keio University and ARK CyberUniversity in Tokyo, Japan via the Internet.

Principal Investigator/Project Manager
Dames & Moore, San Francisco/Oakland, California, 1988-1992

Served as principal investigator of numerous visual analyses of major infrastructure projects throughout the U.S., in Europe, and in Asia. Gained extensive familiarity with the application of a wide range of professionally accepted visual assessment techniques in the context of CEQA, NEPA, and related regulatory requirements of the CPUC, CEC, FERC, DOT, U.S. Forest Service, BLM, and other agencies.

Project Manager
LSA Associates, Pt. Richmond, California, 1987-1988

Project manager and planner on environmental impact reports for various residential and commercial development projects in northern California.

Environmental Planner
Holton Associates, Berkeley, California, 1984-1987

Preparation of various resource and regulatory studies including EIRs, FERC Exhibit E, Section 404 alternative analyses, riparian restoration studies, and cumulative impact methodology studies for EPRI and Sierra County, CA.

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 Carlsbad Energy Center 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: 10/26/09 Signed: Ellen Townsend Hough

At: Sacramento, California

Ellen Townsend-Hough

SUMMARY

I am a chemical engineer with 29 years of experience. My strengths are in analyzing and performing complex environmental engineering analyses, in areas such as Waste Management, Hazardous Materials Management, Worker Safety, and Water Resources. I perform inspections work involved in the design and construction of thermal electrical generating power plants. I have a working knowledge of the California Environmental Quality Act. I worked as a policy advisor to a California Energy Commissioner for three years. I am also an US Environmental Protection Agency Environmental Justice trainer.

PROFESSIONAL EXPERIENCE

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
- 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
- Review and analyze 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

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.

-

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.

EMPLOYMENT HISTORY

2002-Present	Associate Mechanical Engineer	California Energy Commission (CEC) Sacramento CA
1999-2002	Advisor to CEC 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 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
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 **Facility Design** for the **Carlsbad Energy Center 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: November 4, 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

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 **Carlsbad Energy Center Project** based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: October 26, 2009 Signed: _____

At: Black Eagle Consulting, Inc.
Reno, Nevada

REGISTERED GEOLOGIST
ROBERT DALTON HUNTER
No. 1411
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

exp 3-31-11

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
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 **Power Plant Efficiency** for the **Carlsbad Energy Center 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: October 26, 2009 Signed: [signature]

At: Sacramento, California

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 **Power Plant Reliability** for the **Carlsbad Energy Center 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: October 26, 2009 Signed: [signature]

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
AJOY GUHA

I, Ajoy Guha, declare as follows:

1. I am presently employed by the California Energy Commission in the **Transmission System Engineering unit** of the Siting, Transmission and Environmental Protection Division as an Associate Electrical Engineer.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on **Transmission System Engineering**, for the **Carlsbad Energy Center 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: 11-10-09 Signed: Ajoy Guha

At: Sacramento, California

RESUME

AJOY GUHA

Associate Electrical Engineer
California Energy Commission
1516 Ninth Street, MS 46
Sacramento, CA 95814

EDUCATION:

MSEE, POWER SYSTEMS ENGINEERING, PURDUE UNIVERSITY, INDIANA
BSEE, ELECTRICAL ENGINEERING, CALCUTTA UNIVERSITY, INDIA

CERTIFICATIONS:

REGISTERED PROFESSIONAL ENGINEER, CALIFORNIA, INDIANA & ILLIINOIS
MEMBER OF IEEE; MEMBER OF THE INSTITUTION OF ENGINEERS OF INDIA

SUMMARY OF PROFESSIONAL BACKGROUND:

Ajoy Guha, P. E. has years of electric utility experience with an extensive background in evaluating and determining current and potential transmission system reliability problems and their cost effective solutions. He has a good understanding of the transmission issues and concerns. He is proficient in utilizing computer models of electrical systems in performing power flow, dynamic stability and short circuit studies, and provide system evaluations and solutions, and had performed generator interconnection studies, area transfer and interconnected transmission studies, and prepared five year transmission alternate plans and annual operating plans. He is also experienced in utilizing Integrated Resource Planning computer models for generation production costing and long term resource plans, and had worked as an Executive in electric utilities and experienced in construction, operation, maintenance and standardization of transmission and distribution lines.

WORK EXPERIENCE:

CALIFORNIA ENERGY COMMISSION, ENERGY FACLITIES SITING AND ENVIRONMENTAL DIVISION, SACRAMENTO, CA, 11/2000-Present.
Working as Associate Electrical Engineer in the Transmission System Engineering unit on licensing generation projects. Work involves evaluating generation interconnection studies and their impacts on transmission system, and providing staff assessments and testimony to the commission, and coordination with utilities and other agencies.

ALLIANT ENERGY, DELIVERY SYSTEM PLANNING, MADISON, WI, 4/2000-9/2000.
Worked as Transmission Services Engineer, performed Generator Interconnection studies and system planning studies.

IMPERIAL IRRIGATION DISTRICT, POWER DEPT., Imperial, California, 1985-1998.
Worked as Senior Planning Engineer in a supervisory position and in Transmission, Distribution and Integrated Resource planning areas. Performed interconnection studies for 500 MW geothermal plants and developed plan for a collector system, developed methodologies for transmission service charges , scheduling fees and losses. Worked as the Project Leader in the 1992 Electricity Report (ER 92) process of the California Energy Commission. Worked as the Project Leader for installation of an engineering computer system and softwares. Assumed the Project Lead in the standardization of construction and materials, and published construction standards.

CITY LIGHT & POWER, Frankfort, Indiana, 1980 – 1985.
Worked as Assistant Superintendent and managed engineering, construction and operation depts.

WESTERN ILLINOIS POWER CO-OP., Jacksonville, Illinois, 1978 – 1980.
Worked as Planning Engineer and was involved in transmission system planning.

THE CALCUTTA ELECTRIC SUPPLY CORPORATION LTD. (CESC), Calcutta, India, 1964 –1978.
Worked as District Engineer and was responsible for managing customer relations, purchasing and stores, system planning, construction, operation and maintenance departments of the most industrialized Transmission and Distribution division of the Utility. Worked as PROJECT MANAGER for construction of a 30 mile Double Circuit 132 kV gas-filled Underground Cable urban project. During 1961-63, worked as Factory Engineer for design, manufacturing and testing of transformers, motor starters and worked in a coal-fired generating plant.

Mark Hesters
Associate Electrical Engineer

Mark Hesters has sixteen 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
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 **Riverside Energy Resource Center** based on my independent analysis of the Small Power Plant Exemption 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: Nov.10.2009 Signed: Originally Signed By

At: Sacramento, California

DECLARATION OF
Testimony of Negar Vahidi

I, **Negar Vahidi,** 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 Project Manager/Senior Land Use Technical Specialist**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Land Use** and **Alternatives** for the **Carlsbad Energy Center Project** based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: October 26, 2009 Signed: Originally Signed By

At: Agoura Hills, California

NEGAR VAHIDI
Senior Associate

ACADEMIC BACKGROUND

Master of Public Administration, University of Southern California, 1993
B.A., Political Science, University of California, Irvine, 1991

Ms. Vahidi is a planner with more than nine years experience in socioeconomic, land use, and public policy analysis for major infrastructure, development, flood control, and institutional projects throughout the State of California. Her expertise lies in demographic data assessment and technical studies, identification and categorization of existing land uses, policy consistency analysis and policy development, evaluation of physical socioeconomic and land use impacts, and development of land use alternatives. A brief list of relevant projects for which she has conducted socioeconomic and land use assessments, or managed the preparation of the environmental document, is provided below:

Land Use Assessment for Industrial Projects:

- Pacific Pipeline EIS/SEIR Project
- Alturas Transmission Line EIR/S Project
- Santa Fe Pacific Pipeline EIR Project
- Six Flags Substation and Power Line Project
- Calnev Substation and Power Line Project
- Yellowstone Pipeline Reroute EIS Project
- CPUC Hydroelectric Plant Divestiture Project - ongoing

Environmental Studies

- MTA Mid-City/Westside Corridor Study
- St. Francis Medical Hospital Focused EIR
- Santa Monica College Parking Structure B EIR
- Berkeley Manor Condominium Technical Reports
- Huntington Beach Waterfront Development Project Section 108 Loan Guarantee Funds EA
- Imperial Beach Shore Protection EIR/EIS
- U.S. Food and Drug Administration Laboratory EIR/EIS
- National Guard Armory Building EA
- EA for Area Lighting, Fencing, and Roadways at the International Border
- Border Patrol Checkpoint Station EA

Specific Plans, Residential and Mixed-Use Development, and Redevelopment Projects

- Wes Thompson Ranch Development Project EIR
- Cabrillo Plaza Specific Plan EIR
- Culver City Redevelopment Plan and Merger EIR
- Dana Point Headlands Specific Plan EIR
- Seaview Court Condominiums IS/MND
- Pico Union Block 6 Residential Development Revised EIR
- Four-Story Hotel IS/MND, City of Santa Monica
- Santa Monica College Parking Structure B Replacement EIR
- Huntington Beach Blocks 104/105 Redevelopment Project EIR
- Berkeley Manor Condominiums EIR
- Santa Monica North Main St. Mixed-Use Development Project EIR

Water and Wastewater Facilities

- San Antonio Dam EIS
- Whitewater/Thousand Palms Flood Control Project
- San Antonio Creek Bridges Project at Vandenberg Air Force Base
- Lower Santa Ana River Operations and Maintenance EA

Resource Management

- Upper Newport Bay Environmental Restoration Project
- Rio Salado Environmental Restoration EIS

Miscellaneous Studies

- Pacific Pipeline Mitigation Monitoring, Compliance and Reporting Program
- Technical Support to NEPA Lawsuit
- Industry-wide Survey for the South Coast Air Quality Management District

Professional Affiliations

- American Planning Association, Los Angeles Chapter Board Member

DECLARATION OF
ANGELIQUE JUAREZ-GARCIA

I, Angelique Juarez-Garcia, declare as follows:

1. I am presently employed by the California Energy Commission in the Siting, Transmission and Environmental Protection Division as a Compliance Project Manager.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the Compliance General Conditions and Closure Plan section for the Carlsbad Energy Center Power Plant Project 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: 10/26/09

Signed: _____

At: Sacramento, California

ANGELIQUE JUAREZ-GARCIA

Planner I

RELATED EXPERIENCE SUMMARY

Angelique Juarez-Garcia has nine years of experience in utilities project management. She has worked in telephone outside plant engineering and construction from 1999 to 2008 overseeing engineering, GIS, forecasting, and joint utility projects. Angelique now works in the Energy Commission's Compliance Unit of the Siting, Transmission & Environmental Protection Division.

EXPERIENCE

July 2008 -Present Compliance Project Manager – California Energy Commission
Siting, Transmission & Environmental Protection Division

California Energy Commission, Planner I
Direct technical staff in tasks related to power plant project design, construction, operation, and associated environmental issues. Negotiate agreements between power plant operators, public agencies, and community groups. Consult with engineering, legal and technical staff to identify and resolve technical issues. Current construction and operational projects include: Los Esteros 2 Power Plant, Morro Bay Modernization & Replacement Power Plant Project, San Francisco Electric Reliability Project, Delta Energy Center, Los Medanos Energy Center, NCPA 2& 3, Tracy Peaker, and SMUD Cosumnes.

January 2004 -July 2008 OSP Engineer
AT&T via contracting firms NorthStar, Byers Engineer, Randstad and TNMG

Partnered with electrical utility companies for joint facility siting. Cost estimated utility projects for 3rd party contractor on behalf of SBC. Trained team of on and off site engineers to meet SBC standards. Planned and forecasted utility growth to new and existing neighborhoods. Collaborated with government agencies to obtain Right of Way and encroachment permits. Coordinated with clients to develop project guidelines that meet CPUC tariffs.

November 1999 -December 2003 Single Point of Contact and Outside Plant Engineer
SBC/AT&T, 1999-2003

Engineered and cost estimated utility projects for my designated wire centers. Coordinated the path of utilities with electric companies and other utilities. Analyzed demand and consumption trends to develop strategic and cost efficient construction plans. Partnered with customers to obtain property right-of-ways. Coordinated with Federal, State, County and City officials to obtain building, street crossing and encroachment permits. Evaluated construction overages & created a program for better cost forecasting.

Education:

Master of Science Degree, 2002
Management of Technology, Golden Gate University

Bachelor of Arts Degree, 1997
Economics, UC Santa Cruz

Certificate of Paralegal Studies, 1991
Barclay College

Related Training:

Graduate Level Project Management Course at Golden Gate University
AT&T's Eight Week Outside Plant Training Course
Environmental Business Upper Division Course at UC Santa Cruz

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 *CARLSBAD ENERGY CENTER PROJECT*

Docket No. 07-AFC-6
PROOF OF SERVICE
(Revised 9/15/2009)

APPLICANT

David Lloyd
George Piantka, PE.
Carlsbad Energy Center, LLC
1817 Aston Avenue, Suite 104
Carlsbad, CA 92008
david.lloyd@nrgenergy.com
george.piantka@nrgenergy.com

APPLICANT'S CONSULTANTS

Robert Mason, Project Manager
CH2M Hill, Inc.
6 Hutton Centre Drive, Ste. 700
Santa Ana, CA 92707
Robert.Mason@ch2m.com

Megan Sebra
CH2M Hill, Inc.
2485 Natomas Park Drive, Ste. 600
Sacramento, CA 95833
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COUNSEL FOR APPLICANT

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980 Ninth Street, Ste. 1900
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jamckinsey@stoel.com

INTERESTED AGENCIES

California ISO
e-recipient@caiso.com

INTERVENORS

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Kerry Siekmann & Catherine Miller
5239 El Arbol
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siekmann1@att.net

City of Carlsbad
*South Carlsbad Coastal Redevelopment Agency
Allan J. Thompson
21 "C" Orinda Way #314
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allanori@comcast.net

City of Carlsbad
*South Carlsbad Coastal Redevelopment Agency
Joseph Garuba,
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California Unions for Reliable Energy ("CURE")
Gloria D. Smith & Marc D. Joseph
Adams Broadwell Joseph & Cardozo
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South San Francisco, CA 94080
gsmith@adamsbroadwell.com

Center for Biological Diversity
c/o William B. Rostov
EARTHJUSTICE
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*indicates change

DECLARATION OF SERVICE

I, Mineka Foggie, declare that on November 12, 2009, I served and filed copies of the attached, Carlsbad Final Staff Assessment_, dated November 2009. 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/carlsbad/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:

_x__ sent electronically to all email addresses on the Proof of Service list;

_x__ 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:

__x__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-6
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.

Originally Signed By
Mineka Foggie