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CARLSBAD ENERGY CENTER PROJECT AMENDMENT

Preliminary Staff Assessment

DECEMBER 2014
CEC-700-2014-004-PSA

CALIFORNIA
ENERGY COMMISSION
Edmund G. Brown, Jr., Governor

DOCKET NUMBER 07-AFC-06C

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CARLSBAD ENERGY CENTER PROJECT AMENDMENT
(07-AFC-06C)
PRELIMINARY STAFF ASSESSMENT

LIST OF APPENDIX

LIST OF FIGURES

EXECUTIVE SUMMARY

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INTRODUCTION

This Preliminary Staff Assessment (PSA) is a publication by California Energy Commission (Energy Commission) staff for the Carlsbad Energy Center Project Amendment (amended CECP). The project owner and petitioner, Carlsbad Energy Center, LLC, (petitioner/project owner), an indirect, wholly owned subsidiary of NRG, Inc., proposes to modify the project approved by the Energy Commission on May 31, 2012 (licensed CECP).

This PSA contains staff's independent, objective evaluation of the petition to amend the Final Commission Decision of the licensed CECP in 21 separate, technical analyses. The analyses are similar to those normally contained in an Environmental Impact Report (EIR) required by the California Environmental Quality Act (CEQA).

For an amendment of an existing power plant over which it retains regulatory oversight, the Energy Commission is the lead agency under CEQA. The Energy Commission's certified regulatory program provides the environmental analysis that satisfies CEQA requirements. In fulfilling this responsibility, Energy Commission staff provides an independent assessment of the amendment's engineering design, evaluates its potential effects on the environment and on public health and safety, and determines whether the project, if modified, would remain in conformance with all applicable local, state, and federal laws, ordinances, regulations and standards (LORS). LORS compliance and determinations of key federal Clean Air Act and Clean Water Act requirements are made by staff's active coordination with, and incorporation of, other regulatory agencies and their findings (such as the San Diego Air Pollution Control District and its Preliminary Determination of Compliance [PDOC]). The result of staff's research, collaboration and comprehensive process of discovery and analysis are recommendations for additional mitigation requirements to existing conditions of certification to mitigate any significant adverse environmental effects resulting from the proposed modifications.

For the ease of the reader, this PSA provides a description of the environmental setting of the entire project. However, because this is an amendment to an existing Energy Commission license, staff's analysis focuses on the modifications proposed by the amended CECP. These specific changes are explained in detail in the **PROJECT DESCRIPTION** section. A summary of the amended CECP is provided below.

This PSA is not the decision document for these proceedings, nor does it contain findings of the Energy Commission related to environmental impacts or the project's

compliance with local, state, and federal LORS. Rather, the PSA is a precursor to the Final Staff Assessment (FSA), which will serve as staff's testimony during evidentiary hearings scheduled to be held in March of 2015 by an assigned Committee of two Energy Commissioners (Commissioner and Presiding member Karen Douglas, and Commissioner and Associate member Andrew McAllister), and a Hearing Officer (Chief Hearing Officer Paul Kramer). During evidentiary hearings, the Committee will consider testimony, comment and input provided and presented by staff, the applicant, intervenors, governmental agencies, tribes, and the public. The Committee will then engage in deliberation and review of the record before writing and submitting the Presiding Member's Proposed Decision (PMPD) for a 30-day public comment period and then to the full Commission for consideration and action. Following a public hearing, most likely during a monthly Business Meeting, the full Energy Commission will make a final decision on the amended CECP proposal, expected late in the second quarter of 2015.

NECESSITY OF PROPOSED CHANGES

California Code of Regulations, title 20, sections 1769(a)(1)(B) and 1769(a)(1)(C) of the California Energy Commission (Energy Commission) Siting Regulations, require a discussion of the necessity for the proposed changes to the project and whether the modifications sought by a project owner/petitioner are based on information known by the petitioner during the original certification proceeding. In this amendment proceeding, the purpose of the proposed amended CECP changes are to ensure regional electrical reliability and provide for fast-response peaking generation that best responds to the unanticipated retirement of the San Onofre Nuclear Generating Station (SONGS) in June of 2013.

PROJECT BACKGROUND

The amended CECP evolved from a series of meetings and discussions which began in late 2013 between the licensed CECP project owner and its parent company (NRG, Inc.), the city of Carlsbad, its water agency (Carlsbad Municipal Water District), and the local investor-owned utility, San Diego Gas and Electric (SDG&E.) The signed "Settlement Agreement" included demolition and removal of the Encina Power Station by a date certain; allowing the state to meet its policy goals regarding eliminating impacts of once-through power plant cooling; reducing visual blight and other environmental impacts at the Encina Power Station site; and meeting documented local capacity requirements and grid stability in this region of San Diego County by adding new generation to help off-set the June 7, 2013 closure of the 2,200-MW SONGS facility located 25 miles north of the project site in San Clemente, California.

PROPOSED PROJECT LOCATION AND DESCRIPTION

The amended CECP would still be located on the northeastern corner of the 95-acre EPS site in the northern coastal San Diego County city of Carlsbad, California. Prior to construction of the amended CECP, the petitioner seeks permission to demolish three above-ground fuel oil storage tanks (AST) —ASTs 1 and 2 (to provide space for construction lay-down) and AST 4 (which, along with ASTs 5, 6 and 7 constitute the EPS eastern tank farm and the 30-acre footprint where the amended CECP power plant would be constructed and operate). Following successful commercial operation, the petitioner seeks a three-year period of decommissioning and demolition of all above-ground EPS facilities west of the North County Transit District (NCTD) railroad tracks.

These proposed changes were filed by the project owner in two petitions (filed in late April and early May, 2014) seeking to amend the licensed project, that were combined into one procedure by the Committee reviewing this case. The purpose of this PSA is to provide clarification of the modifications to the licensed CECP, and analyze whether these proposed changes would result in any new impacts or any increase in the severity of impacts addressed in the licensed CECP proceeding, and that the amended CECP would continue to conform to local, state, and federal LORS.

PROJECT OBJECTIVES

Based upon a review of the project objectives included in the Final Decision for the **licensed CECP** (CEC 2012a, pg. 3-2) and the **May 2, 2014** Petition to Amend (PTA) (LL 2014, pg. 1-6), staff developed the following objectives to guide the **amended CECP** alternatives analysis. These objectives are consistent with the petitioner's proposal but are not so narrow as to limit consideration of potentially feasible alternatives to construction of the amended CECP, as proposed. The project objectives for the proposed amended CECP are as follows:

- Meet the expanding need for new, highly efficient, reliable electrical generating resources that are dispatchable by the California Independent System Operator (CAISO), and are located in the "load pocket" of the San Diego region.
- Improve San Diego regional electrical system reliability through fast-starting generating technology, creating a rapid responding resource for peak demand situations, and providing CAISO a dependable resource to backup intermittent renewable resources like wind generation and solar.
- 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 energy and environmental agencies in California, including the California Public Utilities

Commission (CPUC), State Water Resources Control Board, Energy Commission, CAISO, and

- Use existing infrastructure to accommodate replacement generation and reduce environmental impacts and costs and avoid Greenfield development.
- Meet the commercial qualifications for long-term power contract opportunities in southern California as determined by the regional investor-owned utility, SDG&E.
- Modify the licensed CECP to include the retirement of all five EPS units allowing for faster and more complete response to both the pending OTC reductions, and grid support to help replace energy lost to the system from the June 7, 2013 shutdown of the San Onofre Nuclear Generating Station.
- Facilitate redevelopment of Brownfield sites in proximity to existing infrastructure.
- Meet the demand for fast response, highly efficient peaking capacity to provide grid stability to accommodate increased renewable energy generation by adding dispatch capabilities to accommodate planned and unplanned grid outages in response to excessive demands and natural disasters.
- Eliminate overrides of LORS that are no longer necessary or appropriate.
- Modify design aspects of the project to reduce potential environmental impacts and to integrate community-desired development on and adjacent to the site.

CUMULATIVE IMPACTS

Preparation of a cumulative impact analysis is required under CEQA. In the CEQA Guidelines, “a cumulative impact consists of an impact which is created as a result of the combination of the project evaluated in the EIR together with other projects causing related impacts” (14 Cal. Code Regs., §15130(a)(1)). Cumulative impacts must be addressed if the incremental effect of a project, combined with the effects of other projects is “cumulatively considerable” (14 Cal. Code Regs. §15130(a)). Such incremental effects are to be “viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects” (14 Cal. Code Regs., §15164(b)(1)). Together, these projects comprise the cumulative scenario which forms the basis of the cumulative impact analysis.

CEQA also states that both the severity of impacts and the likelihood of their occurrence are to be reflected in the discussion, “but the discussion need not provide as great detail as is provided for the effects attributable to the project alone. The discussion of cumulative impacts shall be guided by standards of practicality and reasonableness, and shall focus on the cumulative impact to which the identified other projects contribute rather than the attributes of other projects which do not contribute to the cumulative impact” (14 Cal. Code Regs., §15130(b)).

DEFINITION OF THE CUMULATIVE PROJECT SCENARIO

Cumulative impacts analysis is intended to identify past, present, and probable future actions that are closely related either in time or location to the project being considered, and consider how they have harmed or may harm the environment. Most of the projects listed in the cumulative projects tables (**Executive Summary Table 1)** have, are, or will be required to undergo their own independent environmental reviews under CEQA.

Executive Summary Table 1
Amended Carlsbad Energy Center Project – Master List of Cumulative Projects

Label ID and Shape		Project Name	Project Description	Location	Distance from amended CECP site (Miles)	Status	Estimated or Actual Construction Start Date & Duration
1	point	Demolition of above-ground storage tanks 5, 6, and 7	Demolition of above-ground storage tanks (ASTs) 5, 6, and 7; berm removal between ASTs 5 and 6 and 6 and 7; and remediation activities for ASTs 5, 6, and 7.	amended CECP power plant site, Carlsbad	0.00	Approved	Speculative, but estimated in the 1st or 2nd quarter of 2015 (prior to Phase I of the amended CECP).
1	line	Carlsbad Double Track	Add two miles of second track and replace Agua Hedionda Lagoon rail bridge.	North Coast Corridor, near Agua Hedionda Lagoon, Carlsbad	0.086	Operational	Construction completed early 2012
2	line	Two HOV Lanes from Manchester Avenue to SR 78	Add one HOV lane in each direction from Manchester Avenue to SR 78 including the San Elijo and Batiquitos lagoon bridge replacements, Manchester direct access ramp, and bike/pedestrian Trails under I-5 across the lagoons.	Interstate 5, Manchester Ave. to State Route 78 (SR-78), Encinitas and Carlsbad	0.095	Unknown	Construction begins late 2015
3	line	Manchester Avenue to SR 78 Soundwalls	Construct soundwalls on private property from Manchester Avenue to SR 78.	Interstate 5, Manchester Ave. to State Route 78 (SR-78), Encinitas and Carlsbad	0.095	Unknown	Construction begins early 2016
2	point	Capital Improvement Program (CIP) – Vista/Carlsbad Interceptor Agua Hedionda Lift Station (VC 12)	Replace existing sewer lift station and sewer line with new lift station and line. The total project extends 2.35 miles north-south.	South shore of Agua Hedionda Lagoon adjacent to east side of railroad tracks.	0.178	Coastal Development Permit has been issued by Coastal Commission.	Construction expected to begin early 2015 and end 2017.
3	point	Carlsbad Desalination Project (Poseidon)	50-million gallon per day seawater desalination plant, pipelines, pumps, and other appurtenant and ancillary water facilities to produce and distribute potable water. Includes conveyance pipeline: a ten-mile, 54-inch water delivery pipeline that will travel eastward from the seawater desalination plant through Carlsbad, Vista and San Marcos to San Diego County Water Authority's Second Aqueduct connection facility in San Marcos.	Carlsbad Blvd. / Cannon Road, Carlsbad	0.466	In construction	Construction began late 2012, estimated to be operational November 2015

Label ID and Shape		Project Name	Project Description	Location	Distance from amended CECP site (Miles)	Status	Estimated or Actual Construction Start Date & Duration
4	point	Hallmark Property (mitigation for I-5 Express Lanes Project)	Preserve and create a total of 19.3 acres of coastal habitat adjacent to the Agua Hedionda Lagoon in Carlsbad.	Near Agua Hedionda Lagoon, Carlsbad	0.659	Unknown	Restoration begins in 2015
4	line	Carlsbad Boulevard	Road and pedestrian improvements from Cannon Road to Manzano Drive	Carlsbad Blvd/Cannon Road south to Carlsbad Blvd/Manzano Dr., Carlsbad	0.673	Unknown	2016 to late 2017
5	point	Floral Trade Center	Development of a new 44,180 sq. ft. floral trade distribution center and marketplace, 9,900 sq. ft. micro-brewery and winery building, 1984 sq. ft. culinary center, and 896 sq. ft. farm shed with the remaining land dedicated to farm plots, orchard, hops farm, vineyard and parking on 17.22 acres of land within a 45.60 acre site.	South of Cannon Road and East of Car Country Drive	0.841	Road improvements for project currently being constructed in conjunction with Carlsbad desalination pipeline on Cannon Road	Grading and building permits have not been issued. Unknown construction start of buildings.
5	line	Carlsbad Village Double Track	Add one mile of second track through Carlsbad Village Station and new rail bridge across Buena Vista Lagoon. Funded through design.	North Coast Corridor, near Carlsbad Village Station and Buena Vista Lagoon, Carlsbad	0.865	Unknown	Environmental Completion: Late 2014. Funded through design.
6	point	CP Juniper Apartments	Three story, four unit apartment complex	385 Juniper Ave., Carlsbad	0.874	Approved, needs construction permits	Estimated start construction January 2015, 4 to 5 month duration
7	point	Tram Property	Two story building with office on ground floor and apartment on second floor	3147 Roosevelt St, Carlsbad	1.385	In construction	Estimated completion July-August 2014
8	point	State Mixed Use 30	Four story mixed use building	3068 State St, Carlsbad	1.452	Application in, no entitlements	Unknown
9	point	Bicajessee Adventures	Convert six office units to condos	2815 Jefferson St, Carlsbad	1.678	needs Village Review permit	Existing building, no construction
10	point	Railroad Lofts	Four condos	2685 State St, Carlsbad	1.775	In construction	Estimated completion summer 2014

Label ID and Shape		Project Name	Project Description	Location	Distance from amended CECP site (Miles)	Status	Estimated or Actual Construction Start Date & Duration
11	point	Costco Gas Station Canopy	Add three new dispensers and new canopy	951 Palomar Airport Rd, Carlsbad	1.783	Approved	Start construction 2014, one month duration
6	line	Buena Outfall Force Main Phase 3	New sewer line belonging to Vista. 18-24 inch 17,700 foot long pipeline, part gravity and part force main sewer line along Palomar Airport Road.	North side of Palomar Airport Rd between Paseo Del Norte & El Camino Real, Carlsbad	1.904	Awaiting more info to complete Coastal Development Permit	Estimated start sometime 2015; one year duration
12	point	State Street Townhomes	41 market rate & 6 inclusionary housing units with ground level office/flex space for live-work. Includes demo of approx. 32,000 sq. ft. of existing commercial and light industrial uses.	2531-2586 State St, Carlsbad	1.944	Pending approval of Final Map	Construction expected to start November 2014 with estimated completion by the end of 2015 or early 2016
13	point	De Anda Residence	Construct a 3,412 sq. ft. single-family residence with attached two-car garage, and an attached 640 sq. ft. second dwelling unit with a one-car garage.	Jefferson St & Las Flores Dr, Carlsbad	2.201	Awaiting building permits	Estimated start construction July 2014, duration 4 months
14	point	Robertson Ranch East Village	469 residential units, 78 multi-family and the rest single family detached	NE corner of El Camino Real and Cannon Rd, Carlsbad	2.219	In construction	Construction almost complete, finish by end of 2014
15	point	Robertson Ranch West Village	Master Planned development for 653 residential units and 150,000 sq ft commercial. 414 residential units to be multi-family, remaining will be single family detached.	NE corner of El Camino Real and Cannon Rd, Carlsbad	2.325	Approval of discretionary applications for construction of commercial and residential components required. Applications not submitted.	Grading permit issued August 2014 and expected to be complete within 12 months or less
16	point	Poinsettia Station Improvements	Improve Poinsettia Station in Carlsbad to include new grade-separated pedestrian crossing and signals.	North Coast Corridor, Poinsettia Station, Carlsbad	2.373	Unknown	Construction Early 2015

Label ID and Shape		Project Name	Project Description	Location	Distance from amended CECP site (Miles)	Status	Estimated or Actual Construction Start Date & Duration
17	point	Tabata 10	26 single family residences	2311 Camino Hills Dr, Carlsbad	2.779	Approved	Expected start construction July 2014, duration about 1 year
18	point	Quarry Creek	636 residential units, a 0.5-acre nature/education center, a 1.5-acre community facilities site, a 1.3-acre park and ride site, 92.4 acres of natural open space, and supporting infrastructure on a 155.4-acre site in Carlsbad.	South of Haymar Dr between College Blvd & El Camino Real, Carlsbad	2.937	Master Plan project. Can start grading, putting in utilities, but needs more permits to build	Estimated construction start January 2015, duration 5 years
19	point	Daybreak Community Church	Addition of 17,391 sq. ft., 30-foot-tall assembly building to existing church. New assembly building accommodate up to 1,010 seats. 53 parking spaces removed from existing parking lot and 221 parking spaces added on vacant parcel to the west. New access driveway proposed off Fisherman Drive to the west.	6515 Ambrosia Ln, Carlsbad	3.591	Approved by city. Requires approval of an LCPA by the CCC	Construction on parking lot is expected start January 2015. Estimated start for construction of church addition January 2016.
20	point	Ayoub Property (mitigation for I-5 Express Lanes Project)	Protect 21.7 acres of coastal sage scrub habitat at the Batiquitos Lagoon in Carlsbad.	Batiquitos Lagoon, Carlsbad	3.833	Unknown	Unknown
21	point	ViaSat Expansion	Two office buildings and pedestrian walkway across El Camino Real with signalized light	NE corner of Gateway Rd and El Camino Real, Carlsbad	4.133	In construction	One building in construction, estimated completion January 2015. No estimate for second building
22	point	Shea Industrial Bressi Ranch	Two industrial/warehouse buildings	6131 Innovation Way, Carlsbad	4.362	Application in, no entitlements	Unknown
23	point	Holiday Inn	133 rooms, 83,693 sq ft three-story hotel	south of Palomar Airport Road, east of Innovation Way, and west of Colt Place, Carlsbad	4.470	In construction	Expected completion end of 2014 or beginning of 2015

Label ID and Shape		Project Name	Project Description	Location	Distance from amended CECP site (Miles)	Status	Estimated or Actual Construction Start Date & Duration
24	point	Staybridge Suites	106 rooms, 73,737 sq ft three-story hotel	south of Palomar Airport Road, east of Innovation Way, and west of Colt Place, Carlsbad	4.545	In construction	Expected completion end of 2014 or beginning of 2015
25	point	Aviara Animal Health Center	Tenant improvements & expansion of existing animal hospital	6986 El Camino Real Ste 1, Carlsbad	4.691	Approved, but has not received building permits	Expected to be completed in 2014
26	point	La Costa Town Center Renovation	Additional 3,000 sq ft retail, 60 apartment units	La Costa Avenue and El Camino Real, Carlsbad	5.400	Approved but must appeal to city council; lawsuit possible	Unknown
7	line	La Costa Recycled Water Pipeline	Construction of 5200 foot-long eight-inch pipeline for recycled water	East side of El Camino Real between Alga Rd & Costa Del Mar Rd, Carlsbad	5.693	Waiting for funding, Coastal Development Permit	Expected start late summer/early fall 2014, six month duration
27	point	La Costa Villas	Eight, three-story condos	7570 Gibraltar St, Carlsbad	6.313	Planning Commission hearing 5/21/2014	Start construction 2014, one year duration
28	point	La Costa Town Square	258,000 sq ft retail	3434 Via Mercato, Carlsbad	7.088	In construction	Completion 2015
29	point	Westfield Carlsbad	Remodel and expand existing mall; addition of 226,000 sq ft, including movie theater, gym with indoor pool, and rooftop basketball court	2525 El Camino Real #100, Carlsbad	7.183	In construction	Estimated completion November 2014
30	point	Commercial Office	8,025 sq ft commercial office building	Rancho Santa Fe Rd and La Costa Ave, Carlsbad	7.250	In construction	Estimated completion early 2015
31	point	La Costa Town Square Residential 63	63 single family homes	7329 Calle Pera, Carlsbad	7.317	In construction	Estimated completion November 2014-February 2015
32	point	Blackstone Ranch	49 single family homes	Camino Junipero and Avenida Amapola, Carlsbad	7.858	In construction	Estimated completion February 2015

Under CEQA, there are two acceptable and commonly used methodologies for establishing the cumulative impact setting or scenario: the "list approach" and the "projections approach." The first approach would use a "list of past, present, and probable future projects producing related or cumulative impacts." (14 Cal. Code Regs., §15130(b)(1)(A)). The second approach is to use a "summary of projections contained in an adopted general plan or related planning document, or in a prior environmental document which has been adopted or certified, which described or evaluated regional or area wide conditions contributing to the cumulative impact." (14 Cal. Code Regs., §15130(b)(1)(B)). This PSA uses the "list approach" for purposes of state law to provide a tangible understanding and context for analyzing the potential cumulative effects of the proposed project.

In order to provide a basis for cumulative analysis for each discipline, this section provides information on other projects in both maps and tables. All projects used in the Cumulative Impacts Analysis for this PSA are provided in cumulative projects tables. **Executive Summary Figure 1,** presented at the end of this section, shows project sites.

APPROACH TO CUMULATIVE IMPACT ANALYSIS

This PSA evaluates cumulative impacts within the analysis of each resource area, following these steps:

- Define the geographic scope of cumulative impact analysis for each discipline, based on the potential area within which impacts of the amended CECP could combine with those of other projects.
- Evaluate the effects of the amended CECP in combination with past and present (existing) projects within the area of geographic effect defined for each discipline.
- Evaluate the effects of the amended CECP with foreseeable future projects that occur within the area of geographic effect defined for each discipline.

ENVIRONMENTAL JUSTICE

Environmental justice communities are commonly identified as those where residents are predominantly minorities or low-income; where residents have been excluded from the environmental policy setting or decision-making process; where they are subject to a disproportionate impact from one or more environmental hazards; and where residents experience disparate implementation of environmental regulations, requirements, practices, and activities in their communities. Environmental justice efforts attempt to address the inequities of environmental protection in these communities.

An environmental justice analysis is composed of three parts:

1. Identification of areas potentially affected by various emissions or impacts from a proposed project;

2. A determination of whether there is a significant population of minority persons or persons below the poverty level living in an area potentially affected by the proposed project; and

3. A determination of whether there may be a significant adverse impact on a population of minority persons or persons below the poverty level caused by the proposed project alone, or in combination with other existing and/or planned projects in the area.

California law defines environmental justice as "the fair treatment of people of all races, cultures and income with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies" (Gov. Code §65040.12; Pub. Resources Code, §72000). All departments, boards, commissions, conservancies and special programs of the Resources Agency must consider environmental justice in their decision-making process if their actions have an impact on the environment, environmental laws, or policies. Such actions that require environmental justice consideration may include:

- adopting regulations;
- enforcing environmental laws or regulations;
- making discretionary decisions or taking actions that affect the environment;
- providing funding for activities affecting the environment; and
- interacting with the public on environmental issues.

DEMOGRAPHIC SCREENING ANALYSIS

As part of its CEQA analysis for the Petition to Amend the CECP's 2012 Commission Decision, Energy Commission staff used demographic screening to determine whether a low-income and/or minority population exists within the potentially affected area of the amended CECP site[1]. The demographic screening is based on information contained in two documents: *Environmental Justice: Guidance Under the National Environmental Policy Act* (CEQ, 1997) and *Guidance for Incorporating Environmental Justice Concerns in EPA's Compliance Analyses* (US EPA, 1998), which provides staff with information on outreach and public involvement.

Minority Populations

According to *Environmental Justice: Guidance Under the National Environmental Policy Act*, minority individuals are defined as members of the following groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic. An environmental justice population is identified when the minority population of the potentially affected area is greater than fifty percent or the minority population

[1] Demographic screening data is presented in the Socioeconomics section.

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

Based on the 2010 Census data presented in **Socioeconomics Figure 1**, the total population within the six-mile radius of the project site was 158,518 persons with a minority population of 61,357 persons, or 38.7 percent of the total population. As the minority population is less than fifty percent, this population does not constitute an environmental justice population as defined by *Environmental Justice: Guidance Under the National Environmental Policy Act*, and would not trigger further scrutiny for purposes of an environmental justice analysis.

Below-Poverty-Level-Populations

The official poverty thresholds do not vary by geography (e.g. state, county, etc.), but are updated annually to allow for changes in the cost of living. The population for whom poverty status is determined does not include institutionalized people, people in military quarters, people in college dormitories, and unrelated individuals under 15 years old.

Staff's demographic screening also identifies the presence of below-poverty-level populations within a six-mile buffer of the proposed project site. The CEQA and US EPA guidance documents identify a fifty-percent threshold to determine whether minority populations are considered environmental justice populations, but do not provide a similar threshold for below-poverty-level populations. As an initial indicator of whether a low-income population of sufficient size is present and would warrant status as an environmental justice community, staff compared the below-poverty-level populations in the six-mile radius to other appropriate reference geographies. Staff used data for the Oceanside-Escondido Census County Division (CCD), San Diego County, and California as reference geographies to compare levels of poverty in populations near the project.

Approximately 12 percent, or 49,205 people, in the six-mile buffer, live below the federal poverty threshold. Of the cities used to determine the poverty status within the six-mile radius, the city of Vista stands out with 15.2 percent of the population living below the poverty level, compared with the three other cities' (Carlsbad, Encinitas, and Oceanside) more moderate nine to 12 percent below-poverty-level population. Other reference geographies had percentages ranging from 13.7 percent for the project area CCD to California's 15.3 percent. Staff concludes that the below-poverty-level population in a six-mile radius of the project site is not meaningfully greater than the below-poverty-level population in the reference geographies, and does not constitute an environmental justice population as defined by *Environmental Justice: Guidance Under the National Environmental Policy Act* and would not trigger further scrutiny for purposes of an environmental justice analysis.

PROJECT ALTERNATIVES

Project alternatives developed for the amended CECP are fully discussed in the Alternatives section of this PSA, and include an evaluation of the following:

1. No Project Alternative Scenario One: construction of the licensed CECP ("licensed CECP scenario").

2. No Project Alternative Scenario Two: continuance of current conditions at the EPS site with no new construction "no-build scenario").

SUMMARY OF ENVIRONMENTAL CONSEQUENCES AND MITIGATION

Below is a summary of environmental consequences and mitigation proposed in this PSA. This section also provides a summary of outstanding information that will be analyzed in the FSA.

Executive Summary Table 2
Environmental and Engineering Assessment

Technical Area	Complies with LORS	Impacts Mitigated	Additional Information Required
Air Quality/Greenhouse gases	Yes	Yes	No
Biological Resources	Yes	Yes	No
Cultural Resources	Yes	Undetermined	**Yes**
Hazardous Materials	Yes	Yes	No
Land Use	Yes	Yes	No
Noise and Vibration	Yes	Yes	No
Public Health	Yes	Yes	No
Socioeconomics	Yes	Yes	No
Soil and Water Resources	Yes	Yes	Yes
Traffic & Transportation	Yes	Yes	No
Transmission Line Safety/Nuisance	Yes	Yes	No
Visual Resources	Yes	Yes	No
Waste Management	Yes	Yes	No
Worker Safety and Fire Protection	Yes	Yes	No
Facility Design	Yes	Yes	No
Geology & Paleontology	Yes	Yes	No
Power Plant Efficiency	N/A	Yes	No
Power Plant Reliability	Yes	Yes	No
Transmission System Engineering	Yes	Yes	No

AIR QUALITY/GREENHOUSE GASES

For construction and demolition-related impacts, staff concludes that the amended CECP would have less than significant air quality impacts if the amended staff conditions of certification are implemented.

For operation-related impacts, staff concludes that the amended CECP would be consistent with the applicable air quality laws, ordinances, regulations, and standards,

as confirmed by the District's Preliminary Determination of Compliance, if the amended staff and District conditions of certification are implemented.

Staff has concluded that the amended CECP would have less than significant GHG emissions impacts because it would not cause an increase in GHG emissions from the electricity sector and it would comply with all relevant GHG emission reduction regulations and policies. Additionally, staff has also determined that the amended CECP would be consistent with all three main conditions in the precedent decision regarding GHG emissions established by the Avenal Energy Project's Final Energy Commission Decision (not increase the overall system heat rate for natural gas plants, not interfere with generation from existing or new renewable facilities, and ensure a reduction of system-wide GHG emissions).

BIOLOGICAL RESOURCES

The amended project would occur on a heavily developed industrial site; all native vegetation has been previously removed. Therefore, the site is not expected to support any sensitive plant or wildlife species, and would have no onsite impacts on sensitive or special status species. Offsite, the adjacent Agua Hedionda Lagoon supports special status species that may be impacted by the project; however, these offsite impacts have been determined to be similar to impacts associated with the licensed project; and require no new conditions of certification. Staff has proposed deleting Condition of Certification **BIO-9**, as it covered an action that is no longer part of the project description, and proposed minor edits to **BIO-6**, **BIO-7,** and **BIO-8**. With the implementation of Conditions of Certification **BIO-1 through BIO-8**, the project would remain in compliance with all LORS and all direct, indirect, and cumulative impacts would be avoided, minimized, or mitigated to less than significant levels.

CULTURAL RESOURCES

Staff has not identified any impacts to historic built-environment or ethnographic resources for the amended CECP. However, staff has identified cultural resources data needs and has requested permission from the petitioner to gain access to the sites to conduct archaeological investigations at the amended CECP project site. This information is needed to complete the FSA. If staff is unable to obtain the data, the Commission could assume the presence of resources eligible for listing on the California Register of Historic Resources, and apply mitigation

EFFICIENCY

While the project would consume substantial amounts of energy, it would do so in a sufficiently efficient manner to satisfy the project's objectives of producing peak load electricity and ancillary load-following services. 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 conditions of certification apply to Power Plant Efficiency.

FACILITY DESIGN

Staff has evaluated the proposed engineering LORS, design criteria, and design methods in the record, and concludes that the project will comply with applicable engineering LORS. The Facility Design conditions of certification will ensure that the amended CECP is completed in accordance with these LORS.

GEOLOGY & PALEONTOLOGY

The site is subject to strong seismic shaking originating from earthquakes from a variety of local and regional sources. The site is also subject to other less significant geologic hazards. Staff concludes that, with recommended mitigation, potential adverse impacts to the project facilities from geologic hazards during their design life would be less than significant.

While no geologic or mineralogic resources occur on the project site, paleontological resources have been recovered from soils similar to those that underlie the site. Staff concludes that, with recommended mitigation, the potential impacts to geologic, mineralogic, and paleontologic resources from the construction, operation, and closure of the proposed project would be less than significant.

Staff concludes that the amended CECP would be designed and constructed in accordance with all applicable laws, ordinances, regulations, and standards (LORS) applicable to geological and paleontological resources, and in a manner that both protects environmental quality and assures public safety.

HAZARDOUS MATERIALS

Energy Commission staff concludes that if, during tank demolition, construction, and operation of the amended Carlsbad Energy Center Project, and the closure/decommissioning and demolition of the Encina Power Station (EPS), the project owner fulfills the requirements of existing Conditions of Certification **HAZ-1** through **-10** (with minor revisions to reflect tank demolition, demolition of the EPS, scheduling, and an update to **HAZ-10**), the amended project would incorporate sufficient measures to ensure compliance with applicable laws, ordinances, regulations, and standards.

Staff has also determined that the proposed amended CECP would not have a direct incremental or cumulative hazardous materials management impact under both normal and unique catastrophic circumstances and thus mitigation beyond that already required is not needed.

LAND USE

Staff concludes that the construction and operation of the amended CECP would be consistent with applicable laws, ordinances, regulations, and land use standards (LORS), with the exception of a 35-foot height limitation in the Agua Hedionda Land Use Plan for future buildings. The May 31, 2012, Commission Final Decision for the licensed CECP adopted override findings, under both the Warren-Alquist Act and the California Environmental Quality Act (CEQA), for nonconformance with several land use LORS, including the 35-foot height limitation. Staff does not believe the nonconformance with

the height limitation would be a significant impact under CEQA, and recommends that only a LORS override is needed for the amended CECP.

NOISE AND VIBRATION

The Noise and Vibration conditions of certification will ensure that the demolition, construction, and operational activities related to the amended CECP would comply with all applicable noise and vibration LORS and would produce no significant adverse noise impacts on people within the affected area, directly, indirectly, or cumulatively.

PUBLIC HEALTH

Energy Commission Staff concludes that the amended Carlsbad Energy Center Project, which includes tank demolition, construction and operation of the amended CECP and the closure/decommissioning and demolition of the Encina Power Station (EPS), would incorporate sufficient measures to ensure that the risks to the off-site public are less than significant and that it would comply with applicable laws, ordinances, regulations, and standards. Staff has calculated the maximum theoretical risk and hazard to the nearby public due to emissions from the facility using the most recent Cal-EPA approved methodology and found that the risk and hazard would be lower than that calculated by staff for the licensed project. Staff also concludes that the facility would not contribute to a significant public health cumulative impact.

RELIABILITY

A water will-serve letter is needed before staff can conclude that the sources of the potable or recycled water supplies are adequate to yield reliable operation of this project. Upon receiving this letter, staff can then conclude that the amended CECP would operate in a manner consistent with industry norms for reliable operation. No conditions of certification apply to Power Plant Reliability.

SOCIOECONOMIC RESOURCES

Staff has determined that like the licensed CECP, the demolition, remediation, construction, decommissioning, site restoration, and operation activities associated with the amended CECP in Carlsbad, California, would not cause a significant adverse direct, indirect or cumulative socioeconomic impact on the area's housing, schools, law enforcement, or parks and recreation. Like the licensed CECP, the amended CECP would not induce a substantial population growth or displacement of population, or induce substantial increases in demand for housing, law enforcement services, or parks and recreation. Proposed minor edits to Condition of Certification **SOCIO-1** and a new proposed condition of certification, **SOCIO-2**, would ensure the amended CECP complies with state laws, which were not applicable to the licensed CECP (California Education Code and California Government Code).

SOIL & WATER RESOURCES

For purposes of the analysis, staff reviewed demolition activities applicable to the project. As such, conditions of certification were modified to include water use and

wastewater discharge for EPS demolition activities. In addition, staff requires use of recycled water for EPS demolition activities.

Because the amended CECP no longer proposes desalinated sea water as a water supply and no longer requires disposal of high-salinity industrial wastewater to the city's sewer system, conditions of certification were modified to reflect these changes. Other changes to conditions of certification limit potable water use to drinking, sanitary, and fire protection uses, allowing its use for industrial processes only as a temporary emergency backup.

Staff's analysis is incomplete because more information is needed. The city of Carlsbad expressed willingness to deliver recycled water to the project, but staff needs to review the terms of the recycled water supply. When data responses are provided, staff will complete the analysis for the Final Staff Assessment.

TRAFFIC & TRANSPORTATION

Staff recommends retaining the eight conditions of certification for the licensed CECP with minor changes as noted under the "Proposed Conditions of Certification" subsection of the Traffic and Transportation analysis. These conditions of certification are recommended to prevent significant adverse traffic and transportation-related impacts caused by amended CECP construction and operation and to ensure that the amended project would comply with all applicable laws, ordinances, regulations, and standards (LORS) pertaining to traffic and transportation. Energy Commission staff concludes that with implementation of Conditions of Certification **TRANS-1** through **TRANS-8,** the amended CECP, like the licensed CECP, would not generate a significant impact under the California Environmental Quality Act (CEQA) Guidelines with respect to CEQA Appendix G issues, "Transportation/Traffic."

TRANSMISSION LINE SAFETY/NUISANCE

The petitioner, Carlsbad Energy Center, LLC's amended Carlsbad Energy Center Project (the amended CECP) resulted from a settlement agreement by the petitioner, the city of Carlsbad (city), the Carlsbad Municipal Water District (CMWD), and San Diego Gas and Electric (SDG&E) on specific design and operational modifications to the CECP already licensed by the Energy Commission (licensed CECP). Some of these modifications would relate to the 138 kV and 230 kV transmission lines and related facilities as already approved. In the presently proposed transmission scheme, Units 6, 7, 8, and 9 would be connected to the SDG&E power grid using a new overhead 230-kV line, via the newly expanded 230 kV SDG&E Encina Switchyard. Units 10 and 11 would be connected to the SDG&E 138 kV Encina Switchyard using a new overhead 138 kV transmission line. Since, as with the licensed CECP, the proposed lines 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. As also with the licensed CECP, the proposed lines would be operated in the SDG&E service area and therefore, their design, erection, and maintenance plan would be according to standard SDG&E practices, which conform to applicable laws, ordinances, regulations and standards (LORS). Since the line designs and operations would be the same for both the licensed and amended CECP, staff considers the five

conditions of certification for the licensed CECP as adequate to also ensure against significant safety and nuisance impacts for the amended CECP.

TRANSMISSION SYSTEM ENGINEERING

Staff's analysis addresses the proposed interconnecting facilities for the amended Carlsbad Energy Center Project (CECP), including the 230 kV and 138 kV switchyards, the generator tie lines to the existing 138 kV and 230 kV Encina switchyards and their terminations, and San Diego Gas and Electric (SDG&E) reliability network upgrades and changes required for the project. Staff concludes the amended CECP would meet all industry standards and good utility practices, and comply with applicable engineering laws, ordinances, regulations, and standards (LORS).

Interconnection studies performed by the California Independent System Operator indicate that the transmission system impacts to the California grid could be mitigated by operating procedures and transmission line projects in the SDG&E annual plan. Therefore the proposed project could reliably interconnect to the SDG&E grid.

The amended CECP would conform to applicable LORS upon satisfactory compliance with the staff recommended conditions of certification.

VISUAL RESOURCES

Staff recommends retaining all visual resources conditions of certification for the licensed CECP, but proposes modifications to Conditions of Certification **VIS-3** and **VIS-5** to reflect changes in project design and changed circumstances. Minor edits are proposed to Conditions of Certification **VIS-1**, **VIS-2,** and **VIS-4**.

Staff concludes that with all proposed and recommended conditions of certification, potential project-specific visual impacts of the amended CECP could be mitigated to acceptable, less-than-significant levels. Energy Commission staff concludes that with implementation of proposed Conditions of Certification **VIS-1** through **VIS-5,** the amended CECP, like the licensed CECP, would not generate a significant impact under the California Environmental Quality Act (CEQA) Guidelines with respect to CEQA Appendix G issues, "Aesthetics."

WASTE MANAGEMENT

Staff anticipates that all amended CECP Waste Management conditions of certification approved for the licensed CECP will still apply to the amended CECP.

The available landfill capacity is sufficient to accommodate the amended construction operation and demolition activities, and the project would be consistent with the applicable waste management laws, ordinances, regulations, and standards if the amended CECP conditions of certification are implemented. No cumulative waste management impacts would occur.

WORKER SAFETY AND FIRE PROTECTION

Energy Commission staff (staff) has considered all relevant information as well as the views of the Carlsbad Fire Department and has determined that if existing and one proposed new condition of certification are adopted, the proposed amended Carlsbad Energy Center Project would provide adequate levels of industrial safety and fire protection, would comply with applicable laws, ordinances, regulations, and standards, and would not have a direct incremental or cumulative impact on the Carlsbad Fire Department's ability to respond to a fire or other emergency**.**

Staff concurs with the views expressed by the Carlsbad Fire Department that it has the ability to supply emergency services (fire, rescue, EMS, and hazmat spill response) during all phases of tank removal, construction, operation of the amended CECP, during demolition of the EPS, as well as during a major area-wide crisis. Furthermore, staff also agrees with the position of the Carlsbad Fire Department that the present site configuration that includes a below-ground bowl and the currently-aligned fire lanes would provide adequate access for emergency response personnel and equipment and also be safe for fire fighters.

REFERENCES

CEC2012a – California Energy Commission (TN66185). Commission Decision on the Carlsbad Energy Center Project Application for Certification, dated June 1, 2012. Submitted July 11, 2012.

CEQ 1997 – Council on Environmental Quality. *Environmental Justice: Guidance Under the National Environmental Policy Act. December 10,* 1997, <http://www.epa.gov/compliance/ej/resources/policy/ej_guidance_nepa_ceq1297.pdf>.

LL2014d – Locke Lord LLP (TN202287-2). Petition to Amend Carlsbad Energy Center Project. Submitted 05/02/2014.

LL2014e – Locke Lord LLP (TN202287-3). Petition to Amend Carlsbad Energy Center Project, Part Two, Appendix 2A-5.11A. Submitted 05/02/2014.

LL2014f – Locke Lord LLP (TN202326). Application for the Authority to Construct, (ATC) Petition to Amend. Submitted 05/13/2014.

US EPA 1998 – **United States Environmental Protection Agency**, *Final Guidance for Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analyses*. April 1998. <http://www.epa.gov/compliance/ej/resources/policy/ej_guidance_nepa_epa0498.pdf>.

EXECUTIVE SUMMARY - FIGURE 1

Carlsbad Energy Center Project Amendment - Cumulative Projects

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: OpenStreetMap July 2014, ESRI, Bing Aerial Image, City of Carlsbad, CEC Staff

INTRODUCTION

Mike Monasmith

On May 31, 2012, the California Energy Commission approved the 558-megawatt (MW) combined-cycle Carlsbad Energy Center Project (CECP) for construction and operation. The licensed CECP was to be a natural-gas fired, air-cooled power plant approved for construction on the northeastern section of the existing Encina Power Station (EPS) in Carlsbad, California. Its operation would have allowed for the permanent retirement of EPS Units 1-3. EPS Units 4-5 would continue operation, although a December 31, 2017 State Water Resources Control Board deadline for discontinuing use of seawater for once-through cooling (OTC) would necessitate future re-configuration of EPS' cooling system, or complete cessation of current electricity production.

A shift in the local and regional electricity landscape then occurred in 2013 with the closure of the San Onofre Nuclear Generating Station (SONGS) in San Clemente, California – 25 miles north of Carlsbad. As a 20 percent owner of SONGS, local investor-owned utility San Diego Gas & Electric (SDG&E) began the process of procuring new in-basin generation to replace SONGS, as well as to help integrate its growing portfolio of renewable energy production. A new round of procurement offers, and an agreement between SDG&E, the city of Carlsbad, the project owner, and other parties, resulted in the Carlsbad Energy Center, LLC, (petitioner) filing petitions with the California Energy Commission to amend the licensed CECP. The proposed amended CECP contains several modifications, the most notable being the redesign of CECP into a simple-cycle power plant and the shutdown and demolition of the existing Encina Power Station (EPS). All proposed modifications are described in the **PROJECT DESCRIPTION** section of this Preliminary Staff Assessment (PSA).

This PSA addresses potential impacts related to the construction and operation of the amended CECP, including the demolition of EPS. Where impacts are found to be the same or less than impacts of the licensed CECP, staff applied the existing conditions of certification, as contained in the Final Commission Decision for the licensed CECP dated May 31, 2012 (CEC2012a), to reduce those impacts to less than significant. Aspects of the modified project that are new or substantially different from the licensed project have been identified and examined for potential impacts.

In this document, the term "licensed CECP" refers to the approved project. The proposed modified project is referred to as the "amended CECP." The amended CECP would involve a schedule that could be described in four phases: (1) tank demolition and remediation; (2) construction, commissioning, and operation start up of the new power plant; (3) retirement and decommissioning of the EPS facility; and (4) demolition of the EPS facility. For details about the expected time periods of the amended CECP schedule, see Table 1 in the **PROJECT DESCRIPTION** section of this PSA. Demolition activities are analyzed as phases separate from the construction and operation of the CECP.

The amended CECP would consist of six, GE LMS 100 combustion-turbine units operating in simple-cycle mode. The amended CECP would generate a net of 632 MW (at 96 degrees Fahrenheit [°F] temperature and 36 percent relative humidity), and is designed to provide peaking power at a maximum 31 percent annual capacity factor.

The proposed modifications will align the project's capabilities with the expected needs of the electricity system. The amended CECP will be a peaking facility that is ideally suited to serve the needs of Southern California's electric system as it increasingly relies on intermittent renewable resources such as solar and wind facilities. The amended CECP is designed to provide the fast-start, peaking, and ramping capabilities that will be necessary to facilitate increasing reliance on renewable resources and displacement of older, less efficient, conventional facilities.

The six simple-cycle turbines will be capable of fast-start operation (within about ten minutes from cold status), and are designed to be started, ramped up and down, and shut down on an intra-day basis as needed to meet the needs of the system. With an expected maximum annual capacity factor of 31 percent, the modified amended CECP is designed specifically for fast-start, backup, and peaking service and is intended to operate when electricity needs cannot be met by resources that are higher in the state's preferred loading order as determined by the California Independent System Operator.

As noted above, SDG&E was one of the parties who signed the January 14, 2014 "Settlement Agreement" between petitioner, Carlsbad Energy Center, LLC, and its parent company, NRG, Inc., the city of Carlsbad, and the Carlsbad Municipal Water District. The PSA describes modifications and refinements to the licensed CECP that were first stipulated in the Settlement Agreement (Appendix 2A of the May 2, 2014 Petition to Amend). The PSA provides detailed analyses in 21 separate technical sections on whether the modifications and refinements sought by the petitioner would result in any environmental consequences not previously analyzed. As set forth below, the project modifications do not materially change the environmental consequences of the project, and, with appropriate mitigation, all impacts are expected to remain less than significant. Moreover, the modifications comply with all applicable laws, ordinances, regulations, and standards (LORS) at the local, state and federal level.

PROJECT DESCRIPTION

Mike Monasmith

INTRODUCTION

The Preliminary Staff Assessment (PSA) for the Carlsbad Energy Center Project Amendment (amended CECP) contains 21 technical analyses of potential environmental and public health and safety effects associated with the implementation of proposed modifications to the May 31, 2012 licensed CECP[1] approved by the California Energy Commission. The project owner and petitioner, Carlsbad Energy Center LLC, an indirect, wholly owned subsidiary of NRG Energy, Inc. (petitioner/project owner), proposes to modify the project licensed by the Energy Commission (licensed CECP) by amending the project (amended CECP).

The amended CECP would still be located on the northeastern corner of the 95-acre Encina Power Station (EPS) in the northern coastal San Diego County city of Carlsbad, California. Modifications to the licensed CECP electrical generation equipment and associated linear features include changes that would help fulfill the power generation needs of San Diego Gas & Electric (SDG&E) service territory, as well as provide local and electrical transmission grid support in San Diego County and the southern Orange County and Inland Empire communities served by the investor-owned utility. Prior to construction of the amended CECP, the petitioner seeks permission to demolish three above-ground fuel oil storage tanks—AST's 1 and 2 (to provide space for power plant construction parking and lay-down), as well as AST 4 (which, along w/ the ASTs 5, 6 & 7 currently constitute the EPS eastern tank farm, and would form the 30-acre footprint upon which the amended CECP power plant would be constructed and operate). Following successful commercial operation, petitioner seeks a maximum three-year period of EPS shutdown, decommissioning and demolition of all above-ground EPS facilities west of the North County Transit District (NCTD) railroad tracks.

The proposed changes of the amended CECP were filed by the petitioner/project owner in two separate petitions (one filed on April 29, 2014, and the second on May 2, 2014). The two petitions were consolidated and combined into one proceeding by the Committee reviewing this case on September 23, 2014. The purpose of this PSA is for staff to provide clarification on the modifications to the licensed CECP sought by the petitioner/project owner, and to analyze whether such proposed modifications would result in any new impacts or any increase in the severity of impacts previously analyzed and addressed in the licensed CECP proceeding. Staff will likewise review the amended

[1] California Energy Commission. 2012. *Carlsbad Energy Center Project Commission Decision.* June. Available online at: http://www.energy.ca.gov/2011publications/CEC-800-2011-004/CEC-800-2011-004-CMF.pdf.

CECP to determine if the modified project would conform to local, state, and federal laws, ordinances, regulations and standards (LORS).

NECESSITY OF PROPOSED CHANGES

California Code of Regulations, title 20, sections 1769(a)(1)(B) and 1769(a)(1)(C) of the California Energy Commission (Energy Commission) Siting Regulations require a discussion of the necessity for proposed changes to a licensed project, and whether the modification(s) are based on information known by the petitioner during the certification proceeding. The purpose of the proposed changes is to make the amended CECP conform to current electrical energy needs for fast-response peaking generation and to better respond to the unanticipated retirement of the San Onofre Nuclear Generating Station. Furthermore, and something that could not be anticipated during the original proceeding, changing circumstances since the licensed CECP approval in 2012 has created a unique opportunity for cooperation with the city of Carlsbad (city). The result of that cooperation was an agreement between the city and the project owner that began in 2013 and ultimately resulted in early 2014 in a changed project design, and the full shut down, demolition and removal of EPS Units 1 through 5 and other above-ground features on the 95-acre EPS property.

PROJECT BACKGROUND

As mentioned above, the amended CECP evolved from an initial series of meetings and discussions which began in late 2013 between the licensed CECP project owner and its parent company (Carlsbad Energy Center, LLC and NRG, Inc., respectively), the city of Carlsbad, its water agency (Carlsbad Municipal Water District), and the local investor-owned utility, San Diego Gas and Electric (SDG&E.) These discussions culminated on January 14, 2014, with a signed “Settlement Agreement” signed by all five parties. The agreement included the blueprint for the project modifications that would result in the amended CECP. The motivating factors for the five-party settlement agreement included several factors, including demolition and removal of the Encina Power Station by a date certain; allowing the state to meet its policy goals regarding eliminating impacts of once-through power plant cooling; reducing visual blight and other environmental impacts at the Encina Power Station site important to local Carlsbad residents; and meeting documented local capacity requirements and grid stability in this region of northern San Diego County by adding new generation to help off-set the premature closure of the 2,200-MW San Onofre Nuclear Generating Station in San Clemente, California on June 7, 2013.

PROJECT LOCATION AND REGIONAL SETTING

The amended CECP would be located on the northeastern section of the Encina Power Station (EPS) site, located immediately south of the Agua Hedionda Lagoon, within the city of Carlsbad, in northern San Diego County. The EPS and the amended CECP (as well as the Carlsbad Seawater Desalination Project) are located at 4600 Carlsbad

Boulevard, along the southern edge of the Agua Hedionda Lagoon on the Pacific Ocean. The EPS comprises approximately 95 acres, and is generally bounded by SDG&E property on the south; the Pacific Ocean and Carlsbad Boulevard on the west; Interstate 5 on the east; and the southern shore of the outer and middle basins of the Agua Hedionda Lagoon on the north (see **Project Description Figures 1** and **1A**).

DESCRIPTION OF LICENSED PROJECT

The licensed CECP would have been a 558-megawatt (MW) gross combined-cycle power generating facility configured with two, Siemens SCC6-5000F natural-gas fired combustion turbines and a steam-turbine generator in a combined-cycle configuration. As proposed, the 23-acre licensed CECP would be constructed and operated on the northeast section of the larger, 95-acre EPS power plant complex. The proposed amended CECP power plant site is currently occupied by the EPS east tank farm, including above-ground fuel oil storage tanks (AST's) 4, 5, 6, and 7.

Prior to demolition activities in Phase I for the amended CECP, above-ground fuel oil storage tanks (AST's) 5, 6, and 7 would have been removed, as previously approved by the licensed CECP permit. The following briefly outline the permitted tasks that will be performed in association of the removal of AST's 5, 6, and 7:

- Demolition of AST's 5, 6, and 7
- Berm removal between AST's 5 and 6 as well as ASTs 6 and 7
- Remediation activities for AST's 5, 6, and 7

The above activities are included as part of the amended CECP's cumulative setting.

DESCRIPTION OF PROPOSED CHANGES

The 632-MW amended CECP would be located at the same, slightly larger northeastern parcel of the 95-acre EPS power plant complex. The amended CECP would involve several phases over a 64 month period. These phases, described in detail below, would include the Phase I demolition of above-ground fuel oil storage tanks (ASTs) 1, 2 and 4 (following demolition of those AST's permitted by the licensed CECP for demolition, i.e. AST's, 5, 6 and 7). Phase II would involve the construction, commissioning and operation of the amended CECP power plant. Following commercial operation of the amended CECP, Phase III would begin (on or before December 31, 2017); a maximum 12-month EPS phase including cessation of all once-through seawater cooling (OTC), per the state water board OTC deadline of December 31, 2017. The final Phase IV of the amended CECP involves the demolition of EPS Units 1-5, the 200-ft. concrete enclosure building housing the units, the 400-ft exhaust stack and other above-ground ancillary facilities located west of the North Coast Transit District (NCTD) railroad tracks. The only facilities west of the railroad tracks that would remain following Phase IV demolition would be facilities associated with the Carlsbad Seawater Desalination

Project (CSDP), and transmission and linear features necessary for the operation of the amended CECP power plant.

The amended CECP electrical generation power plant re-configuration would include six simple-cycle LMS100 natural gas-fired combustion turbines (designated amended CECP Units 6, 7, 8, 9, 10 and 11). Similar to the licensed CECP, the amended CECP units would interconnect with SDG&E's 138-kv and 230-kV switchyard facilities. The estimated total length of the 230kV overhead conductor is 2,790 ft. The estimated total length of the 138kV overhead conductor is 1,665 ft. All key power plant operation and maintenance features would be located to the eastern side of the railroad tracks within the 30-acre project footprint (an expansion of seven acres from the licensed CECP footprint). Relocated features would include a new administrative and control building and smaller warehouse.

While the licensed CECP would have consisted of two combustion turbine generators (CTGs) and a steam-turbine generator in combined-cycle configuration, the amended CECP would consist of six, General Electric LMS simple-cycle CTGs that would operate a maximum of 2,700 hours per year per turbine, with no more than 400 startups and shutdowns per year. By using smaller, fast-start, peaking units instead of larger, combined-cycle power trains, the amended CECP would have greater operational flexibility for use at various levels required by the state's electricity balancing authority, the California Independent System Operator (CAISO). The flexibility of the simple cycle amended CECP would enhance its ability to respond to changing electricity demands in the state from cyclical and intermittent renewable generation in a more efficient and integrated manner for SDG&E. The amended CECP would be a fast-start, readily dispatchable source of 632-MW of electricity. Additionally, the amended CECP would retire the older EPS generating facility, and eliminate its permitted use of up to 837 million gallons/day of sea water for once-through cooling (OTC). Cessation of OTC by EPS Units 1-5 allows NRG to comply with the state water board's deadline for eliminating EPS use of sea water for OTC by December 31, 2017.

A new 138-kV transmission line route and a new 230-kV transmission line route are proposed for this project (see **Project Description Figure 2)**. The 1,665-foot-long, 138-kV transmission line and 2,790-foot-long, 230-kV transmission line would be located along the eastern and southern boundary of the CECP site before crossing the railroad tracks and tying into the SDG&E Encina switchyards. Additional details regarding the transmission lines are provided in the **TRANSMISSION SYSTEMS ENGINEERING** section of this document.

To support the evaporative air-cooling system make-up and other industrial uses, the amended CECP would use no more than 215 acre-feet per year (afy) of California Code of Regulations, title 22 reclaimed water provided by the city's Carlsbad Water Recycling Facility (CWRF). The evaporative cooling blow-down would be recycled to an onsite raw

water storage tank for reuse. Onsite wastewater demineralizers would be utilized resulting in effluent discharges that would average 17 gallons-per-minute into the city's sewer system via the Encina Wastewater Authority (EWA) existing sanitary/industrial sewer line that traverses the amended CECP site. The EWA is a joint power authority that includes the city of Carlsbad. Reclaimed water would be provisioned to the amended CECP through a 12 inch diameter pipeline that begins at the CWRF, with 2,600 feet still remaining to be constructed within city easements from Cannon Road along the Avenida Encinitas right-of-way.

Potable water for drinking, eye protection, safety showers, restrooms, and emergency fire protection would be provided from the city's existing potable water system, as planned for the licensed CECP and would not exceed 19.4 acre-feet per year.

Sanitary and industrial wastewater would be discharged to a planned 42-inch EWA sanitary sewer system pipeline that would run along the western edge of the amended CECP site. Connection to the sewer line would require approximately 1,100 feet of new, onsite piping for points of connection from the proposed six peaking units, administration and control building, and operations/maintenance building. Wastewater would flow approximately 1.5 miles south for processing at the EWA's Encina Water Pollution Control Facility (EWPCF).

CONSTRUCTION

Demolition, remediation, construction, decommissioning, and site restoration activities proposed by the amended CECP would take 64 months to complete, are anticipated to begin in the 2nd or 3rd quarter of 2015, and would be completed in the 4th quarter of 2020. During that period, the amended CECP power plant would come online prior to December 31, 2017. Construction of the amended CECP's six generating units (designated Units 6, 7, 8, 9, 10 and 11) would last approximately 21 months, with commissioning activities requiring three additional months.

Like the licensed CECP, the amended CECP would be constructed within the recessed, 25-feet below-grade location where the EPS east tank farm currently resides. This location helps reduce and/or eliminate many issues commonly associated with large power plants, some of which posed community challenges for the licensed CECP. For instance, by being constructed at a lower elevation than the existing topography, the generating units present a lower visual profile, and the site's bowl-shaped topography provide sound energy attenuation (combined effect of scattering and absorbing noise created by the power plant). Additionally, the amended CECP would be located east of the NCTD railroad tracks that bisect the EPS site, and would be farther from Carlsbad State Beach than the existing EPS facilities, ensuring the amended CECP's consistency with the City of Carlsbad's land-use goal of enabling future non-power-production redevelopment for portions of the former EPS footprint west of the railroad tracks.

Once the amended CECP units are online, EPS Units 1 through 5 and the 17-MW "black start" generator would be decommissioned in phases as amended CECP Units 6-11 are brought online to replace existing EPS power generation.

To support the 21-month construction activities, approximately 19.3 acres of the EPS site west of the railroad tracks would be used for a combination of equipment laydown and construction worker parking (see **Project Description Figure 3**). Some preparation would be required to ensure the areas are usable for the purpose intended, including removal of abandoned fuel oil storage tanks 1 and 2 (to their concrete pads), and distribution of gravel over lay-down areas. Removal of the eastern fence of the SDG&E Encina switchyard would also occur so that a 435 foot-long trench (five feet deep by two feet diameter) can be dug, allowing for placement of the 576-ft underground portion of the 230-kV transmission line to occur. Similar to the licensed CECP, no offsite construction worker parking or construction equipment or material lay-down areas would be necessary.

The approximately 30-acre amended CECP site is located in an area zoned Public Utility, which specifically allows electrical generation and transmission facilities. **Project Description Figure 4** shows the location of the amended CECP generating facility, its electric transmission lines, natural gas supply pipeline, reclaimed water supply pipeline, and potable water supply line. The total land acreage of the existing EPS is approximately 95 acres, and consists of two parcels: (1) approximately 65-acres west of the NCTD tracks that contains the existing EPS generating equipment (Assessor Parcel Number [APN] 210-01-43), and (2) approximately 30-acres east of the railroad tracks where the Energy Commission approved the construction of the licensed CECP, and upon which the amended CECP would also be constructed (APN 210-01-41).

Additionally, following demolition of the aboveground EPS structures, parcels comprising APN 210-01-43 would be transferred to the city's Redevelopment agency for joint non-power redevelopment in conjunction with NRG, Inc., as defined in the January 14, 2014 Settlement Agreement. The removal of the EPS units would create environmental benefits, including the elimination of 857-million gallons per day of seawater OTC permitted for the existing EPS units. This would enable compliance with the state water board's existing December 31, 2017 deadline for cessation of seawater OTC by the EPS, and result in the decrease in impingement and entrainment of marine organisms per EPA 316 (B) Clean Water Act regulations.

SCHEDULE

The 64 month amended CECP schedule would involve four phases, including:

Phase I: Tank Demolition and Remediation: demolition of above-ground fuel oil storage tanks (ASTs) 1, 2 and 4.Modifications to the licensed CECP were initially proposed through the April 29, 2014 Petition to Remove Obsolete Facilities that was

subsequently blended into one amendment proceeding by Order of the CECP Amendment Committee reviewing this proceeding. Also slated for demolition are AST's 5, 6 and 7 (previously permitted for demolition as part of the licensed CECP Final Decision and separate from the amended CECP project), which would occur just prior to amended CECP Phase I demolition activities.

EXPECTED TIME PERIOD: *2nd Quarter, 2015 through 3rd Quarter, 2015*

Licensed CECP activities expected to begin Q1, 2015 and end Q2, 2015:

- Demolition of ASTs 5, 6, and 7
- Berm removal between ASTs 5 and 6 as well as ASTs 6 and 7
- Remediation activities for ASTs 5, 6, and 7

Phase I amended CECP activities expected to begin Q2 and end Q3, 2015:

- Demolition of ASTs 1, 2, and 4;
- Removal of a berm between ASTs 4 and 5, and;
- Removal of oily sands from under ASTs 1, 2, and 4.

Phase II: Construction / Commissioning / Operation of amended CECP: The next amended CECP phase would involve the construction, commissioning and operation of the reconfigured power plant, and would be expected to commence late in the fourth quarter of 2015. Construction of the 632-MW facility and associated linear facilities (reclaimed water pipeline, 138-kV and 230-kV transmission lines and upgrade of the SDG&E 230-kV switchyard) would last approximately 21 months. Following a three month commissioning process of the facility and successful commercial operation in the 3rd or 4th quarter of 2017, generation from the EPS would no longer be necessary and permanent decommissioning of the EPS power plant would then begin.

EXPECTED TIME PERIOD: *4th Quarter, 2015 through 4th Quarter 2017*
According to the amended CECP filings, and the various documents that laid the legal and procedural groundwork for the amended CECP (i.e. the January 14, 2014 Settlement Agreement), Phase II is expected to last a total of 24 months (21 months for construction, and three months for commissioning and start-up trials).

Phase III: Retirement and Decommissioning of EPS units: With the transfer of electricity production from the aging EPS Units 1-5 to the newly constructed amended CECP Units 6-11, EPS would be permanently shut-down and decommissioned. The settlement agreement has indicated that the decommissioning phase would last no more than 12 months, and involve several activities following the

short process of shutting down the electricity-generating capability of EPS Units 1-5. Several activities would occur prior to the commencement of demolishing EPS structures, including

- De-energize unnecessary electrical equipment. Some electrical supplies may remain in service in support of demolition activities.
- Purge industrial gases from equipment (e.g., natural gas, hydrogen)
- Remove industrial chemicals from the site, including aqueous ammonia, and mercury if present
- Remove oil from all pumps, motors, pipes, oil reservoirs, transformers, and other equipment
- Electrically isolate decommissioned equipment
- Physically isolate decommissioned equipment by disconnecting from piping systems or other means
- Operate and maintain vital equipment as required for environmental permit compliance (e.g., storm drainage system
- Verify that all facilities are left in a safe and secure condition

Another component of Phase III activities would be the removal and recycling of equipment for resale or reuse. EPS equipment subject to resale could include generators, transformers, switchgear, chillers and other power and cooling systems.

EXPECTED TIME PERIOD: *4th Quarter, 2017 through 4th Quarter, 2018*

PHASE IV: EPS Demolition: The final phase of the CECP amendment requests is Commission approval to demolish EPS Units 1-5 and its 200-ft.tall, 600-ft.long concrete enclosure building, as well as its 400-ft tall exhaust stack and other above-ground facilities located west of the railroad tracks. The only facilities that would remain west of the railroad tracks following the 22-month demolition period would be associated with the Carlsbad Seawater Desalination Project and transmission and linear features necessary for the operation of the amended CECP.

Demolition activities would last 22 months, and would occur through seven specified steps, according to the January 14, 2014 settlement agreement, including:

- Power plant building and contents
- Combustion turbine and structures, east power plant building
- Ocean water intake/discharge piping, structures and equipment
- Northwest structures, tanks, and piping
- Fuel oil piping and supports
- Southeast corner structures
- Two domestic water tanks on SDG&E property

Site restoration (grading and contouring) activities would last two months and complete the amended CECP activities.

EXPECTED TIME PERIOD: *1st Quarter, 2019 through 4th Quarter, 2020*

Table 1
Amended CECP Estimated Schedule

PHASES																								
	I																							
	II																							
	III																							
	IV																							
	YR	2015				2016				2017				2018				2019				2020		
	QTR	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

SITE ARRANGEMENT

The amended CECP site plan is shown in **Project Description Figure 5**. The primary operations access would be from Carlsbad Boulevard, through the existing EPS site and the Carlsbad Seawater Desalination Project (CSDP). The main operations access would also serve as a secondary construction access point. The primary construction access would be from the Cannon Road Service Center gate, west of the railroad tracks. Additional construction access would be from Carlsbad Boulevard, at an entrance just south of the EPS. Heavy haul truck access would be from Cannon Road through the Avenida Encinas entrance to the SDG&E switchyard property, east of the railroad tracks. An existing North County Transit District railroad spur would be used for select heavy and oversize equipment deliveries during construction.

Portions of the amended CECP site would be paved to provide internal access to project facilities and buildings. The area surrounding equipment, where not paved, would have gravel surfacing. Similar to the licensed CECP, the 138-kV and 230-kV high-voltage transmission lines would run from the three amended CECP power blocks (Units 8, 9, 10 & 11 stepped-up to the 230-kv gen-tie line; and Units 6&7 to the 138-kV gen-tie) before extending west to the existing SDG&E 138-kV and 230-kV switchyards on the EPS property. The onsite route for the high-voltage lines is shown in **Project Description Figure 2**. The single-line representation of the interconnection scheme is depicted in, and further analyzed in, the **TRANSMISSION SYSTEM ENGINEERING** section. Based on the previously approved large generator interconnection agreement (LGIA), SDG&E would expand the existing Encina 230-kV switchyard to accommodate the new interconnection from the amended CECP power block.

GENERATING COMPONENTS

The amended CECP would consist of six independent combustion turbine generators (CTG) designed for demineralized water injection to reduce nitrogen oxide production; an air-cooled fin-fan cooler; a shell and tube heat exchanger for cooling of system

cooling water as well as the intercooler between the low-pressure and high-pressure compressor stages; and associated support equipment providing 632 MW net output. The proposed combustion turbines are General Electric LMS100 units. The CTGs would be supported by common, balance of plant (BOP) equipment including: a bulk water storage and treatment plant, fuel gas compressor enclosure, compressed air system, fire protection enclosure, and an aqueous ammonia storage area.

Each GE LMS100 turbine is capable of reaching 100 percent load in ten minutes or less with ramp rates up to 50 MW per minute, providing rapid response to changes in grid demand and flexibility for personnel at the CAISO. Associated equipment for the amended CECP would include emission control systems necessary to meet existing local, state, and federal air emission standards.

GENERATING PROCESS

Within each CTG, combustion air would flow through the inlet air filter, through the evaporative cooler and associated air inlet ductwork, be compressed in the gas turbine compressor section, and then flow to the CTG combustor. Natural gas fuel would be injected into the compressed air in the combustor and ignited. The hot combustion gases would expand through the power turbine section of the CTG, causing the shaft to rotate, creating electricity and driving the electric generator and CTG compressor.

COMBUSTION TURBINE GENERATORS

In a typical GE LMS100 CTG, thermal energy is produced through the combustion of natural gas, which is converted into mechanical energy required to drive the combustion turbine compressors and electric generators. Each CTG system consists of a stationary combustion turbine generator, supporting systems, and associated auxiliary equipment. The CTGs would be equipped with the following required accessories to provide safe and reliable operation:

- Inlet air filters
- Inlet air evaporative coolers
- Demineralized water injection skid
- Compressor intercooler
- Fin/fan cooler, shell and tube heat exchanger as well as a cooling water circulating pump
- Metal acoustical enclosure
- Redundant lube oil coolers
- Compressor wash system
- Fire detection and protection system

EMISSIONS CONTROL

Metal acoustical enclosures would be provided for the CTGs and respective accessory equipment, all of which would be located outdoors. Each CTG exhaust would be equipped with a carbon monoxide (CO) oxidation catalyst and a selective catalytic reduction (SCR) emission control system that uses 19 percent aqueous ammonia in the presence of a catalyst to reduce oxides of nitrogen (NO_x) levels in the exhaust gases. Ammonia from the 19 percent aqueous ammonia storage tank would be vaporized and then injected into the CTG exhaust gas stream via a grid of nozzles located upstream of the catalyst module. The subsequent chemical reaction would reduce NO_x to nitrogen and water. Exhaust from each CTG would be discharged from individual, 90-foot-tall, 14.25-foot-diameter exhaust stacks.

MAJOR ELECTRICAL EQUIPMENT AND SYSTEMS

For the amended CECP, like the licensed CECP, the bulk of the electric power produced by the facility would be interconnected to the CAISO grid via the existing SDG&E 138-kV and 230-kV switchyards located on the EPS site. A small amount (approximately 20.6 MW) of parasitic electric power would be used to power the amended CECP's onsite auxiliaries such as pumps, fans and compressors, control systems, and general facility loads including lighting, heating, and air conditioning. Some power would also be converted from alternating current (AC) to direct current (DC), which would be used as backup power for control systems and other critical uses.

WATER SUPPLY AND USE

The amended CECP would preferentially use Title 22 reclaimed water as the primary water source, provided it is available. The ocean water alternative approved in the licensed CECP would not be implemented as a backup water supply for the amended CECP. And while high-purity demineralized water would no longer be required for the steam cycle, it would still be required for emission control via direct injection into the combustion turbines and turbine wash water.

PRIMARY WATER SUPPLY SOURCE

Reclaimed water would be obtained via a new, 36 inch diameter reclaimed water pipeline that would tie into the onsite 500,000-gallon aboveground raw water tank. This tank would have a dedicated capacity of 150,000 gallons for fire water, and 350,000 gallons for process water. the 500,000-gallon raw water storage tank would be pretreated with a filter and then passed through a series of cation, anion and mixed bed demineralizers. The pre-filter and demineralizer vessels would be trailer-mounted and connected with piping and hoses. As the resin beds within a trailer are exhausted, the trailer would be disconnected and the trailer taken off-site to the trailer's lessors' facility for regeneration. At peak power output and production between two to five trailers a

day could be exchanged, depending upon dispatch. The demineralizer trailer units would be located on the northeastern corner of the amended CECP project footprint.

The demineralized water would be stored in a dedicated 250,000-gallon demineralized water storage tank and used for NOx emission control of the combustion turbines. A portion of the reverse osmosis permeate would be mixed with untreated process water in a 2,500-gallon mix tank and used for evaporative cooling of the inlet air for the combustion turbines, as needed. The demineralized water, mixed with minimal, non-toxic cleaning chemicals, would also be used for infrequent cleaning of the internal components of the combustion turbines during scheduled outages.

The reclaimed water balance diagram **(Project Description Figure 6**) shows the equipment required as well as water uses and waste streams for both a daily maximum and yearly average use. The water diagram is more fully discussed and analyzed in the **SOIL & WATER RESOURCES** section of this PSA.

POTABLE WATER

The amended CECP would require potable water for the administration/control building and the warehouse buildings, as well as for emergency eye wash stations and showers in the power block area. Similar to the licensed CECP, the amended CECP would use potable water as the backup water source for all CECP needs should reclaimed water become unavailable or be interrupted. Potable water would be supplied from the Carlsbad Municipal Water District system, and would be protected against cross-contamination with reclaimed water by use of a reduced-pressure backflow prevention device or air gap.

CONSTRUCTION PRACTICES

The amended CECP's connection to the existing potable water line and connection to the existing EWA sewer line would be constructed from the tie points immediately west of the power plant site. The 36 inch diameter reclaimed water pipeline is more extensive in scope, extending approximately 2,600 feet from the south at Cannon Road. The pipeline to Cannon Road (and Avenida Encinas) originates at the Carlsbad Water Recycling Facility, approximately 1.5 miles south of the EPS (the EWA complex also includes the Encina Water Pollution Control Facility). The reclaimed water pipeline would be installed under Cannon Road using partial traffic lane closures to accommodate open trench construction. The installation crossing under Cannon Road is expected to occur over a period of approximately three weeks.

All trenches would be backfilled using excavated soil and compacted for pipe stability and minimum subsequent subsidence. Backfill would be to original grade or level. The Cannon Road crossing for the reclaimed water line would be repaved to achieve original traffic surface conditions.

WATER REQUIREMENTS

The replacement of the licensed CECP combined-cycle units by the amended CECP simple cycle units, along with the reduction of the maximum annual capacity factor (from 60 percent to 31 percent), will reduce the project's total water consumption from an average of 440 gallons/minute to 120 gallon/minute. The estimated average daily, maximum daily, and maximum annual quantity of reclaimed water required for operation of the amended CECP is presented in Table 2, below. All water requirements shown below are estimated quantities based on the simple-cycle amended CECP operating at a 31percent capacity factor, with evaporative cooling.[2]

Table 2
Daily and Annual Water Use for Amended CECP Operations—Reclaimed Water Supply

Water Use	Average Daily Use (gpm)	Maximum Daily Use (gpd)	Maximum Annual Use (afy)
Reclaimed Water	120*	464,400	215*
Potable Water	12	17,280	19.4

*Based on an annual operation of 2,700 hours/year at full plant output

PLANT COOLING SYSTEMS

The amended CECP cooling system would consist of air-cooled fin-fan coolers, shell and tube heat exchangers with closed loop circulating water pumps and evaporative coolers. The heat rejection system would cool the CTG lube oil to within specified limits by the CTG manufacturer as well as reject the heat created by the high-temperature inter-cooler.

Mixed reclaimed and demineralized water would be used for evaporative cooling. Mixing of reclaimed and demineralized water would avoid formation of scales on the evaporative cooler media. It is estimated that 50 percent of the evaporative cooling water would be lost to atmosphere via CTG exhaust and the remaining 50 percent would be recycled to the raw water storage tank. The evaporative cooling water would not be treated with any chemicals.

WASTE MANAGEMENT

Similar to the licensed CECP, wastes produced at the amended CECP would be properly collected, treated if necessary, and properly disposed of. Wastes would include

[2] Peak water requirements shown in Tables 2.1-1 and 2.1-2 are based on the plant operating at full load, with evaporative cooling, and an ambient temperature of 96.0°F and 36.0 percent relative humidity.

process and sanitary wastewater, and nonhazardous waste and hazardous waste, both liquid and solid, as detailed in the **WASTE MANAGEMENT** section of this document.

Wastewater Collection, Treatment, and Disposal

Evaporative cooler blowdown and other plant industrial water would be internally recycled for reuse. Miscellaneous plant drains (sample cooling, pump leaks, equipment washwater, etc.) would be collected. Oil and suspended solids contamination would be removed by an oil/water separator and the balance would be discharged to the city and Encina Wastewater Authority sewer system at approximately five gallons-per-minute (gpm). Wastewater from sinks, toilets, showers, eye washes and other sanitary facilities that originated from Carlsbad Municipal Water System-supplied potable water would also be discharged to the sewer system (at ~12 gpm). Total wastewater discharged to the sewer system during operations is estimated to be 17 gpm, of which 12 gpm would be potable use waters. This waste water stream would be accommodated and serviced by the City of Carlsbad sewer system and the Encina Water Authority treatment systems.

Accidental leaks and discharges inside the power generating areas would be contained and disposed offsite, in accordance with approved Emergency Response and Spill Prevention, Control and Countermeasures (SPCC) Plans. The trailer-mounted, demineralizer units would be regenerated off-site and would produce no liquid or solid wastes at the project site.

Demineralizer Disposal

Specific processing of reclaimed water through the demineralizer units is discussed in more detail in the **SOIL & WATER RESOURCES** section of this document.

Plant Drains and Oil/Water Separator

Blowdown from the inlet air evaporative cooling system would be recycled to the raw water tank for re-use. Normal plant drains would collect any containment area washdown and drainage from facility equipment. Water from these areas would be collected in a system of floor drains, hub drains, and sumps. Oil and grease and suspended solids would be filtered from the water and the balance discharged to the sewer system. Water from drains that can potentially contain accidental spills of oil or grease would be routed through an oil/water separator first. Plant wastewater that might carry high amounts of oil and grease or chemicals would be collected and removed for offsite disposal. Wastewater from combustion turbine water washes would be collected in sumps and would be trucked offsite for disposal at an approved wastewater disposal facility.

Storm Drains

The storm drain system would be installed to manage storm water collection around each power block and the balance of plant area, with gravity drains to an oil/water separator. A secondary containment system would provide additional verification that no hydrocarbons are present prior to pumping the water to a bio-swale on the north side of the amended CECP site. From the swale, the remaining water that has not evaporated or absorbed would be drained through the existing permitted discharge into the lagoon. An emergency generator would supply backup power for the storm drain system. The existing National Pollutant Discharge Elimination System (NPDES) permit for the EPS would be modified to support the amended CECP.

Solid Wastes

The amended CECP would produce wastes typical of power generation operations and routine maintenance. Generation plant wastes include oily rags, broken and rusted metal and machine parts, defective or broken electrical materials, empty containers, and other solid wastes, including the typical refuse generated by workers. Solid wastes would be trucked offsite for recycling and/or disposal.

Hazardous Wastes

Several methods would be used to properly manage and dispose of hazardous wastes generated during Phase I and II construction and Phase III and IV decommissioning and demolition activities. Please see the **HAZARDOUS MATERIALS MANAGEMENT** and **WASTE MANAGEMENT** sections of this document for more details. Waste lubricating oil from operations of the amended CECP would be recovered and recycled by a waste oil recycling contractor. Spent lubrication oil filters would be disposed of in a Class I landfill. Spent SCR and oxidation catalysts would be recycled by the supplier or disposed of in accordance with regulatory requirements. Workers would be trained to handle hazardous wastes generated at the site.

EMISSIONS

NO_X Emission Control

The CTGs selected for the amended CECP require high-purity demineralized water for injection into the combustors to control emissions of NO_X. In addition, the exhaust duct work incorporates SCR systems to further control NO_x concentrations in the exhaust stacks to no more than 2.5 parts per million; by volume dry (ppmvd), corrected to 15 percent oxygen (O_2). The SCR process would use 19 percent aqueous ammonia. Ammonia slip, or the concentration of un-reacted ammonia in the stack exhaust, would be limited to 5.0 ppmvd, corrected to 15 percent O_2. The SCR equipment would include a reactor chamber, catalyst modules, ammonia storage system, ammonia vaporization and injection system, and monitoring equipment and sensors.

Carbon Monoxide and Volatile Organic Compound Emission Control

The combustion turbine combustors incorporate staged combustion of a pre-mixed fuel/air charge, resulting in high thermal efficiencies with reduced Carbon Monoxide (CO) and volatile organic compounds (VOC) emissions. CO and VOC emissions would be further controlled by means of a CO oxidation catalyst. The CO emission rate in stack exhaust would be limited to 4.0 ppmvd, corrected to 15 percent O_2. VOC emission rate would be limited to 2.0 ppmvd, corrected to 15 percent O_2.

Particulate Emission Control

Emissions would be controlled by the use of best combustion practices, high-efficiency air inlet filtration, and the use of pipeline quality natural gas. Similar to the licensed CECP, natural gas would be the only fuel used which is low in sulfur and is very low in particulate emissions.

Continuous Emission Monitoring

Similar to the licensed CECP, each CTG would have a continuous emission monitoring system (CEMS) that would sample, analyze, and record fuel gas flow rate, NO_x and CO concentration levels, and percentage of oxygen ($O_{2)}$ in the exhaust gas from the CTG exhaust stacks. The CEMS system would transmit data to a data acquisition system (DAS) that would store the data and generate emission reports in accordance with federal, state, and regional permit requirements. The DAS would also include alarms to signal plant personnel when the emissions approach or exceed pre-selected limits.

FIRE PROTECTION

The fire protection system design detailed in the licensed CECP has been modified with the assistance of the Carlsbad Fire Department and is reflected in the amended CECP site layout. The existing potable water fire suppression system would be removed and replaced by a deluge system by interconnection to the reclaimed water supply. This system would have onsite storage in a dual-purpose, combination raw water/fire water storage tank. City potable water would be the emergency backup water source should there be an unlikely interruption in the reclaimed water supply. Two separate distribution loops would be installed at the amended CECP site: one located around the perimeter of the reconfigured power block in the recessed area, and a secondary loop surrounding the perimeter of the area above the recessed power block. Access roads on the site would be expanded to a width of 28 feet to ensure adequate space for firefighting trucks to access the site.

Additionally, General Electric (GE) would provide self-contained systems to provide independent protection of the individual CTGs. The GE system would deploy National Fire Protection Association (NFPA) required protection for the new equipment.

The GE Fire and Explosion Protection System include the following fire protection measures:

- Mitigating fires from starting, through fire prevention,
- Detects fires in early stages with fire detection systems,
- Contains fires using confinement designs, and
- Employs active fire suppression systems.

Additional fire protection measures for the amended CECP would include:

- Establishing fire zones with physical separation between buildings,
- Separating buildings and structures for mitigating smoke spread,
- Constructing containment walls where oil is used,
- Minimizing the use of combustible materials,
- Providing sloped surfaces for draining combustible material to containment sumps,
- Adding separate escape routes in enclosures to the outside, and
- Implementing egress escape plans for large structures.

The amended CECP fire protection system would consist of wet pipe sprinkler systems and carbon dioxide (CO_2) systems. Fire detection devices, or methods for detection, include fuel gas, thermal-rate compensated, and smoke- or manual-activated sensing. Potential hazards being monitored include ammonia, natural gas, lubricating oil, hydraulic oil, insulating oil, electrical gear, wood, PVC, and other flammable material like the gas turbine inlet filter. System isolation and area classifications would be in accordance with NFPA recommendations.

The primary source of the fire protection systems would be the 500,000 gallon raw water storage tank supplied with reclaimed water, with backup sources from the city potable water system. Tank sizing is governed by NFPA 850A: a 100-percent-capacity electric and a 100-percent-capacity diesel-driven fire pump would maintain system pressure during filling and fire events. A low-capacity jockey fire pump would maintain system pressure during non-fire suppression system activity.

A fire water loop would surround the power block with hydrants installed per criteria specified in NFPA codes and standards. This loop would also supply the deluge system in the air compressor enclosure, gas compressor enclosure, and the fire pump enclosure in the BOP area, as well as provide fire suppression for the warehouse/maintenance and administration/control buildings. Electrically sensitive areas in the administration/control building would be protected by automated dry agent fire protection suitable for occupied spaces. Each CTG would be equipped with a CO_2 fire-suppression system that is integrated into the turbine control system. The

automatically actuated CO_2 system provides fire suppression in the turbine compartments.

Power distribution centers and auxiliary enclosures in the power block would also be equipped with fire extinguishers per NFPA guidelines.

The main transformers would be designed in accordance with NFPA 78 and would not be provided with specific fire suppression systems.

Local fire protection and suppression panels would be provided for each area being protected with automated functions and alarming. Local alarm annunciation would also be replicated to the main control system.

The **HAZARDOUS MATERIALS MANAGEMENT** and **WORKER SAFETY & FIRE PROTECTION** sections include additional information for fire and explosion risk, and the **SOCIOECONOMICS** section provides information on local fire protection capability.

PROJECT CONSTRUCTION

The construction schedule addressed in the AFC for the licensed CECP has changed to accommodate the modifications proposed in the amended CECP. The **SOCIOECONOMICS** section provides the amended CECP construction workforce by labor craft by month during the 24-month construction/commissioning schedule, as well as the average and peak construction workforce throughout the entire 64 month, four-phased amended CECP schedule.

The hours at which construction takes place for the amended CECP have changed from the licensed CECP (“sunset” replaced by 6pm on Monday through Friday, and 5pm on Saturdays). Please see the **TRAFFIC & TRANSPORTATION** section of this PSA for the anticipated construction deliveries by truck, and for average and peak construction traffic (construction workers and deliveries). Construction laydown and construction worker parking areas for the amended CECP would occupy a total of 19.3 acres at selected locations within the existing EPS site.

GENERATING FACILITY OPERATION

Operations at the amended CECP would be staffed with an estimated 18-person workforce, including operators on rotating shifts and maintenance technicians during the standard eight-hour work day. This estimated 18-person workforce would be sourced from the existing 50-person workforce that presently operates the EPS. The facility would be staffed seven days a week, 24 hours per day, but would have a limit of 2,700 operating hours per CTG annually.

It is expected that the amended CECP would be operated primarily as a peaking facility on daily cycles, especially during summer months. The exact operational profile of the

amended CECP, however, cannot be defined in detail because operation of the facility depends on the variable demand in the service area and various grid conditions.

The amended CECP may be operated in one or all of the following conditions:

- **Load Following**. During non-peak seasons (primarily spring and fall), the facility would most likely be operated at loads that may vary between maximum continuous output (all six units operating at base load) and minimum load (one CTG operating as low as 25 percent load) to meet electrical demand at all times between 0600 and 2400 hours.[3] In this mode, the plant is dispatched on a real-time basis by the Independent System Operator
- **Daily Cycling**. The facility would most likely be operated in daily cycling condition, wherein the plant is operated at pre-determined fixed load points during the day and totally shut down at night or on weekends. This condition may occur either with daily nighttime shutdowns or with weekend shutdowns depending on electrical demand, and other issues.
- **Full Shutdown**. This would occur if forced by lack of load demand/dispatch, equipment malfunction, fuel supply interruption, transmission line disconnect, or scheduled maintenance.

In the unlikely event of a situation that causes a longer-term cessation of normal operations, security of the facilities would continue to be maintained on a 24-hour basis, and the Energy Commission would be notified. See the **COMPLIANCE CONDITIONS** section of this PSA for a full discussion of temporary cessation of operations and full closure of the amended CECP.

ENCINA POWER STATION DEMOLITION

This amended CECP also incorporates the shutdown, decommissioning and demolition of the EPS as part of the project modifications. Following shutdown of EPS Units 1 through 5, the project owner would demolish the EPS above-ground structures west of the railroad tracks. Demolition would also include the removal of the 17-MW emergency/black start combustion turbine generator. This project change would also allow and facilitate future redevelopment of western portions of the EPS site for non-power-production uses. The demolition of EPS is another step toward facilitating a remodeled coastal area and reflects a significant and important community development flowing from the amended CECP.

[3] Between mutual agreements with City of Carlsbad, the amended CECP would normally operate between 0600 and 2400 hours. Only in emergency situations will the plant operate between 2400 and 0600 hours.

EPS Background

The EPS demolition (Phase IV) is anticipated to take 22 months (including a two month period for grading/contouring and site restoration). Phase IV would begin after the 12-month shutdown and decommissioning (Phase III) of EPS Units 1 through 5 (which would occur after achieving commercial operation of the amended CECP power plant). The subject demolition areas are shown in **Project Description Figure 7**. **Project Description Figure 8** depicts the site after EPS demolition is complete. Phase IV EPS demolition would generally occur within an area bounded by the property fence line west of the railroad tracks, south of the lagoon, east of Carlsbad Boulevard or the Pacific Coast Highway, and north of the SDG&E maintenance property. Two EPS water storage tanks located on the SDG&E north coast maintenance property would be included in Phase IV demolition as part of the amended CECP. No activity is planned west of Carlsbad Boulevard. The SDG&E Encina switchyards and supporting control house are excluded from Phase IV demolition. Additionally, areas of the EPS property in the previously described boundary would remain, such as the leased areas required by the Carlsbad Seawater Desalination Project. There are no plans to use areas of the property east of the railroad tracks for demolition activities, but vehicle access could occur through the southwest corner of the amended CECP site.

Generally, Phase IV demolition would proceed as a set of segmented tasks associated with each of the following major components or component areas on site:

- Power plant building and contents
- Combustion turbine and structures, east power plant building
- Ocean water intake/discharge piping, structures and equipment
- Northwest structures, tanks, and piping
- Fuel oil piping and supports
- Southeast corner structures
- Two domestic water tanks on SDG&E property

The following is a more complete description of the seven primary demolition targets:

Power plant building and contents: The main powerhouse structures and systems would be demolished to an “at grade” condition. This includes the transformers up to an interface with the SDG&E switchyard. Crushed concrete would be used to fill basements and other subgrade infrastructure that represent a safety risk by not being filled. This period will also include the removal of Hazardous Building Materials (HBMs), including one of the most prevalent HBMs, asbestos. State and Federal law requires specific steps for the proper removal of asbestos-containing materials.

Combustion turbine and structures, east power plant building: Removal of the emergency/black-start gas turbine generator would include the ISO phase bus,

dedicated water storage tank, and structures that would no longer be necessary for SDG&E switchyard operations and maintenance.

Ocean water intake/discharge piping, structures, and equipment: The EPS ocean water intake system would be isolated from the lagoon. Poseidon Resources, Inc. would continue to intake ocean water for its Carlsbad Seawater Desalination Project from the current EPS discharge tunnel, as permitted. The intake would have stop logs installed to allow a concrete plug to be poured to isolate the intake piping from the lagoon, and the circulating water piping at the inlet and exit of each condenser would be cut and a welded cap installed. Aboveground piping, valves, screens, filters, and other structures would be demolished and removed. The intake canals and underground circulating piping would be isolated and remain intact. Crushed concrete and other onsite fill would be used to restore subgrade areas to grade where they represent a safety risk by not being filled.

Northwest structures, tanks and piping: The industrial wastewater facility north of the switchyard would be demolished. Some of the tanks and equipment that would be removed are Low Volume Waste Tanks #1 and #2 (that discharge via the NPDES permit), Extended Waste Tanks #3 and #4 and Treated Water Tanks #5 and #6 (that discharge to the Encina Wastewater Authority sewer system), as well as supporting pumps, filters, piping, instrumentation and controls. The tanks, piping, valves, pumps, and other structures would be demolished and removed and crushed concrete and other onsite fill used to fill subgrade areas that represent a safety risk by not being filled.

Fuel oil piping and supports: Any final above-grade fuel oil piping and supports not previously removed as part of the amended CECP development and/or during construction of the Carlsbad Seawater Desalination Project would be removed.

Southeast corner structures: The machine shop and compressor building, each on either side of the existing fuel gas regulating station, would be demolished to grade.

Two domestic water tanks on SDG&E property: Two welded steel tanks, located on the SDG&E maintenance yard to the south of EPS, serve as storage for the EPS fire water system. The aboveground tanks and associated piping, pumps, and structures would be demolished to grade.

Remediation

Subsurface remediation of the EPS site is not included as part of the Phase IV demolition activities to occur under the amended CECP unless obvious signs of soil contamination based on odor or discoloration trigger sampling, demolition work discontinuation, and completion of soil sample analyses. If these samples exceed county or state standards, the soil would be cleaned to industrial clean up levels in coordination with the San Diego County Department of Environmental Health Voluntary

Action Plan guidelines before demolition activities would resume. More specifics on remediation during Phase I (above ground fuel storage tank removal) or Phase IV (EPS Demolition) can be found in the **WASTE MANAGEMENT** section of this document.

PROJECT DESCRIPTION - FIGURE 1

Carlsbad Energy Center Project Amendment - Project Context and Layout

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: 07-AFC-06 Petition to Amend - Figure 1-1

PROJECT DESCRIPTION - FIGURE 1A

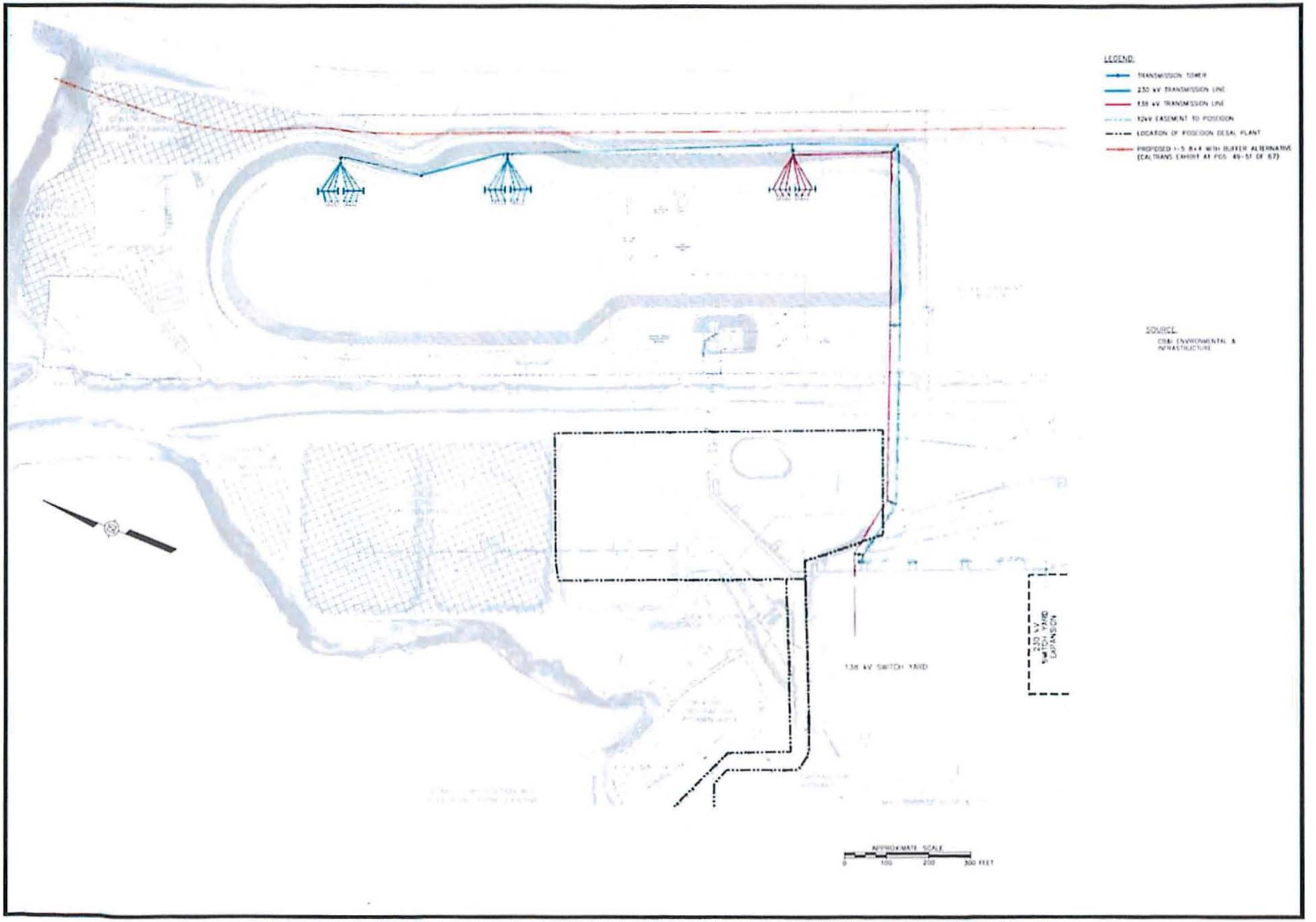
Carlsbad Energy Center Project Amendment - Regional Transportation

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: AFC Figure 5.13.1

PROJECT DESCRIPTION - FIGURE 2

Carlsbad Energy Center Project Amendment - Encina Power Station Transmission Line Routes



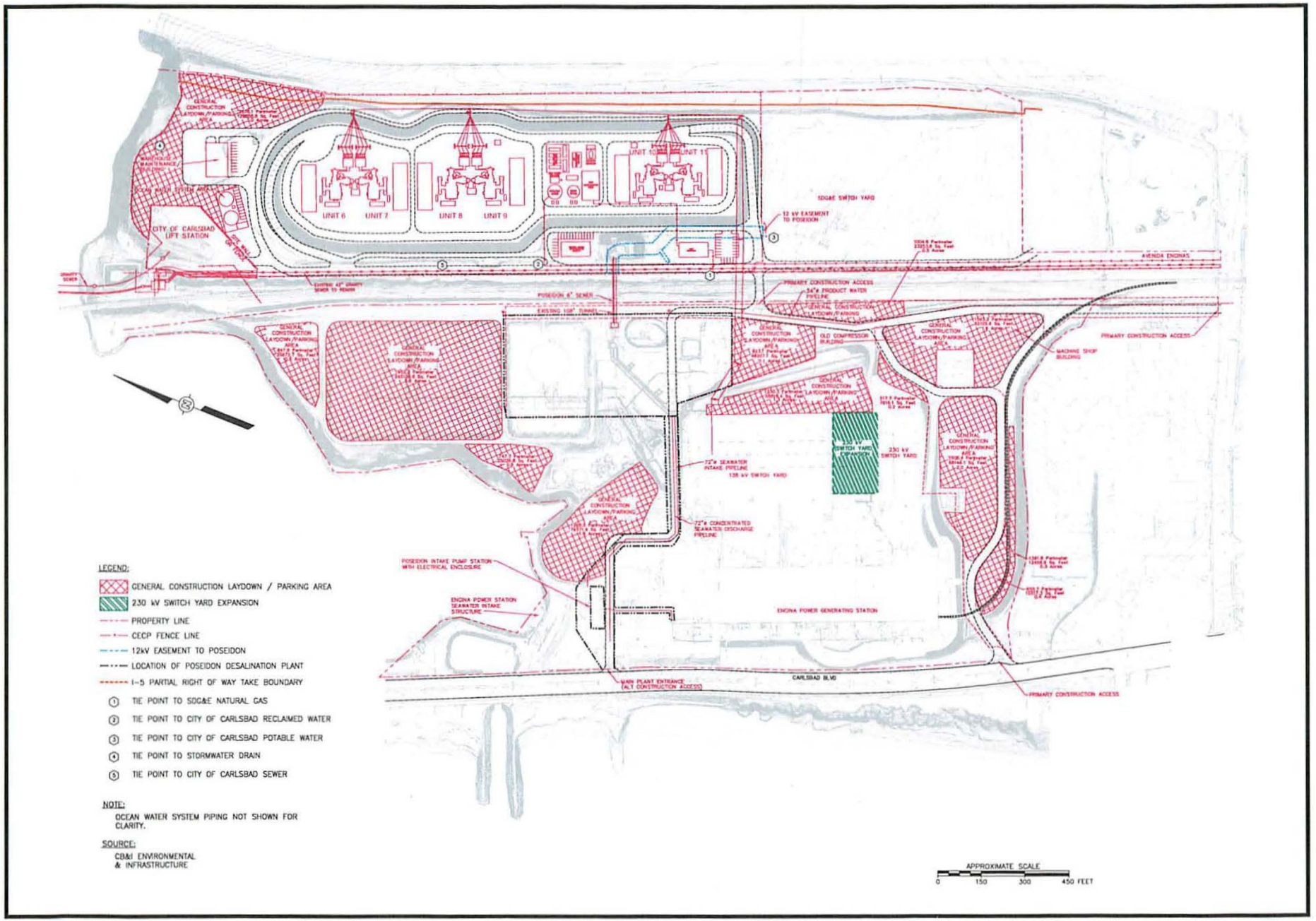
PROJECT DESCRIPTION

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Data Responses Set 4 (Nos. 86-92) docketed November 21, 2014 (TN203363)

PROJECT DESCRIPTION - FIGURE 3

Carlsbad Energy Center Project Amendment - Construction Laydown and Parking

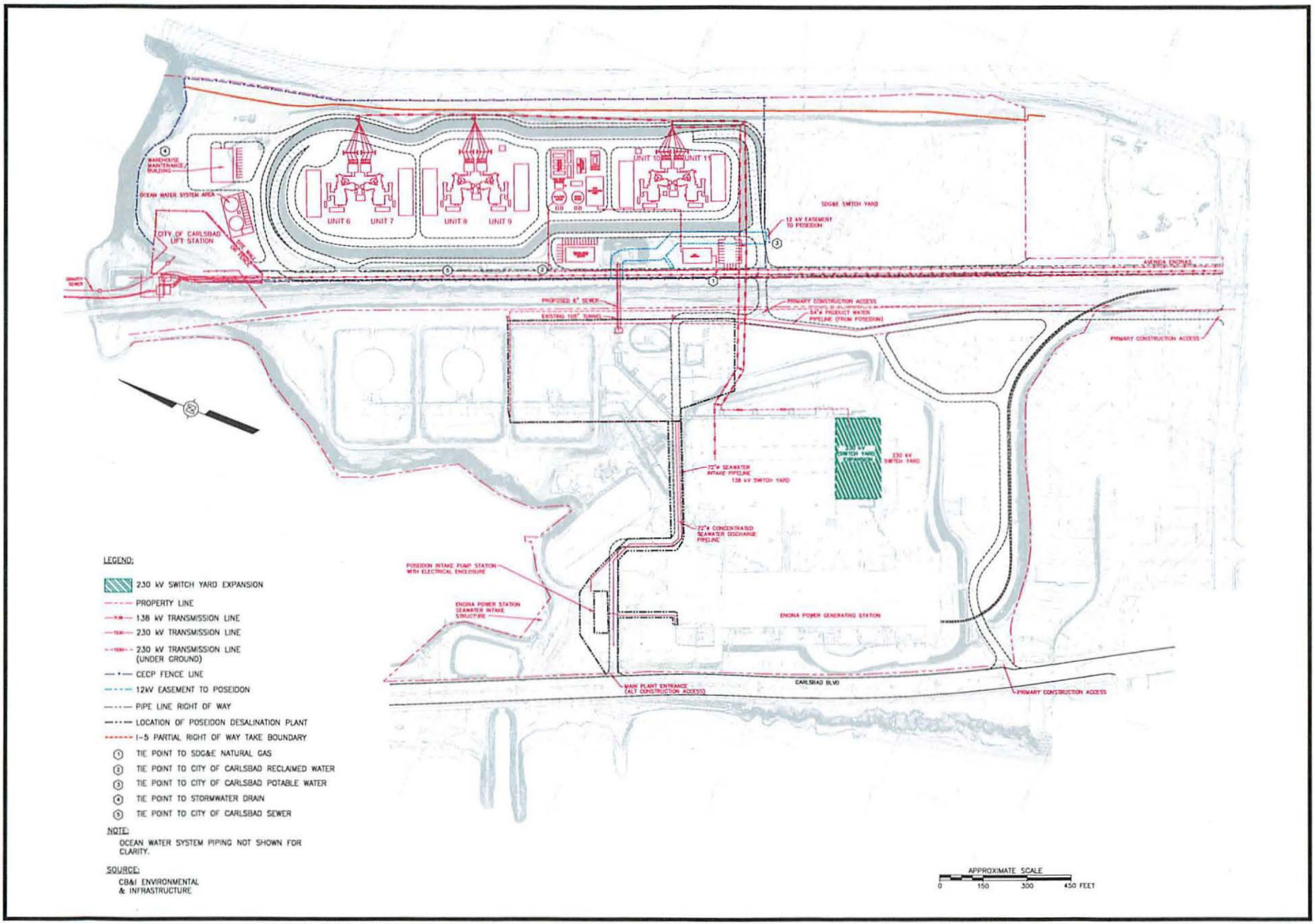


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: 07-AFC-06C Petition to Amend - Figure 2.0-2

PROJECT DESCRIPTION - FIGURE 4

Carlsbad Energy Center Project Amendment - Plot Plan



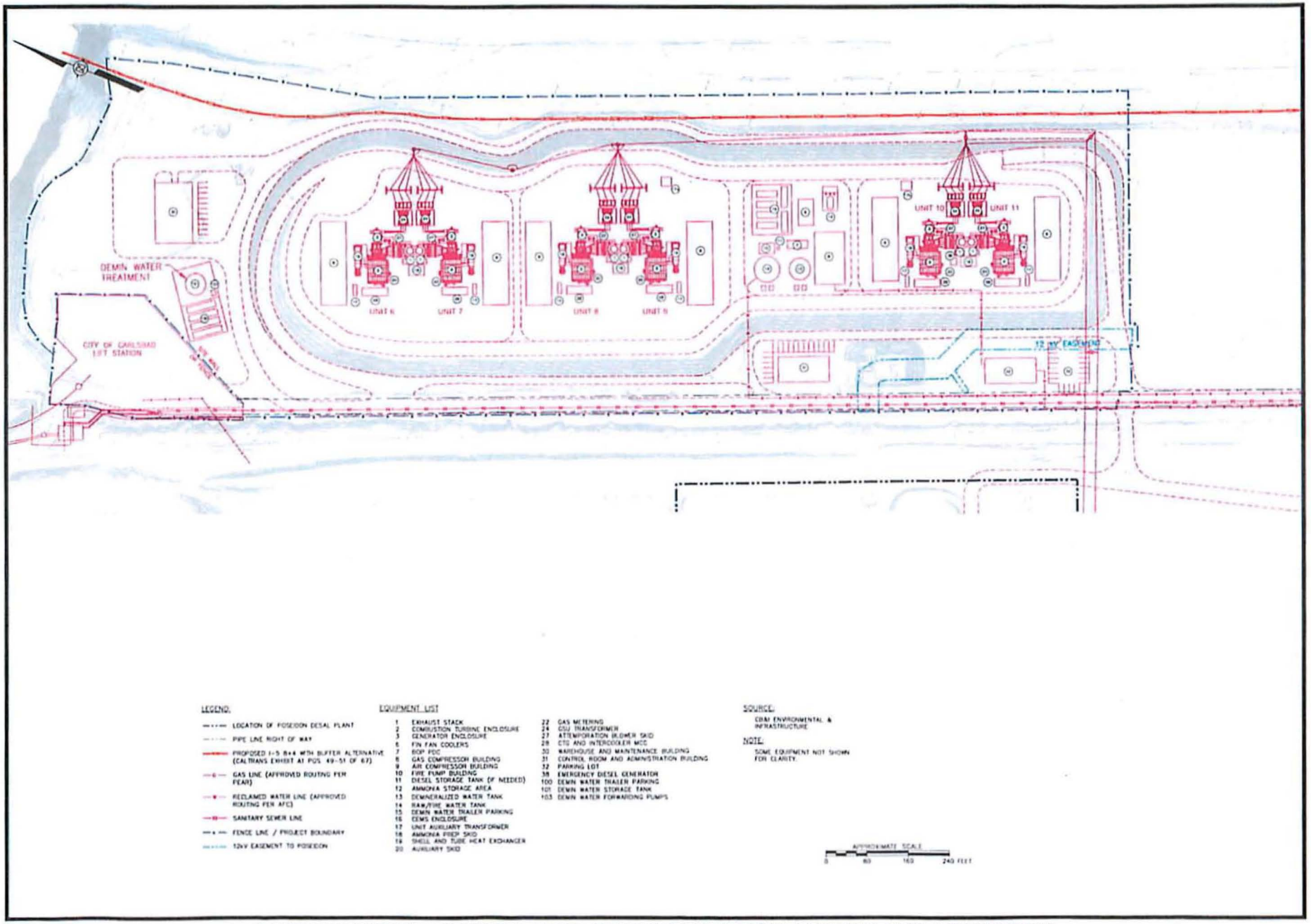
PROJECT DESCRIPTION

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: 07-AFC-06C Petition to Amend - Figure 2.0-1

PROJECT DESCRIPTION - FIGURE 5

Carlsbad Energy Center Project Amendment - Site Plan

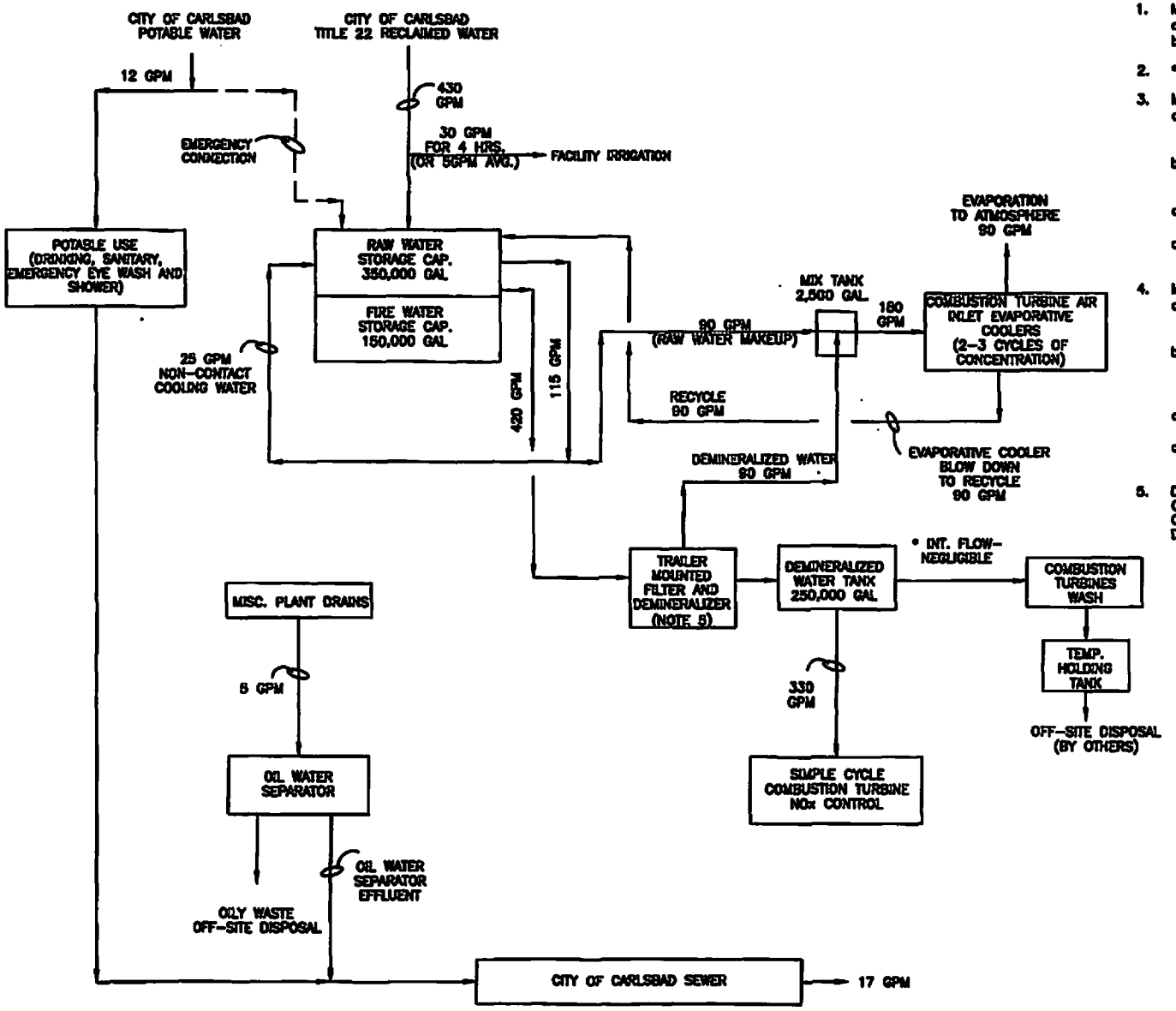


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Data Responses Set 4 (Nos. 86-92) docketed November 21, 2014 (TN203363)

PROJECT DESCRIPTION - FIGURE 6

Carlsbad Energy Center Project Amendment - Reclaimed Water Balance



NOTES:

1. MAXIMUM USE BASIS:
   a) NOx USE – 55 GPM PER TURBINE
   b) EVAP COOLING USE – 15 GPM PER TURBINE
2. * INT. = INTERMITTENT FLOWS
3. MAXIMUM DAILY CONSUMPTION:
   a) TITLE 22 RECLAIMED WATER – 464,400 GAL/DAY. ASSUMES 18-HR OPERATION AT FULL LOAD.
   b) POTABLE WATER – 17,200 GAL/DAY. ASSUMES OCCUPIED SITE FOR 24-HR DAY. (NON-FIRE USE)
   c) POTABLE WATER – EMERGENCY ONLY (FIRE USE)
   d) FIRE WATER STORAGE REFILL – 500GPM MINIMUM (150,000 GALS./FILL)
4. MAXIMUM YEARLY CONSUMPTION:
   a) TITLE 22 RECLAIMED WATER – 70,082,480 GAL/YR. ASSUMES FULL LOAD OPERATION FOR A TOTAL OF 2,700 HRS PER YEAR.
   b) POTABLE WATER – 6,278,000 GAL/YR. ASSUMES OCCUPIED SITE 24-HR/DAY AND 365 DAY/YR. (NON-FIRE USE)
   c) POTABLE WATER – EMERGENCY ONLY (FIRE USE)
   d) FIRE WATER STORAGE REFILL – 500GPM MINIMUM (150,000 GALS./FILL)
5. DEMINERALIZER SYSTEM TO CONSIST OF A COMBINATION OF PRE-FILTRATION AND A COMBINATION OF CATION, ANION AND MIXED BED DEMINERALIZERS.

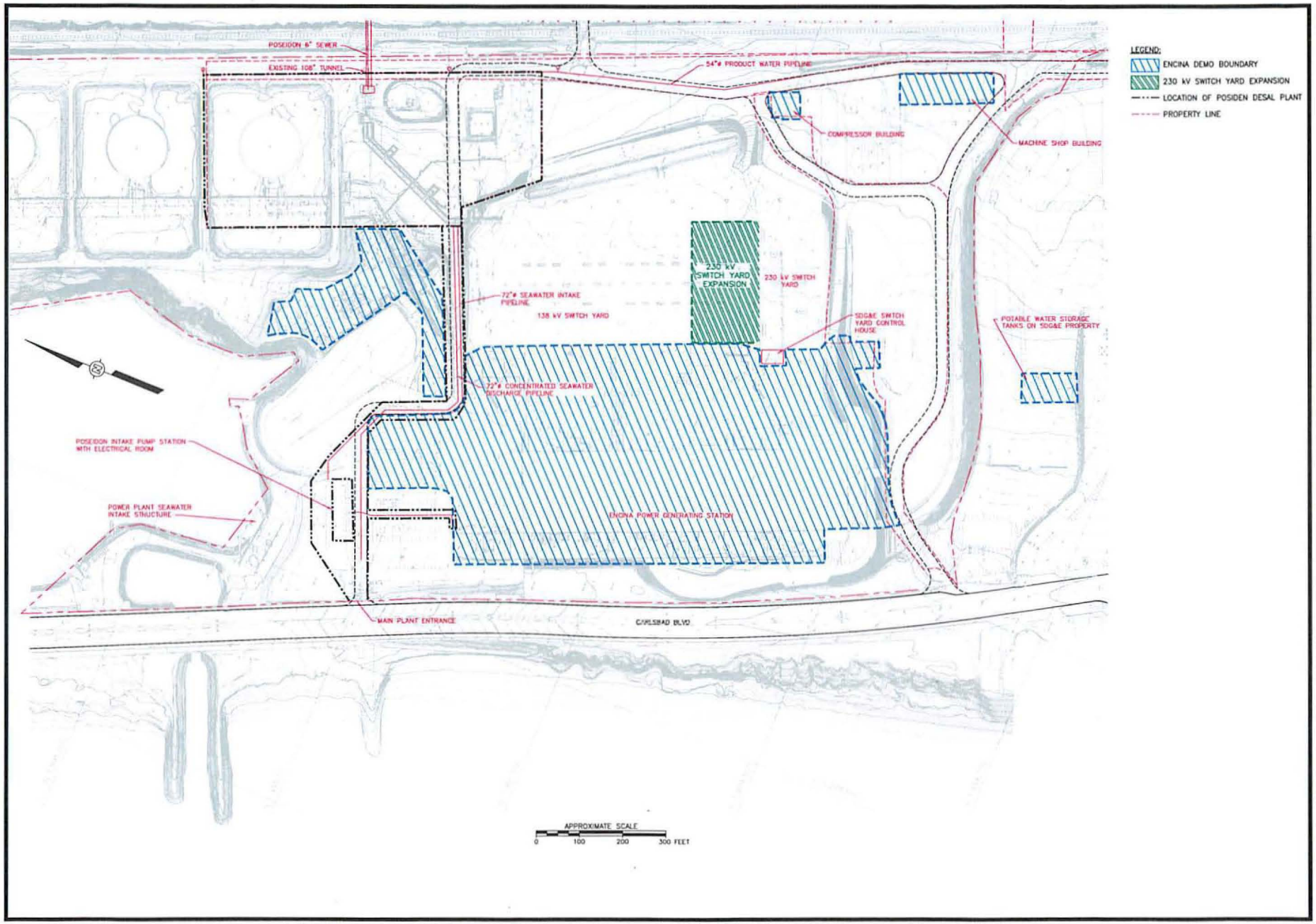
PROJECT DESCRIPTION

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Data Responses Set 4 (Nos. 86-92) docketed November 21, 2014 (TN203363)

PROJECT DESCRIPTION - FIGURE 7

Carlsbad Energy Center Project Amendment - Encina Power Station Demolition

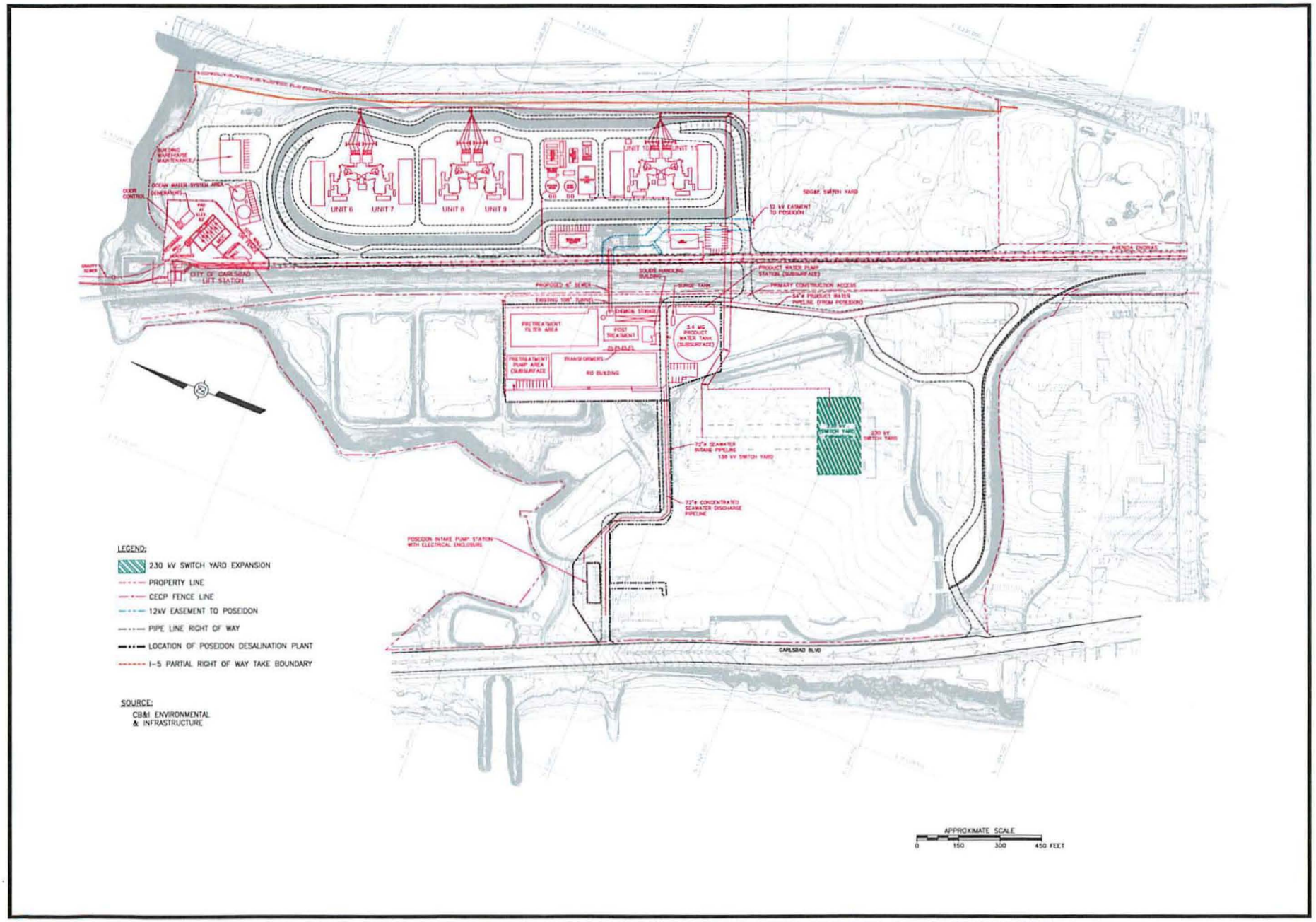


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: 07-AFC-06C Petition to Amend - Figure 2.2-1

PROJECT DESCRIPTION - FIGURE 8

Carlsbad Energy Center Project Amendment - Depiction of Site after EPS Demolition



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: 07-AFC-06C Petition to Amend - Figure 2.2-2

Environmental Assessment

AIR QUALITY

William Walters, P.E.

SUMMARY OF CONCLUSIONS

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

All air quality issues related to the amended project have been addressed in the San Diego Air Pollution Control District's Preliminary Determination of Compliance (PDOC) for the amended project, and through additional staff recommended revised conditions of certification. The project has secured emission reduction credits in sufficient quantity to meet staff's recommended Condition of Certification **AQ-SC10,** will create or obtain sufficient emission reduction credits 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 amended project's construction and operation, including the proposed demolition of the Encina Power Station (EPS), and as a product of this analysis, staff has recommended revised mitigation and monitoring requirements that should be sufficient to reduce the adverse construction, demolition, and operating emission impacts to less than significant.

Global climate change and greenhouse gas (GHG) emissions from the amended project are discussed and analyzed in **Appendix AQ-1**. The amended 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 0.503 metric tonnes of carbon dioxide per net megawatt hour (MTCO2/MWh). The project would emit as much as 0.85 million metric tonnes of carbon dioxide equivalent emissions and therefore would be subject to mandatory state and federal GHG reporting requirements. The amended project, as a peaking project with an enforceable operating limitation less than 60 percent of capacity, is not subject to the requirements of SB1368 (Perata, Chapter 598, Statutes of 2006), the state's Emission Performance Standard.

If built, the amended CECP would be required to participate in California's greenhouse gas cap-and-trade program. This cap-and-trade program is part of a broad effort by the State of California to reduce GHG emissions as required by AB 32, which is being implemented by the California Air Resources Board (ARB). Market participants such as the amended CECP would be required to report their GHG emissions and to obtain GHG emissions allowances (and offsets) for those reported emissions by purchasing allowances from the capped market and offsets from outside the AB32 program. Thus, the amended CECP, as a GHG cap-and-trade participant, would be consistent with California's landmark AB 32 Program, which is a statewide program coordinated with a region-wide Western Climate Initiative program to reduce California's GHG emissions to 1990 levels by 2020.

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 amended CECP by Carlsbad Energy Center LLC (petitioner). The amended CECP would be located in Carlsbad at the existing NRG-owned Encina Power Station (EPS) located west of Interstate 5 and north of Cannon Road. The EPS would be demolished in the final phase (IV) of the amended CECP project.

The analysis in this section focuses on the impacts of the proposed amended project's criteria air pollutant emissions, while the climate change/greenhouse gases emissions impact analysis is provided in **Appendix AQ-1**, and the air toxics emissions health impacts are analyzed separately in the **PUBLIC HEALTH** section. 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 the amended 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 the amended 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 amended 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)).

PROPOSED MODIFIED PROJECT

The amended project would revise the power plant design of the licensed project from a 540-MW rapid response, combined cycle gas turbine project to a 632-MW simple cycle gas turbine project. The major differences in the licensed and proposed amended project design related to air quality are as follows (LL 2014b, LL 2014d, and LL 2014e):

Amended Project	Licensed Project
Six GE LMS100 simple cycle turbines each with an air-cooled fin fan cooler.	Two Siemens Rapid Response SGT6-5000F gas turbines operating in combined- cycle mode, each with an air-cooled fin fan cooler.
Amended CECP footprint would be 30 acres and requires the additional removal of aboveground storage tank (AST) 4 and the berm between ASTs 4 and 5. This additional demolition and construction activity is the subject of a separate Petition to Remove (PTR).	Project footprint is 23 acres.
Amended CECP would be effectively limited to an equivalent of 2,700 hours of operation at full load.	Project is effectively limited to an equivalent of 4,100 hours of operation at full load.
Operation would be restricted to 0600 to 2400 hours (6 am through midnight).	No operating hours restrictions.
Auxiliary equipment with air pollutant emissions would include: 1) A 327 brake-horsepower (bhp) diesel-fired emergency fire water pump engine (tier 3 engine). 2) A 500-kW diesel fired emergency generator engine (interim tier 4 engine). 3) Three electric-driven natural gas compressors	Auxiliary equipment with air pollutant emissions include: 1) A 246 brake-horsepower (bhp) diesel-fired emergency fire water pump engine (engine tier based on regulatory requirement for 2009 model year).
The amended project would retire all five Encina Power Station (EPS) boilers and simple cycle gas turbine.	The licensed project would require EPS Boilers 1-3 to retire.
The amended project includes a specific timeline and specified methodology for the demolition of the EPS.	The licensed project does not have a timeline or specified methodology for EPS demolition.

Refer to the **PROJECT DESCRIPTION** of this Preliminary Staff Assessment (PSA) for a more details on specific components of the modified project, and accompanying figures identifying project features and facilities.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The following federal, state, and local laws and policies shown below in **Air Quality Table 1** 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 LORS	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 amended CECP would be a modification of an existing major source and thus the trigger levels are emissions increases of 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 generators and 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, and 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 establish 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 San Diego County is not unnecessarily restricted. This regulation establishes Best Available Control Technology (BACT) and emission offset requirements.

Applicable LORS	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 generator and fire pump engines (40 CFR Part 60 Subpart IIII) as described above in the federal LORS description. Subpart KKKK establishes 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 coast. 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 10.4 inches of rain annually (WC 2014).

Temperature, wind speed, and wind direction data collected in Camp Pendleton, about 6.3 miles north northwest of the project site, were processed and a five-year data set (2008-2012) was provided with the Petition to Amend (PTA) air dispersion modeling files (LL 2014i). 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 second and third quarters. The winds during the first and fourth 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 infrequently less than one-half percent of the time. The wind speeds are generally higher during daylight hours, and are highest during the first and second 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 the presence of lower level inversion layers 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 $\mu g/m^3$).

The U.S. Environmental Protection Agency (U.S. EPA) and the California Air Resource Board (ARB) 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 amended 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.

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 (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	100 ppb (188 µg/m^3) [a]	0.18 ppm (339 µg/m^3)
Sulfur Dioxide (SO_2)	24 Hour	—	0.04 ppm (105 µg/m^3)
	1 Hour	75 ppb (196 µg/m^3) [b]	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	12.0 µg/m^3 [c]	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
	Rolling 3-Month Average	0.15 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 2014a.
Notes:
a - This 1-hour federal standard is based on the 98th percentile of maximum daily peak hourly values, unlike the State 1-hour standard that is a not to exceed standard.
b - This 1-hour federal standard is based on the 99th percentile of maximum daily peak hourly values, unlike the State 1-hour standard that is a not to exceed standard.
c - There is also a secondary standard of 15 µg/m3.

Air Quality Table 3
Federal and State Attainment Status for the San Diego Air Basin [a]

Pollutant	Attainment Status	
	Federal	**State**
Ozone	Marginal Nonattainment (8-hr)	Nonattainment
CO	Attainment/Maintenance	Attainment
NO_2	Attainment	Attainment
SO_2	Attainment	Attainment
PM10	Attainment	Nonattainment
PM2.5	Attainment	Nonattainment

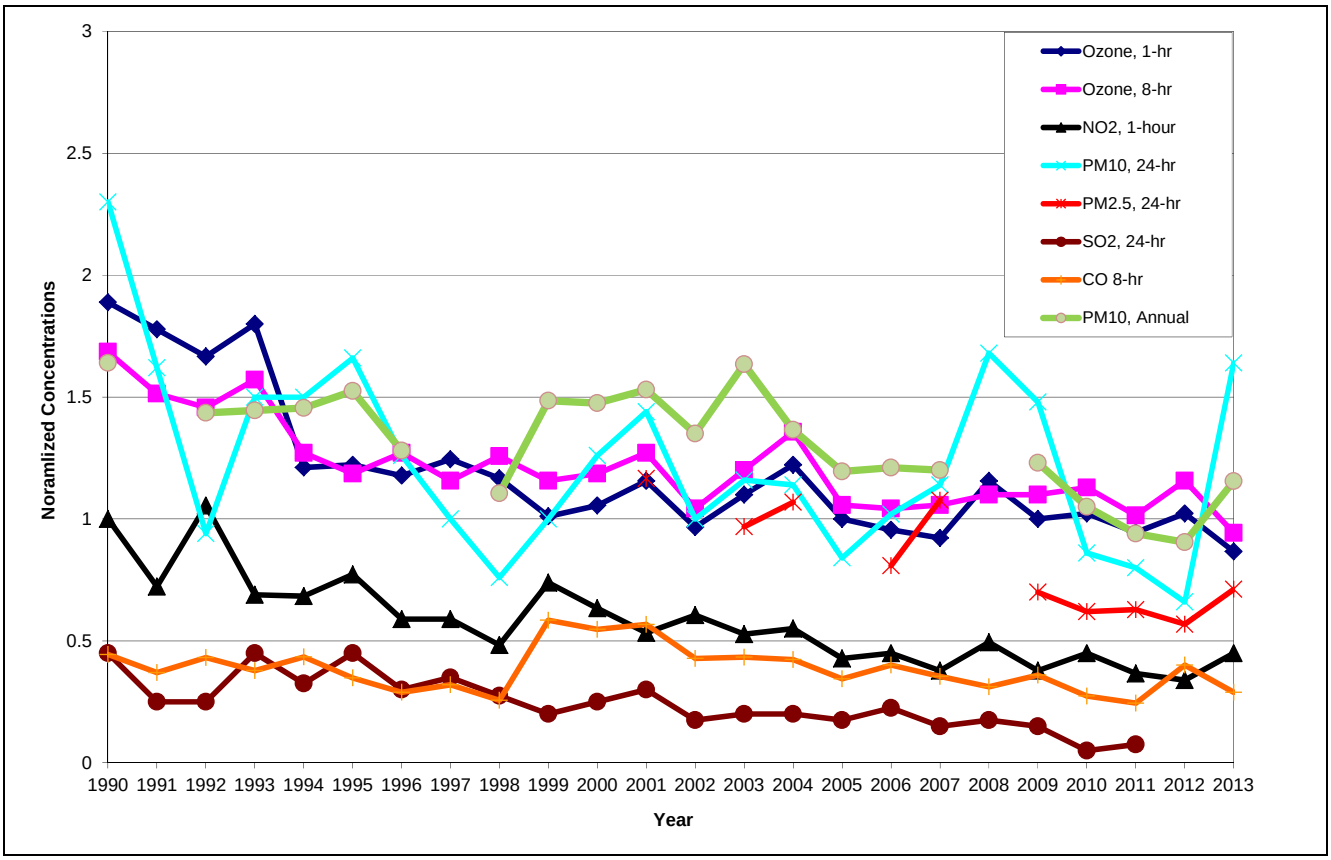
Source: ARB 2014b, U.S. EPA 2014a, U.S. EPA 2014b
Note: a – The term Attainment is used for all designations, such as unclassifiable, that are functionally the same as an attainment designation.

The project site is located in northwestern San Diego County, in the city of Carlsbad just west of the Interstate 5, 0.25 miles east of Carlsbad Boulevard, just south of Aqua Hedionda Lagoon, and 0.4 miles 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 station, 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 Figure 1 summarizes the historical air quality data for the project location recorded at representative air monitoring stations (1990-2013 for Ozone, PM10, CO, NO_2, 1990-2011 for SO_2; and 1999-2013 for PM2.5). In **Air Quality Figure 1**, the short term normalized concentrations are provided from 1990 to 2013. 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 indicate 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 2008, SDAPCD 2008, ARB 2014c, U.S. EPA 2014c.
Note: 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.

The 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 standards. Ozone formation is higher in spring, summer, and early fall and lower in the winter. The San Diego Air Basin (SDAB) was classified as an attainment area for the previous federal one-hour ozone standard (no longer applicable) and is classified as a marginal nonattainment area for the federal 8-hour ozone standard. The SDAB is also classified as a nonattainment area for the state ozone standards.

Air Quality Table 4
Ozone Air Quality Summary, 1990-2013 (ppm)

Year	Days Above CAAQS 1-Hr	Month of Max. 1-Hr Avg.	Max. 1-Hr Avg.	Days Above CAAQS 8-Hr	Month of Max. 8-Hr Avg.	Max. 8-Hr Avg.
Oceanside - Mission Avenue						
1990	14	OCT	0.170	9	OCT	0.119
1991	14	MAY	0.160	24	MAY	0.106
1992	12	SEP	0.150	19	SEP	0.103
1993	7	SEP	0.162	13	SEP	0.110
1994	2	JUN	0.109	10	SEP	0.089
1995	5	SEP	0.110	14	NOV	0.083
1996	4	MAY	0.106	12	OCT	0.090
1997	6	OCT	0.112	7	OCT	0.081
1998	3	JUL	0.105	12	JUL	0.089
1999	0	APR	0.091	4	APR	0.081
2000	1	MAR	0.095	2	MAR	0.083
2001	1	SEP	0.104	5	SEP	0.089
Camp Pendleton						
2002	0	MAY	0.087	5	MAY	0.073
2003	4	OCT	0.099	10	OCT	0.085
2004	4	MAY	0.110	12	OCT	0.095
2005	0	AUG	0.090	2	APR	0.075
2006	0	SEP	0.086	5	FEB	0.073
2007	0	MAR	0.083	4	MAY	0.074
2008	1	NOV	0.104	3	APR	0.077
2009	0	APR	0.090	5	APR	0.077
2010	0	SEP	0.092	1	SEP	0.079
2011	0	SEP	0.085	2	SEP	0.071
2012	0	SEP	0.092	1	SEP	0.081
2013	0	AUG	0.078	0	MAY	0.066

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 through 2007.

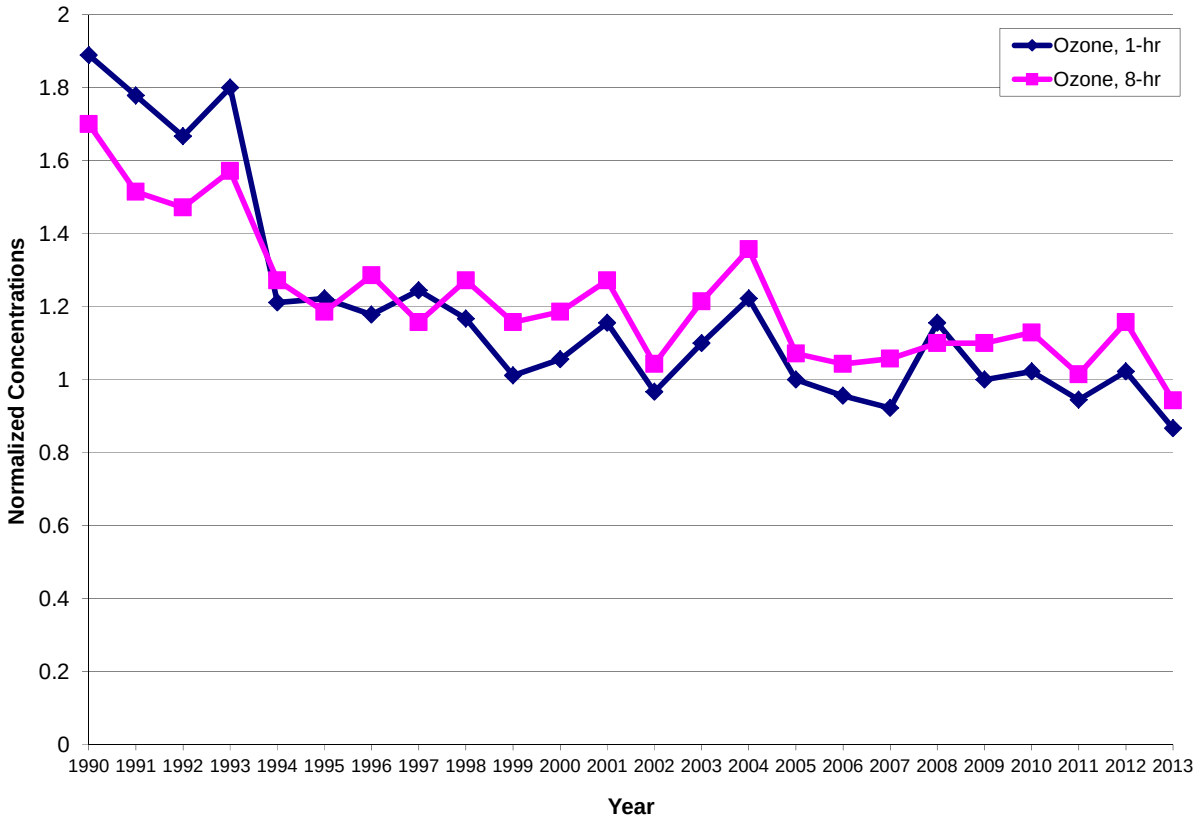
Source: ARB 2008 and ARB 2014c.

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 and eight-hour standards for the Oceanside Mission Avenue (1990-2001) and Camp Pendleton (2002-2013) monitoring stations are 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. The air basin cannot be redesignated as attainment of the federal and state ozone standards until all monitoring stations within the air basin show no official exceedances of these standards for three consecutive years. Federal

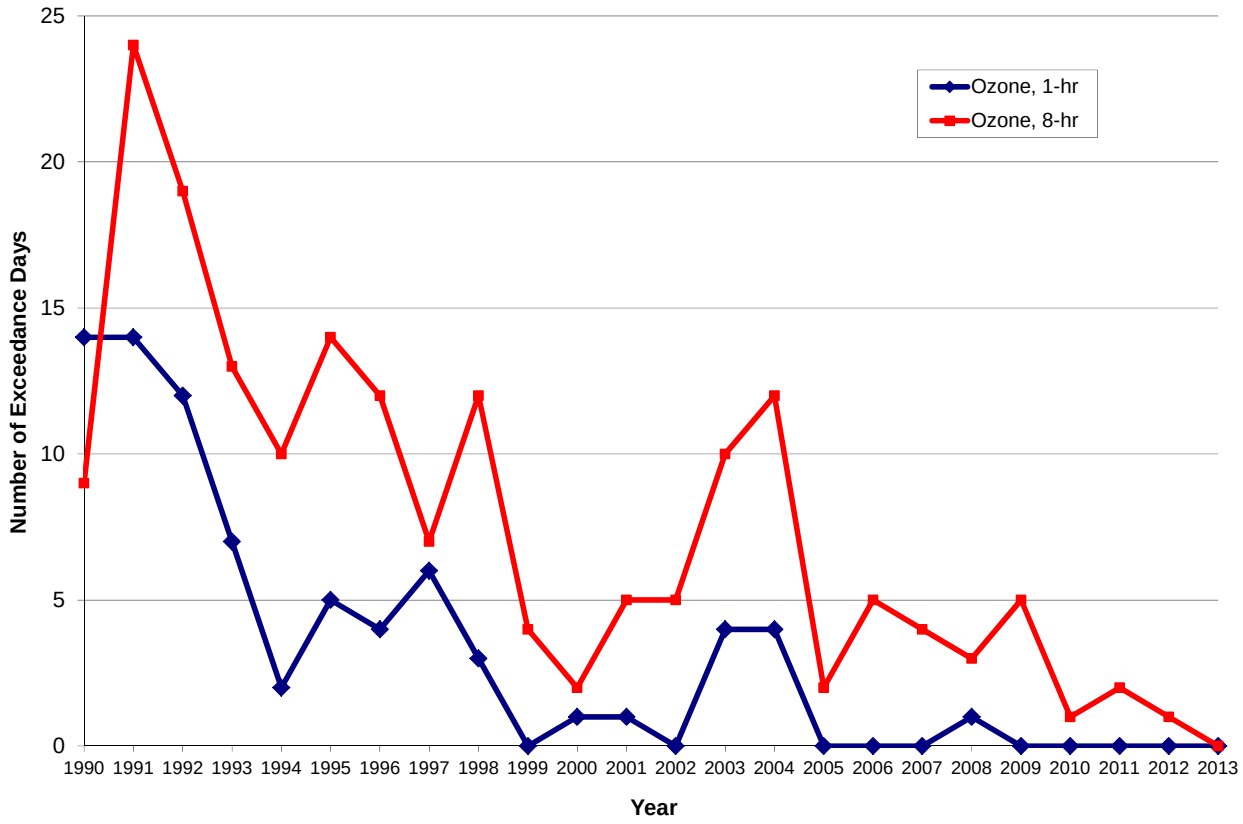
redesignation requires an official request for redesignation and the approval of an attainment maintenance plan.

Air Quality Figure 2
Normalized Ozone Air Quality Maximum Concentrations



Source: ARB 2008 and ARB 2014c.

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



Source: ARB 2008 and ARB 2014c.

Respirable Particulate Matter (PM10)

PM10 can be emitted directly or it can be formed many miles downwind from emission sources when various precursor pollutants interact in the atmosphere. Gaseous emissions of pollutants like NOx, SOx, and VOC from 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 **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, 1990-2013 (µg/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	13	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	12	NOV[a]	57[a]	24[a]
2008	--	JAN	84	--
2009	6	JAN	74	24.6
2010	0	DEC	43	21.0
2011	0	APR	40	18.8
2012	0	DEC	33	18.1
2013	6	FEB	82	23.1

California Ambient Air Quality Standard: 24-Hr, 50 µg/m^3; Annual Arithmetic, 20 µg/m^3
National Ambient Air Quality Standard: 24-Hr, 150 µg/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.

-- Data not available

[a] Excludes 2003 and 2007 firestorm events

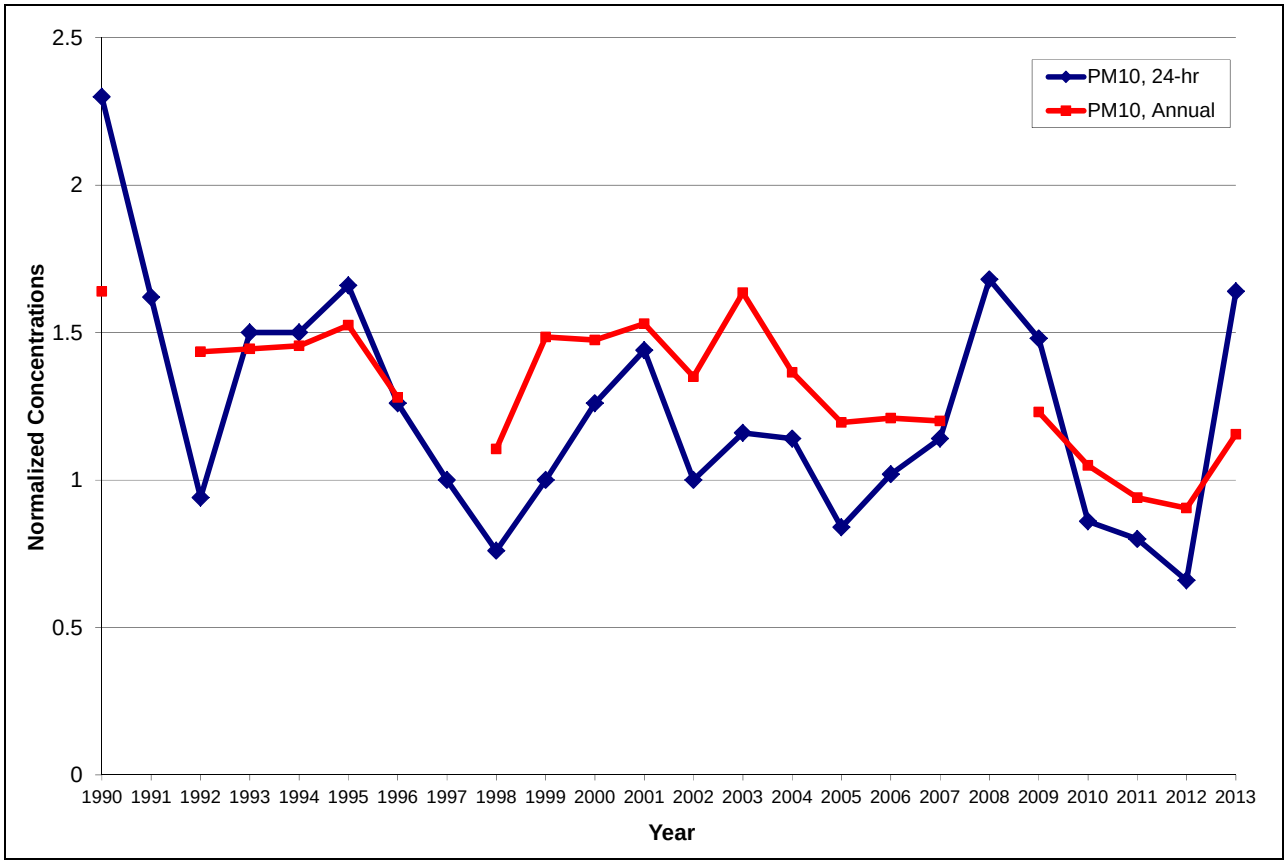
Source: ARB 2008, SDAPCD 2008, and ARB 2014c.

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 2013 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 are shown in **Air Quality Figure 4** and **Figure 5**, respectively.

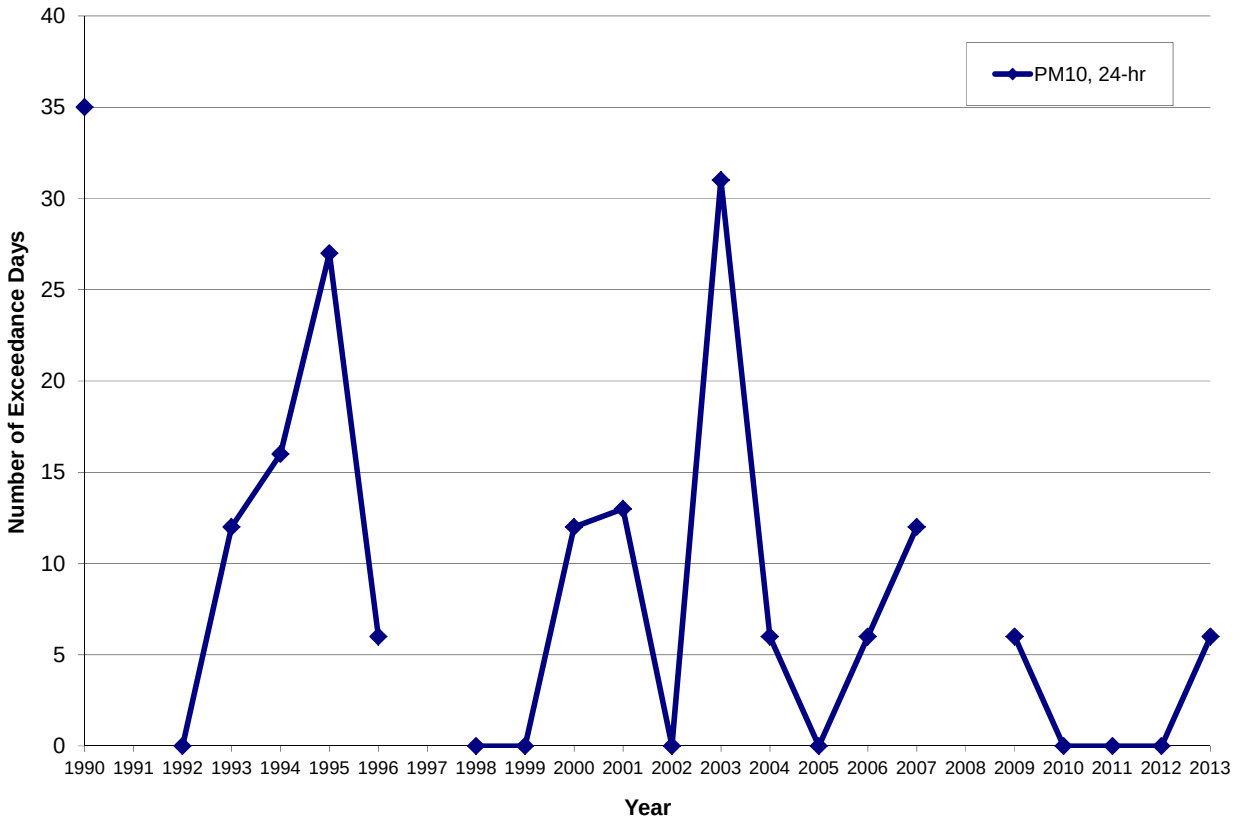
As the two figures show, there is an overall gradual downward trend for annual PM10 concentrations and number of violations of the California 24-hour standard since 1990; however, there has been little progress in the peak 24-hour PM10 concentrations since 1996.

Air Quality Figure 4
Normalized PM10 Air Quality Maximum Concentrations



Source: ARB 2008, SDAPCD 2008, and ARB 2014c.

Air Quality Figure 5
PM10 24-Hour – Number of Days Exceeding the Air Quality Standard



Source: ARB 2008, SDAPCD 2008, and ARB 2014c.

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 PM2.5 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.

As **Air Quality Table 6** indicates, the 24-hour (three-year average 98th percentile) PM2.5 concentration levels and the annual average concentration levels have been declining from 1999 through 2013. These concentrations were at or above the current federal standards as of 2007, but the 24-hour concentrations have been below the federal standard since that year and the area is classified as attainment of that federal standard. The PM2.5 concentration data at the Escondido monitoring station has also been below the state standard since 2008; however, other monitoring stations still show exceedances and the air basin will not be deemed attainment until all of the monitoring stations within the air basin meet the standard.

Air Quality Table 6
PM2.5 Air Quality Summary, 1999-2013 (µg/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
2008	31.3	JUL	--	12.4	--
2009	64.9	JAN	24.5	--	11.0
2010	33.3	DEC	21.7	--	10.5
2011	27.4	NOV	22.0	10.4	10.4
2012	70.7	JAN	19.9	--	10.5
2013	56.3	JAN	24.9	10.5	10.5

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

Source: ARB 2008, SDAPCD 2008, ARB 2014c.

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 a 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, 1990-2013 (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
2008	JAN	5.6	2.81
2009	JAN	4.4	3.24
2010	JAN	3.9	2.46
2011	JAN	3.5	2.20
2012	JAN	4.4	3.61
2013	--	3.2	2.6

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 2008, SDAPCD 2008, ARB 2014c, U.S. EPA 2014c.

Nitrogen Dioxide (NO2)

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 are lower than the California and national ambient air quality standards and typically occurred in winter or fall.

Air Quality Table 8
NO_2 Air Quality Summary, 1990-2013 (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
2008	NOV	0.089	0.010
2009	JAN	0.068	--
2010	NOV	0.081	0.009
2011	DEC	0.066 (0.046)	--
2012	NOV	0.061 (0.046)	0.008
2013	NOV	0.081 (0.050)	--
California 1-Hr Ambient Air Quality Standard: 0.18 ppm California Annual Arithmetic Mean Ambient Air Quality Standard: 0.03 ppm National 1-Hr 98th Percentile Ambient Air Quality Standard: 0.100 ppm National Annual Arithmetic Mean Ambient Air Quality Standard: 0.053 ppm Values in "()" are the last three year 98th percentile values			

Source: ARB 2008, ARB 2014c, U.S. EPA 2014c.

Sulfur Dioxide (SO2)

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, 1990-2011 (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
2008	0.037 (0.020)	OCT	0.007	0.003
2009	0.021 (0.014)	JAN	0.006	0.001
2010	0.008 (0.007)	JAN	0.002	0.000
2011	0.013	JAN	0.003	--

California Ambient Air Quality Standard: 1-Hr, 0.25 ppm; 24-Hr, 0.04 ppm
National Ambient Air Quality Standard: 1-Hr, 0.075 ppm, 99th percentile of maximum daily values
[a] 2005 is a mixture of San Diego 12th Avenue and Beardsley Street.
Values in "()" are the last three year full years of data 99th percentile values

Source: ARB 2006, ARB 2008, SDAPCD 2008, ARB 2014c, U.S. EPA 2014c.

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 typically used to determine the recommended background values. However, for this project we are using data from 2010 to 2012 to determine the background concentrations, as determined by the District, since these values correspond to the meteorological and hourly background concentration data used by the District in their Air Quality Impact Analysis for the amended CECP.

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	339	45%
	1 hour NAAQS	96	188	51%
	Annual	17	57	30%
PM10	24 hour	42	50	84%
	Annual	21	20	105%
PM2.5	24 hour	21.3	35	61%
	Annual	10.6	12	88%
CO	1 hour	5,039	23,000	22%
	8 hour	4,352	10,000	44%
SO_2	1 hour	34	655	5%
	1 hour NAAQS	34	196	17%
	24 hour	8	105	8%

Source: SDAPCD 2014

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 are at or above the most restrictive existing ambient air quality standards, while the background concentrations for the other pollutants are all 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 project owner has proposed to develop the amended CECP on a 30-acre site, within the 95-acre Encina Power Station site. This 30-acre site currently contains four unused fuel-oil aboveground storage tanks (ASTs 4, 5, 6, and 7) that previously serviced the existing Encina Power Station (EPS). The amended CECP project would consist of six General Electric LMS100 simple-cycle gas turbines, a diesel-fueled emergency generator, a diesel-fueled fire water pump, and three electric-driven natural gas compressors. The project would employ air cooling and would not include any other stationary criteria pollutant emission sources. The entire existing EPS, including boiler Units 1 through 5 and the gas turbine, would be removed from service after the new power plant facilities are constructed, commissioned, and begin commercial operation. Additionally, demolition of the EPS would begin within 12 months of the start of commercial operation of the amended CECP power plant facilities.

The amended CECP would consist of: (1) Phase I demolition and AST removal activities requested in the PTR (LL 2014b); (2) Phase II construction and commissioning of the revised CECP power plant design, (3) Phase III shut-down and decommissioning of EPS Units 1-5 and gas turbine, and (4) Phase IV EPS demolition activities that are requested in the PTA (LL 2014d). The amended project would maximize the use of existing linear lines; therefore, little or no off-site construction is necessary for transmission, gas supply, or sewer/industrial wastewater lines for this project. The amended project is proposed to be supplied with reclaimed water from the city of Carlsbad's recycled water facility, and would discharge waste water through an on-site connection with the city of Carlsbad's existing sanitary/industrial and Encina Wastewater Authority sewer system. The portion of the approved project not being amended includes demolition of ASTs 5, 6, and 7 along with any resulting soil remediation.

The project site is located in the city of Carlsbad just west of the I-5, 0.25 miles east of Carlsbad Boulevard, just south of Aqua Hedionda Lagoon, and 0.04 miles north of Cannon Road. The site location is in a man-made depression or basin that was constructed as secondary containment for the ASTs 4, 5, 6, and 7. The general area around the site has mixed use with heavy industrial use (the Encina Power Station), light industrial use, commercial use, residential use, and school use, as well as recreational use of the Pacific Ocean (Carlsbad State Beach), the Agua Hedionda Lagoon, and Cannon Park.

The nearest residence is located approximately 0.44 miles to the northeast of the power plant 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 amended CECP would consist of the following four primary phases:

1) Phase I - Tank Demolition and Remediation

2) Phase II - Construction and Initial Commissioning of the amended CECP

3) Phase III – Retirement and Decommissioning of EPS units

4) Phase IV – EPS Demolition

Phase I is requested by the project owner in their PTR, and the other three phases for the amended CECP are requested in their PTA. Phase II includes the initial commissioning of the gas turbines that are described separately in the following subsection. None of the construction/demolition phases overlap with each other, and the demolition and remediation of ASTs 5, 6, and 7, approved as part of the licensed CECP, would be completed prior to initiation of Phase I. The amended CECP operation would overlap with Phase III and Phase IV.

The total construction period for all four phases is 64 months. During the construction and demolition periods, Phases I, II and IV, of the amended CECP; most of heavier construction and demolition activities, including truck trips would occur between 6:00 a.m. and 6:00 p.m., five days per week; and the use of heavy off-road equipment on-site would occur primarily between the hours of 7:00 a.m. and 4:00 p.m., 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, seven days per week, during some construction or demolition periods and during startup and commission of the units.

Construction laydown and construction worker parking areas for this project would occupy approximately 19.3 acres of property within the existing Encina Power Station, west of the existing railroad tracks in the area of existing ASTs 1 and 2 (which would both be demolished as part of the PTR). The existing railroad line, which would be available for delivery of materials and heavy equipment, is located immediately west of the project site. Materials and other equipment would also be delivered by truck, accessed from Cannon Road via Avenida Encinitas.

Fugitive dust emissions during the construction of the amended CECP power plant and EPS demolition would result from dust entrained during demolition, site preparation and grading/excavation activities, on-site and off-site 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 on-site soil disturbances, such as dozing and grading, and from on-site and off-site traffic also were estimated.

Combustion emissions during the construction of the amended CECP and demolition of the EPS would result from off-road and on-road equipment exhaust sources, such as diesel construction equipment used for site preparation, water trucks used to control dust emissions, cranes, excavators, diesel-powered welding machines, electric generators, air compressors, water pumps, diesel trucks used for deliveries and demolition waste hauling, trains used for deliveries, and automobiles and trucks used by workers to commute to and from the construction sites. Construction/demolition emissions were estimated by the project owner for the three of the four primary construction and demolition work phases as described below.

Phase I - Tank Demolition and Remediation

This phase includes the demolition of ASTs 1, 2, and 4 including any necessary soil remediation, and removal/reuse of the berm between ASTs 4 and 5 as proposed under the PTR (LL 2014b). The project owner's estimates for the maximum daily emissions and maximum daily on-site emissions during the peak month for this phase are summarized in **Air Quality Table 11**. The licensed CECP construction emissions estimates are also provided in this table for comparison.

Air Quality Table 11
Construction Phase I Maximum Daily Emissions, lbs/day

Total Project Phase Emissions:	**NOx**	**CO**	**VOC**	**SOx**	**PM10**	**PM2.5**
Tank Demolition/Berm Removal	46.14	59.64	2.47	0.10	4.01	2.00
Licensed CECP Maximum Daily Emissions	493.67	529.42	67.82	0.71	51.66	27.04
Total Onsite Emissions:	**NOx**	**CO**	**VOC**	**SOx**	**PM10**	**PM2.5**
Tank Demolition/Berm Removal	42.81	56.00	2.15	0.09	3.85	1.88
Licensed CECP Maximum Daily Emissions	274.90	150.27	25.19	0.30	42.22	17.59

Source: LL 2014b, Tabled 3.1-1 and 3.1-2; CEC 2009b, Table 11

As can be seen in air pollutant emissions estimates provided in **Air Quality Table 11**, the licensed CECP construction had much higher estimated emissions than those estimated for the Phase I AST demolition and berm removal work.

This phase is a six month activity and it would be performed in the same twelve month period as portions of the licensed CECP construction activities (demolition of ASTs 5, 6, and 7) that are not included in the PTR or PTA and the amended CECP construction activities: however, it along with the licensed CECP and amended CECP construction activities are not expected to have a higher 12-month emissions peak than that determined for the amended CECP construction as shown below.

Phase II – Construction and Initial Commissioning of the amended CECP

Construction of the amended CECP would take 21 months of the 24 month schedule of this phase. The peak daily and the and peak annual, based on the peak 12-month period, total and on-site construction equipment exhaust and fugitive emissions estimated for construction of the amended CECP are shown in **Air Quality Tables 12**

and **13**. The licensed CECP construction emissions estimates are also provided in these tables for comparison.

Air Quality Table 12
Construction Phase II Maximum Daily Emissions, lbs/day

Total Project Phase Emissions:	**NOx**	**CO**	**VOC**	**SOx**	**PM10**	**PM2.5**
Amended CECP Construction	122.31	162.85	7.38	0.31	11.01	7.58
Licensed CECP Maximum Daily Emissions	493.67	529.42	67.82	0.71	51.66	27.04
Total Onsite Emissions:	**NOx**	**CO**	**VOC**	**SOx**	**PM10**	**PM2.5**
Amended CECP Construction	118.31	146.18	6.01	0.27	8.47	6.86
Licensed CECP Maximum Daily Emissions	274.90	150.27	25.19	0.30	42.22	17.59

Source: LL 2014e, Table 5.1F-2; CEC 2009b, Table 11

Air Quality Table 13
Construction Phase II Peak Annual Emissions, tons/year

Total Project Phase Emissions:	**NOx**	**CO**	**VOC**	**SOx**	**PM10**	**PM2.5**
Amended CECP Construction	10.87	14.51	0.67	0.03	1.09	0.74
Licensed CECP Peak Annual Emissions	26.63	44.95	4.94	0.05	3.68	1.65
Total Onsite Emissions:	**NOx**	**CO**	**VOC**	**SOx**	**PM10**	**PM2.5**
Amended CECP Construction	10.55	12.94	0.54	0.02	0.84	0.67
Licensed CECP Peak Annual Emissions	16.94	13.34	1.68	0.02	3.18	1.16

Source: LL 2014e, Table 5.1F-2; CEC 2009b, Table 12

As can be seen in air pollutant emissions estimates provided in **Air Quality Tables 12** and **13**, the licensed CECP construction had higher estimated emissions than those estimated for the amended CECP construction. There are three primary reasons why the amended CECP construction emissions are lower than the licensed CECP construction emissions: 1) the construction activities are separated in more discrete events with a longer schedule which reduces the peak fugitive dust emissions; 2) more effective emissions reduction for the off-road equipment engines are assumed in the form of newer engines with higher minimum U.S. EPA/ARB tier levels along with a reduction in emissions factors associated with revisions by ARB to the OFFROAD emissions estimating program; and 3) reduced on-road equipment emission factors that correspond to the revised starting date for the construction schedule.

Initial commissioning, which would cover the last three months of this phase, is described separately in the “Initial Commissioning” subsection.

Phase III – Retirement and Decommissioning of EPS units

This phase will start after the completion of initial commissioning and the start of commercial operation of the amended CECP. This phase is estimated to require 12 months and would consist of the permanent shutdown and decommissioning of EPS units 1-5 and the gas turbine. Other activities to be performed during this phase, that would be required prior to the initiation of Phase IV – EPS Demolition, would include the removal of EPS materials and equipment that would be reused, sold, or recycled; and the removal of hazardous materials. In addition all of the SDAPCD air permits for the EPS boilers and gas turbine would be retired at the beginning of this phase.

The applicant did not provide an emissions estimate for this phase, which would occur concurrently with amended CECP operation. However, due to the substantially lower level of activity required, this phase would have emissions that would be substantially lower than the emissions during the EPS demolition.

Phase IV – EPS Demolition

EPS demolition would require 22 months and would be comprised of removing all EPS structures down to current grade levels. Specific major activities include the removal of the EPS stack, removal of the boiler building, and plugging the ocean water intake and outfalls. Demolition would not include implosion or felling of the EPS stack or boiler building. The project owner provided a demolition plan that explains the methods, requirements, and assumptions for the EPS demolition process (LL 2014cc) to respond to staff data requests (CEC 2014u); and also provided a revised emissions estimate for EPS demolition (LL 2014uu) that addressed staffs issues with the emissions estimate provided with the PTA that were noted in staff's data requests (CEC 2014i). This construction phase would occur concurrently with the amended CECP operation.

The peak daily and the and peak annual, based on the peak 12-month period, total and on-site construction equipment exhaust and fugitive emissions estimated for EPS demolition are shown in **Air Quality Tables 14** and **15**. The licensed CECP construction emissions estimates are also provided in these tables for comparison.

Air Quality Table 14
Construction Phase II Maximum Daily Emissions, lbs/day

Total Project Phase Emissions:	**NOx**	**CO**	**VOC**	**SOx**	**PM10**	**PM2.5**
EPS Demolition	94.29	170.00	5.15	0.31	9.94	2.13
Licensed CECP Maximum Daily Emissions	493.67	529.42	67.82	0.71	51.66	27.04
Total Onsite Emissions:	**NOx**	**CO**	**VOC**	**SOx**	**PM10**	**PM2.5**
EPS Demolition	85.00	152.62	3.92	0.24	0.95	0.50
Licensed CECP Maximum Daily Emissions	274.90	150.27	25.19	0.30	42.22	17.59

Source: LL2014uu, Table 5.1-12 (revised); CEC 2009b, Table 11

Air Quality Table 15
Construction Phase II Peak Annual Emissions, tons/year

Total Project Phase Emissions:	**NOx**	**CO**	**VOC**	**SOx**	**PM10**	**PM2.5**
EPS Demolition	10.07	17.71	0.52	0.03	0.98	0.21
Licensed CECP Peak Annual Emissions	26.63	44.95	4.94	0.05	3.68	1.65
Total Onsite Emissions:	**NOx**	**CO**	**VOC**	**SOx**	**PM10**	**PM2.5**
EPS Demolition	9.08	16.20	0.41	0.03	0.12	0.05
Licensed CECP Peak Annual Emissions	16.94	13.34	1.68	0.02	3.18	1.16

Source: LL2014uu, Table 5.1-12 (revised); CEC 2009b, Table 12

As can be seen in air pollutant emissions estimates provided in **Air Quality Tables 14** and **15**, the licensed CECP construction had higher estimated emissions than those estimated for the Phase IV EPS demolition with the exception of a small increase in maximum annual on-site CO and SOx emissions.

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. The initial commissioning is scheduled to occur during the last three months of Phase II. For most power plants, normal operating emission limits usually do not apply during the initial commissioning activities. The commissioning period is needed, in part, to ensure the facility's operation is fine-tuned to minimize emissions during normal operations.

The commissioning activities for the six turbines (known as Units 6 through 11) would be completed simultaneously. Commissioning of the six turbines is estimated to require three to four months and is estimated to require 213 fired hours per gas turbine, 125 of which would be without the pollution control catalysts in operation and the last 88 would be with the pollution control catalysts in operation. After completing the commissioning period, the new units are expected to be available for commercial operation, with pollution control catalysts. During the commissioning period, the existing EPS would be also available for operation as needed. The EPS units would be shutdown and decommissioned directly after the successful commercial operation of the amended CECP gas turbine power plant.

Air Quality Table 16 presents the project owner's estimated emissions during the initial commissioning period (LL 2014e). The project would have a total of 11 major commissioning test types, where the maximum emissions potentials are summarized in the table. The emission rates for SO_2 are not presented as they are fuel-flow based and are not expected to be higher during any of the commissioning period activities than during normal operation.

Air Quality Table 16
Amended CECP Initial Commissioning Maximum Short-Term Emissions

Time Period	NOx	CO	VOC	PM
Maximum Hourly (lbs/hr/turbine)	90.0	247.67	7.92	5.0
Maximum Hourly All Turbines (lbs/hour)	540.0	1,486	47.5	30
Maximum Daily (lbs/day/turbine)	1,080	2,971	181	120
Maximum Daily (lbs/day/all turbines)	6,480	17,826	1,086.3	720

Source: LL 2014e, GE estimates and Tables 5.1B-12 and 5.1B-13, PDOC (SDAPCD 2014)

The short-term air pollutant emissions estimates from **Air Quality Table 16** were used in air dispersion modeling impacts analysis, presented in the "Impacts" subsection, to determine the worst-case air quality impacts during initial commissioning.

Air Quality Table 17 shows the summary of total initial commissioning emissions per turbine, with a comparison to the licensed CECP initial commissioning emissions.

Air Quality Table 17
Amended CECP Initial Commissioning Emissions per Turbine, tons

	NOx	CO	VOC	PM
Per Gas Turbine	2.96	7.16	0.36	0.35
Total	17.74	42.95	2.18	2.11
Licensed CECP	12.48	130.34	6.96	3.92

Source: PDOC (SDAPCD 2014), CEC 2009b

The initial commissioning emissions estimated for the amended CECP, for all pollutants except NOx, are well below the initial commissioning emissions estimated for the licensed CECP. The total NOx emissions are approximately 40 percent higher than those estimated for the licensed CECP. The maximum 12-month rolling average emissions for the amended CECP, that includes the initial commissioning period, are included in the SDAPCD permit conditions and are evaluated in the "Impacts" subsection.

OPERATIONAL PHASE

Equipment Description

The amended CECP facility would consist of six gas turbine power blocks, with the following major components, providing a total nominal generating capacity of 632 MW net: (LL 2014d):

- Six GE LMS100PA gas turbines equipped with water injection for NOx control, inlet air filters, inlet air evaporative coolers, and compressor intercoolers;
- Each gas turbine 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;
- Six air-cooled fin-fan coolers that serve the gas turbine's intercooler;
- Six 90-foot tall, 14.25-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 779 brake-horsepower (bhp) emergency generator engine;
- A 327 brake-horsepower (bhp) emergency fire pump engine; and
- Three electric motor-driven 50 percent capacity fuel gas compressors.

Facility Operation

The facility would be capable of operating seven days a week, 24 hours per day, but is being permitted to a maximum emission equivalent of 2,700 hours per year at full load per gas turbine. This is equivalent to an annual facility-wide capacity factor of approximately 31 percent. The licensed CECP is permitted to an annual facility-wide capacity factor of 47 percent. The project owner is not able to determine the exact operational schedule for amended CECP since the operation profile for a peaker facility would change depending on the variable demand in the service area. However, the project owner has committed to operating only between the military time hours of 600 and 2400 daily except under emergency situations.

Annual non-emergency operation of the emergency engines would be limited to 50 hours per year of engine testing. The emissions estimates assume that the total annual operation, engine testing and emergency operation, is 200 hours per year for each of the two emergency engines.

The amended CECP operations would require an 18-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 18-person workforce would be provided from 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. Gas turbine water injection 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 2.5 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, and a CO oxidizing catalyst would be used to further reduce CO and VOC concentrations in the exhaust gas emitted to the atmosphere to 4.0 ppmvd and 2.0 ppmvd, adjusted to 15 percent oxygen, respectively. Particulate emissions would be controlled through the use of best combustion practices, the use of a high-efficiency inlet air filter, and the use of pipeline quality natural gas as the sole fuel source. SOx emissions would be controlled using natural gas as the sole fuel for the gas turbines. Compliance with Best Available Control Technology requirements are described in the "Compliance with LORS" subsection.

The emergency engines would be controlled by the purchase of engines meeting the best available U.S. EPA/ARB Tier engine and using California low sulfur (15 ppm sulfur) diesel fuel. The emergency generator engine and the emergency fire pump are currently assumed to have Tier 4i and Tier 3 engines, respectively.

Six 90-foot tall, 14.25-foot diameter stacks would release the gas turbine exhaust gas into the atmosphere. A continuous emission monitoring (CEM) system would be installed on the gas turbine 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

Expected maximum emission rates during startup and shutdown events are summarized in **Air Quality Table 18**. Hourly startup emissions rates reflect 25 minutes of elevated emissions followed by 35 minutes of normal operating emission levels. During shutdown, the emissions rates reflect 13 minutes of elevated emission levels preceded by 37 minutes of normal operating emissions. The project owner also expects that there could be periodic cases that would have a startup, a shutdown, and another startup event, all occurring within one hour. This case represents the worst-case hourly emissions, reflecting 47 minutes of higher emissions levels in startup and 13 minutes of

higher emissions levels in shutdown in one hour; however, it is expected that this would occur very infrequently. PM10 and SO_2 emissions are not shown in the **Air Quality Table 18**, 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 18
Maximum Short-Term Event Emissions, lbs/hr, per gas turbine

Startup/Shutdown	NOx	CO	VOC
Startup	19.95	12.53	3.46
Shutdown	7.65	10.29	4.36
Startup/Shutdown/Restart	28.24	17.31	6.16
Licensed CECP Startup	69.2	545	15.5
Licensed CECP Shutdown	47	286	8.2
Licensed CECP Startup/Shutdown	86	814	19.8

Source: LL 2014e, Table 5.1B-12; PDOC FDOC (SDAPCD 2014); and FSA (CEC 2009b)

The maximum short-term pollutant emission rates for NOx, CO, and VOC are higher for the licensed CECP than the amended CECP.

The maximum hourly normal operating emission rates for the gas turbines are provided in **Air Quality Table 19.** The maximum hourly normal operating emission rates reflect the average ambient temperature full load operating case without operation of the inlet air evaporation unit. Included in this table is a comparison with the licensed CECP gas turbine/HRSG maximum normal operating emissions.

Air Quality Table 19
Maximum Normal Pollutant Emission Rates, lb/hr

Amended CECP Operating Unit	NOx	CO	VOC	SOx[a]	PM[b]
Gas Turbine Units 6 – 11 (each)	9.07	8.83	2.52	2.07	5.00
Total Maximum Gas Turbine Emissions	54.42	52.98	15.12	12.42	30.00
Emergency Generator Engine	3.84	1.15	0.13	0.01	0.09
Emergency Fire Pump Engine	1.87	0.505	0.072	0.003	0.079
Natural Gas Compressors	--	--	0.057	--	--
Licensed CECP Maximum Emissions for Gas Turbines	30.2	18.4	8.0	8.8	19.00

Source: LL 2014e, Table 5.1B-12; and PDOC FDOC (SDAPCD 2014); and FSA (CEC 2009b)
[a] SO_2 short-term 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.
[b] This is a short-term limit to determine maximum hourly and daily emissions limits. The annual emissions limit is based on a facility wide average of 3.5 lbs/hour/turbine of PM10. PM=PM10=PM2.5

The maximum normal pollutant emission rates are higher for the amended CECP than the licensed CECP for all pollutants.

Air Quality Table 20 summarizes the maximum (worst-case) estimated daily and annual emissions for the amended CECP, and provides the licensed CECP maximum daily and annual emissions for comparison. Maximum daily emissions for the gas turbines are based on four hours of startup, four hours of shutdown, and 16 hours of normal operation at annual average temperature full-load conditions. The daily emergency engines emissions are based on one hour of operation at full load and the

daily natural gas compressor VOC emissions are based on 24 hours at the normal hourly emission rate. Maximum annual emissions for the gas turbines are based on 400 hours of startup and 400 hours of shutdown and 1,900 hours of normal operation at annual average temperature full-load conditions. The annual emergency engines emissions are based on 50 hours at full load and the annual natural gas compressor VOC emissions are based on 8,760 hours at the normal hourly emission rate.

Air Quality Table 20
Amended CECP Worst-Case Daily and Annual Emissions

	NOx	CO	VOC	SOx[a]	PM[b]	NH_3
Maximum (Single gas turbine, lbs/day)	259.9	232.8	71.8	49.6	120.0	160.9
Maximum (Six gas turbines, lbs/day)	1,535.2	1,396.8	430.6	297.9	720.0	965.2
Maximum (New Equipment, lbs/day)	1,541	1,398.4	432.2	298	720.2	965.2
Maximum (Single gas turbine, tons/year)	14.15	12.96	3.97	0.93	4.7	9.0
Maximum (Six gas turbines, tons/year)	84.9	77.8	23.8	5.59	28.35	54.3
Maximum (New Equipment, tons/year)	85.07	77.83	24.06	5.59	28.35	54.3
Licensed CECP Maximum (lbs/day)	1,756	1,205	380	211	456	672
Maximum Licensed CECP (tons/year)	75.59	217.31	20.05	5.61	38.95	53.62

Source: LL 2014e, Table 5.1B-13; PDOC (SDAPCD 2014); and FSA (CEC 2009b)
[a] SO_2 annual emissions are based on an annual average sulfur content of 0.25 grains/100 dry standard cubic feet.
[b] The PM10 short-term limit to determine maximum hourly and daily emissions limits is 5.0 lbs/hour. The annual PM10 emissions limit is based on a facility wide annual average of 3.5 lbs/hour/turbine. PM=PM10=PM2.5

The maximum amended CECP worst-case daily and annual emissions estimates are higher than those estimated for the licensed CECP with the exception of the daily NOx emissions, the annual CO emissions, and the annual PM emissions.

Air Quality Table 21 summarizes the estimate for the maximum annual emissions for the amended CECP, the existing EPS annual emissions baseline as determined by SDAPCD through a review of recent emissions data (years 2009 to 2013), and the expected maximum annual incremental project emission increase or decrease from the EPS baseline.

Air Quality Table 21
Amended CECP Incremental Annual Emissions

Emission Source	Pollutant (tons/year)				
	NOx	CO[b]	VOC	SOx	PM[c]
CECP Expected Maximum Annual	84.8[a]	77.83	24.06	5.59	28.35
Encina Power Station (EPS) Emissions [d]	59.9	122.1	30.73	4.00	42.55
Amended CECP Net Emissions Change	24.89	-44.27	-6.67	1.59	-14.20
Licensed CECP Net Emissions Change[e]	39.9	-51.51	4.8	-0.6	7.5

Source: LL 2014e, Table 5.1B-14; PDOC FDOC (SDAPCD 2014); and FSA (CEC 2009b)
Notes:
[a] The project owner has taken a reduced facility-wide NOx emission limit, a very small reduction of less than 0.3 tons/year, 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 102.1 tons, which for that one year of initial commissioning would result in an emission decrease of 20.0 tons.
[c] PM=PM10=PM2.5
[d] This baseline represents the average annual values determined by SDAPCD using their approved 2012 and 2013 annual emissions estimates for the EPS. This does not represent the maximum sequential two-year average from 2009 to 2013, which would be the average of the 2011 and 2012 EPS emissions.

[e] This is based on the EPS emissions baseline in effect at the time of the licensed CECP approval. Except for CO, these values would be reduced with the use of the current EPS emissions baseline.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Staff assesses three kinds of impacts: construction/demolition, operation, and cumulative effects. As the name implies, construction/demolition impacts result from the emissions occurring during the construction or demolition phases 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/demolition 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 amended project, the impacts are the concentration of pollutants from the amended 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 project owner has used U.S. EPA-approved screening (SCREEN3) and refined (AERMOD version 13350) air dispersion models to estimate the direct impacts of the project's NOx, PM10, CO, and SOx emissions resulting from project construction/demolition and operation. Additionally, the District completed an analysis of the project's operating emissions using the SCREEN3 and AERMOD (version 14134) air dispersion models in their Air Quality Impact Analysis, which was provided as Appendix C of the Preliminary Determination of Compliance (PDOC).

Staff revised the background concentrations provided by the project owner, replacing them with the ambient background concentrations determined by the District in their Air Quality Impact Analysis (AQIA), and as shown in **Air Quality Table 10**. Staff has provided the project owner (construction) or District (operation) modeled impacts with the appropriate background concentrations, and compares 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, 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 project owner obtained from the District hourly ozone and NO_2 ambient data from the Camp Pendleton monitoring station that was used in a more refined NO_2 impact modeling analysis using the Ozone Limiting Method (OLM) options that are available with AERMOD. The project owner modeled using data from 2008 through 2012, while the District used data from 2010 to 2012 in their AQIA, which included reprocessing of the meteorological data using the newest version of AERMET, which is a program that process meteorological data for use in 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 project owner with revised background concentrations from the District, and provides a discussion of appropriate mitigation. Staff reviewed the construction emissions estimates and air dispersion modeling procedures and requested that the project owner provided revisions to both analyses as part of project discovery (CEC 2014i, LL 2014p). Staff considers the analyses to provide an adequately conservative prediction of project construction impacts. Please see the "Cumulative Impact Analysis" section for a description of the current status of the impact analysis for the EPS demolition.

Construction Impact Analysis

The project owner used both the U.S. EPA guideline ARMS/EPA Regulatory Model (AERMOD) to estimate ambient impacts. The District does not analyze construction impacts in the Air Quality Impact Analysis that is completed with the Determination of Compliance. Therefore, for construction, the project owner's modeling analysis is presented. The emission sources for the construction site were modeled as volume source where the vertical dimension was set to six meters, and the horizontal dimension was set to approximately 30 meters. The construction impact analysis also included the emissions from the EPS boilers and gas turbine emissions as point sources, since these units could be operating concurrently with the amended CECP project construction activities.

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 construction equipment and for the EPS boilers. An initial NO_2/NOx ratio of 0.13 was used for the EPS gas turbine. Actual monitored hourly background ozone and NO_2 concentration data (2008 to 2012 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 0.80 for the annual average NO_2/NOx ratio was used by the project owner.

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. 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 7:00 a.m. to 3:00 p.m. for the short-term impact modeling (24 hours or less) and also only work on weekdays for the annual impact modeling. **Air Quality Table 22** provides the results of this modeling analysis.

Air Quality Table 22
Amended CECP Maximum Onsite Construction Impacts, (µg/m^3)[a]

Pollutant	Averaging Period	Project Impact (µg/m^3)	Background (µg/m^3) [b]	Total Impact (µg/m^3)	Limiting Standard (µg/m^3)	Type of Standard	Percent of Standard
NO_2	1 hour [b]	134.7	152	286.7	339	CAAQS	85%
	1 hour NAAQS[c]	115.3[d]	96	158 [d]	188	NAAQS	84%
	annual	10.8	17	27.8	57	CAAQS	49%
PM10	24 hour	3.6	42	45.6	50	CAAQS	91%
	Annual	0.9	21	21.9	20	CAAQS	110%
PM2.5	24 hour	2.9	21.3	24.2	35	NAAQS	69%
	Annual	0.7	10.6	11.3	12	CAAQS	94%
CO	1 hour	736	5,039	5,775	23,000	CAAQS	25%
	8 hour	163	4,352	4,515	10,000	CAAQS	45%
SO_2	1 hour	4.7	34	38.7	655	CAAQS	6%
	1 hour NAAQS	4.7	34	38.7	196	NAAQS	20%
	24 hour	0.4	8	8.4	105	CAAQS	8%

Source: LL 2014e, Table 5.1F-1
[a] This modeling includes the modeling of emissions estimated for the amended CECP construction and the emissions from the continued operation of the Encina Power Station that would occur during construction.
[b] Background values are adjusted, based on the District's evaluation in their AQIA, as presented in **Air Quality Table 10**.
[c] The hourly NOx modeling analysis was performed using the ozone limiting method
[d] The maximum one-hour NAAQS NO_2 project impacts shown in **Air Quality Table 22** are not the maximum project impact plus the background because this is a statistical standard. The statistical 98th percentile of the maximum project NO_2 impact plus the actual NO_2 background result in a lower combination of project impacts plus background NO_2 concentration.

As can be seen from the modeling results provided in **Air Quality Table 22**, the construction impacts have the potential to worsen the existing violations of the PM10 ambient air quality standards and are therefore potentially significant and require mitigation. The project owner's construction modeling analysis indicates that the maximum NO_2, PM2.5, 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 mitigation.

Construction Mitigation

Staff recommends that construction PM10 and ozone precursor emission impacts be mitigated, 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.

Project Owner's Proposed Mitigation

The project owner's proposed mitigation measures are a continuation of the licensed CECP conditions of certification for construction (**AQ-SC1** through **AQ-SC5**) with two specific modifications/updates (LL 2014p, DR 17). These modifications/updates are as follows:

- Including the term “demolition” in each of these conditions so that it is clear that these conditions cover the construction and demolition phases of the amended CECP project.
- Updating the off-road equipment conditions to have a base engine requirement of Tier 4/4i, which would now be feasible for the project’s construction and demolition phases.

The project owner’s construction emissions estimates as presented in **Air Quality Table 11 through 15**, which were used to determine the construction modeling impact results shown in **Air Quality Table 22**, assume the use of these fugitive emission control measures, as well as the use of construction equipment that meets U.S. EPA/ARB Tier 4/4i non-road diesel engine standards starting with the amended CECP construction phase.

Adequacy of Proposed Mitigation

Staff generally considers these modification and updates to the existing conditions of certification to be adequate, with a few additions. Staff also has additional site-specific concerns that we believe need to be addressed with additional modifications to the existing conditions and the inclusion of two new conditions.

Staff Proposed Mitigation

Staff recommends construction PM10 and NOx emission mitigation measures as articulated in the licensed CECP Conditions of Certification **AQ-SC1** through **AQ-SC5** with a few suggested revisions. Staff also recommends new Conditions of Certification **AQ-SC12** and **AQ-SC13**.

Staff recommends limited nomenclature additions to Conditions of Certification **AQ-SC1**, **AQ-SC2**, and **AQ-SC4** that make it clear that these conditions are effective for both construction and demolition events that would be approved as part of the amended license, including the period for demolition of the Encina Power Station.

For Condition of Certification **AQ-SC3,** staff recommends incorporation of the project owner’s requested text additions, similar to that noted above, to clearly include the approved demolition activities as part of this condition. Additionally, staff recommends the addition of a requirement to ensure that the large amount of EPS demolition waste truck traffic is routed through the Encina site only on paved or graveled roads to reduce the on-site localized impacts of fugitive dust during the EPS demolition.

Staff recommends the revision of Condition of Certification **AQ-SC5** as proposed by the project owner to include demolition as part of this condition and to upgrade the off-road engine mitigation requirements to a more restrictive level that is currently feasible. This update would change the base off-road engine requirement, with noted exceptions, from U.S. EPA/ARB nonroad diesel engine Tier 3 to Tier 4/4i. This updated requirement could reduce the PM10 and diesel particulate matter emissions from the off-road equipment by as much as 90 percent over the licensed CECP condition; and reduce the NOx emission up to 80 to 90 percent depending on the amount of full Tier 4 versus interim Tier 4 (Tier 4i) off-road engines that are used during construction and demolition. The only difference between the project owner’s suggested revision and staff’s is that

staff is recommending this for all construction and demolition phases covered under both the PTR and PTA, while the project owner did not specifically request a change for this condition for the construction and demolition activities covered under the PTR.

Staff recommends the new condition **AQ-SC12** to ensure that the staging of specific major construction, demolition, and commissioning events are not performed concurrently. Staff's impact analysis findings are based on these events being sequential, which is how they have been identified and analyzed by the project owner.

Staff recommends the new condition **AQ-SC13** to ensure that major short-term air quality impacts would not occur from large implosion or felling events during the EPS demolition. The project owner has not proposed and staff has not analyzed the potential impacts of large implosion or felling events.

Implementation of staff's recommended construction/demolition emission mitigation measures contained in the recommended conditions of certification would substantially reduce fugitive dust and tailpipe emissions during the amended CECP construction and demolition phases, and reduce the potential for significant air quality impacts from these temporary emission sources.

Operation Impacts and Mitigation

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

The project owner performed direct impact modeling analyses, including operations, startup and shutdown, fumigation, and an initial commissioning impact analysis. The District performed these analyses in their Air Quality Impact Analysis (AQIA) that is included as an appendix in the PDOC. The District's AQIA modeling analysis results are shown below.

Operational Modeling Analysis

The project owner used the AERMOD model to estimate ambient impacts during normal operation and higher short-term emissions events, such as worst-case initial commissioning and start-up and shutdown emissions events (LL 2014e). The District replicated this modeling analysis in the PDOC AQIA (SDAPCD 2014, Appendix C) using AERMOD version 14134. Staff is presenting the District's modeling analysis results below. For the determination of NOx concentrations under all operating conditions, the Ozone Limiting Method 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 then assumes full conversion of stack NO emission with that available amount of ozone. The District assumed initial NO_2/NOx ratio of 0.13 for the gas turbines during normal operation, 0.24 for the gas turbines during non-normal maximum emissions events, 0.18 for the emergency generator engine, and 0.14 for the fire pump engine. Actual monitored hourly background ozone and NO_2 concentration data from the Camp Pendleton monitoring station (2010 to 2012 data that corresponds with the

meteorological file surface data source) were used by this modeling method to calculate maximum potential NO to NO_2 conversion.

The District's predicted maximum concentrations of the directly emitted (not secondarily formed) pollutants for the amended CECP project under normal steady-state operating conditions of the gas turbines are summarized in **Air Quality Table 23.**

Air Quality Table 23
Amended CECP Normal Gas Turbine Operating Impacts - All Gas Turbines

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 [b]	1 hour	NA [b]	152	153	339	CAAQS	45%
	1 hour NAAQS	NA [b]	96	97	188	NAAQS	52%
	Annual	0.08	17	17.1	57	CAAQS	30%
PM10	24 hour	2.15	42	44.2	50	CAAQS	88%
	Annual	0.04	21	21.04	20	CAAQS	105%
PM2.5	24 hour	2.15	21.3	23.5	35	NAAQS	67%
	Annual	0.04	10.6	10.64	12	CAAQS	89%
CO	1 hour	20.1	5,039	5,059	23,000	CAAQS	22%
	8 hour	7.2	4,352	4,359	10,000	CAAQS	44%
SO_2	1 hour	4.7	34	38.7	655	CAAQS	6%
	1 hour NAAQS	4.7	34	38.7	196	NAAQS	20%
	24 hour	0.6	8	8.6	105	CAAQS	8%

Source: SDAPCD 2014, Appendix C Table 4-2
[a] Background values are adjusted, based on the District's evaluation in their AQIA, as presented in **Air Quality Table 10**.
[b] NO_2 1-hour impacts provided in the District's AQIA are presented with background.

The District's predicted maximum concentrations of the directly emitted pollutants for the amended CECP project, including the fire pump and emergency generator engines along with the gas turbines operating under normal steady-state conditions, are summarized in **Air Quality Table 24.**

Air Quality Table 24
Amended CECP Normal Facility Operating Impacts – Gas Turbines and Emergency Engines

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 [b]	1 hour	NA [b]	152	209	339	CAAQS	62%
	1 hour NAAQS	NA [b]	96	165	188	NAAQS	88%
	Annual	0.08	17	17.1	57	CAAQS	30%
PM10	24 hour	2.15	42	44.2	50	CAAQS	88%
	Annual	0.04	21	21.04	20	CAAQS	105%
PM2.5	24 hour	2.15	21.3	23.5	35	NAAQS	67%
	Annual	0.04	10.6	10.64	12	CAAQS	89%
CO	1 hour	38.8	5,039	5,078	23,000	CAAQS	22%
	8 hour	7.2	4,352	4,359	10,000	CAAQS	44%
SO_2	1 hour	4.7	34	38.7	655	CAAQS	6%
	1 hour NAAQS	4.7	34	38.7	196	NAAQS	20%
	24 hour	0.6	8	8.6	105	CAAQS	8%

Source: SDAPCD 2014, Appendix C Table 4-2
[a] Background values are adjusted, based on the District's evaluation in their AQIA, as presented in **AIR QUALITY Table 10**.
[b] NO_2 1-hour impacts provided in the District's AQIA are presented with background.

As the difference in **Air Quality Table 23** and **24** shows, the fire pump and emergency generator engines, when testing, have a much higher short-term, near-field impact potential for NOx and CO than the gas turbines during normal operations. 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 and emergency engines exhausts. The District'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 standards. In light of the existing state PM10 and PM2.5 non-attainment status for the project site area, staff considers the modeled impacts to be significant and, therefore, staff is recommending appropriate mitigation. Additionally, the NOx and VOC emissions from operation, 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, therefore, staff is recommending appropriate 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 District modeled the maximum emissions from the simultaneous startup/shutdown of all six gas turbines and the predicted maximum short-term NOx and CO concentrations are summarized in **Air Quality Table.**

Air Quality Table 25
Amended 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 [b]	1 hour	NA [b]	152	169.4	339	CAAQS	50%
	1 hour NAAQS	NA [b]	96	102	188	NAAQS	54%
CO	1 hour	61.0	5,039	5,100	23,000	CAAQS	22%
	8 hour	20.9	4,352	4,373	10,000	CAAQS	44%

Source: SDAPCD 2014, Appendix C Table 4-2
[a] Background values are adjusted, based on the District's evaluation in their AQIA, as presented in **Air Quality Table 10**.
[b] NO_2 1-hour impacts provided in the District's AQIA are presented with background.

The District's modeling results indicate that the project's maximum startup/shutdown emission impacts would not cause any new significant ambient impacts associated with maximum short-term NOx and CO concentrations that could occur near the project site.

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 District modeled the worst-case operating cases to determine the maximum fumigation impacts from the gas turbines. The results of the District's fumigation modeling analysis are shown in **Air Quality Table 26**.

Air Quality Table 26
Maximum Amended 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	4.8	152	156.8	339	CAAQS	46%
PM10	24 hour	0.9	42	42.9	50	CAAQS	86%
PM2.5	24 hour	0.9	21.3	22.2	35	NAAQS	63%
CO	1 hour	4.6	5,039	5,044	23,000	CAAQS	22%
	8 hour	2.6	4,352	4,355	10,000	CAAQS	44%
SO_2	1 hour	1.1	34	35.1	196	NAAQS	18%
	24 hour	0.3	8	8.3	105	CAAQS	8%
Shoreline Fumigation							
NO_2	1 hour	33.9	152	185.9	339	CAAQS	55%
PM10	24 hour	1.4	42	43.4	50	CAAQS	87%
PM2.5	24 hour	1.4	21.3	22.7	35	NAAQS	65%
CO	1 hour	32.7	5,039	5,072	23,000	CAAQS	22%
	8 hour	6.2	4,352	4,358	10,000	CAAQS	44%
SO_2	1 hour	1.1	34	35.1	196	NAAQS	18%
	24 hour	0.3	8	8.3	105	CAAQS	8%

Source: SDAPCD 2014, Appendix C Table 4-2
[a] Background values are adjusted, based on the District's evaluation in their AQIA, as presented in **Air Quality Table 10**.

Maximum inversion breakup fumigation impacts for the turbines are lower than normal operating impacts predicted by AERMOD. The impacts under shoreline inversion fumigation conditions were found to be above the maximum concentrations calculated under normal gas turbine operations (see **Air Quality Table 23**). All fumigation impact concentration levels were found to be below the CAAQS and NAAQS.

Initial Commissioning Short-Term Modeling Impact Analysis

The project owner presented several dozen initial commissioning activities and sub-activities that would occur prior to meeting normal emission limits. The worst-case initial commissioning conditions for the short-term NO_2 and CO impacts occur prior to the installation of the oxidation and SCR catalysts. The District modeled the two worst-case activities, dynamic load step 10, and sync idle to determine the worst-case short-term NO_2 and CO impacts during initial commissioning. The District also modeled the PM10/PM2.5 impacts as the exhaust conditions during initial commissioning can result in reduced dispersion and elevated downwind concentrations. The project owner expects that multiple gas turbines would undergo initial commissioning simultaneously, so the absolute worst-case of all six gas turbines operating under these worst-case initial commissioning conditions were modeled by the District. The results of this conservative modeling analysis are show in **Air Quality Table 27.**

Air Quality Table 27
Maximum Amended 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 [b]	1 hour	NA [b]	152	169.4	339	CAAQS	50%
	1 hour NAAQS	NA [b]	96	138.2	188	NAAQS	74%
PM10	24 hour	3.3	42	45.3	50	CAAQS	91%
PM2.5	24 hour	3.3	21.3	24.6	35	NAAQS	70%
CO	1 hour	658.6	5,039	5,698	23,000	CAAQS	25%
	8 hour	217.3	4,352	4,569	10,000	CAAQS	46%

Source: SDAPCD 2014, Appendix C Table 4-3 and 4-4
[a] Background values are adjusted, based on the District's evaluation in their AQIA, as presented in **Air Quality Table 10**.
[b] NO_2 1-hour impacts provided in the District's AQIA are presented with background.

The District's modeling 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 amended 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.

U.S. EPA issued guidance on May 20th, 2014 that requires secondary PM2.5 impacts be addressed for sources seeking PSD permits. This guidance provides several methods, or tiers, that can be used to analyze secondary PM2.5 impacts; including refined air dispersion modeling methods. The amended CECP has been determined to not require PSD permitting, so this type of modeling analysis is not required. However, the District completed a preliminary analysis that indicated that the conclusions of their AQIA for PM2.5 and PM10 would not change if the modeling analysis included secondary particulate formation (SDAPCD 2014).

Impact Summary

The project owner 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. Additionally, the amended project would cause an emissions reduction for all pollutants except NOx and a very small increase in SOx. The increase in SOx is offset by the decrease in PM10/PM2.5 emissions, and no significant increases in secondary PM2.5 emission were determined by the District, so staff does not believe that this permit increase of 1.6 tons per year of SOx require additional mitigation. However, staff believes that the permitted emissions increases for ozone precursors should be mitigated.

Operations Mitigation

Project Owner's Proposed Mitigation

Emission Controls

As discussed in the project description section, the project owner proposes to employ gas turbines equipped with water injection and an SCR with ammonia injection for NOx control, CO catalyst for CO and VOC control, and operate exclusively on pipeline quality natural gas to limit turbine emission levels. The PDOC (SDAPCD 2014) provides the following BACT emission limits, each for the six gas turbines:

- NOx: 2.5 ppmvd at 15 percent O_2 (one-hour average, excluding startup/shutdown) and 9.07 lbs/hr
- VOC: 2.0 ppmvd at 15 percent O_2 (one-hour rolling average, excluding startup/shutdown) and 2.52 lbs/hr
- PM10: 5.0 lbs/hr (3.5 lbs/hr facility-wide annual average)
- SO_2: 2.07 lbs/hr with fuel sulfur content of 0.75 grains/100 scf
- NH_3: 5 ppmvd at 15 percent O_2 and 6.70 lbs/hr

The CO emissions do not require BACT; however, the project owner's use of a CO catalyst would control CO emissions to 4.0 ppmvd at 15 percent O_2 (one-hour rolling average, excluding startup/shutdown) and 8.83 lbs/hr. The District's PDOC conditions include provisions to meet these control emissions limits during normal operation and provide separate emission limits for startup, shutdown, and initial commissioning consistent with the amended CECP emission levels shown in **Air Quality Table 16** through **18** and **20**.

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 amended CECP would not exceed these thresholds, so NOx and VOC offsets are not required per District rules.

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 District's net emissions analysis, with the PDOC's specified annual emissions limits, that the project does not trigger offsets per District rules. However, staff believes that for a CEQA determination of less-than-significant air quality impacts from operation, the permitted increase in ozone precursors should be mitigated.

Staff Proposed Mitigation

Staff is proposing no substantive changes, only editorial revisions, to licensed CECP Conditions of Certification **AQ-SC6** through **AQ-SC8.**

Staff is proposing to delete licensed CECP Condition of Certification **AQ-SC9**, which would not apply to the initial commissioning of the amended CECP gas turbines. Staff is recommending a new Condition of Certification **AQ-SC9** that requires that the project owner meets their stipulation in the petition that they will only operate the gas turbines between the hours of 0600 and 2400, military time, except in the event of a declared emergency.

taff is proposing to amend Condition of Certification **AQ-SC10** to mitigate the amended CECP permitted ozone precursor emissions increase. This emissions increase is determined as the sum of the increase in permitted NOx emissions and the decrease in permitted VOC emissions. VOC emissions are considered equal to NOx at a 2:1 ratio based on the allowance of VOC for NOx interpollutant offsets in District Rule 20.3. Using this basis, the total permitted emissions increase in ozone precursors, as NOx, is calculated as follows:

24.89 NOx tons/yr – 6.67 VOC tons/yr/2 = 21.56 tons/year NOx equivalent

Staff proposes that the modified Condition of Certification **AQ-SC10** specify the following three methods that the project owner can use to offset its emission increases for ozone precursors (specified as NOx equivalent):

1. ERCs from the SDAPCD bank that are currently owned by the project owner.

2. Create enforceable emission reductions from third party sources, which could be accomplished by funding the Carl Moyer Program[1] or a similar emission reduction program specific to this project[2].

3. ERCs from the SDAPCD bank to be obtained by the project owner 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.

Air Quality Table 28
Project Owner NOx and VOC Emission Reduction Credits

Pollutant	Origin 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 NOx ERC	49.6
			Total Required	21.56

Source: PTA Appendix 5.1G (LL 2014e)

Air Quality Table 28 shows that the total amount of NOx ERCs available (49.6 tpy) exceeds staff's recommended offset requirements based on the revised potential to emit and EPS background total ozone precursor emissions increase of 21.56 tpy.

Assuming that the project owner does use their currently owned credits to meet the staff recommended offset liability, the project owner's emission reduction fee for the remaining 21.56 tons of emissions would, based on the current Carl Moyer Carl Moyer Program Guideline cost-effectiveness limit value and an administration fee of 20 percent, would equal $458,452.

Staff is proposing to delete existing Condition of Certification **AQ-SC11** as PSD permitting does not apply to the amended CECP. Staff proposes a new Condition of Certification **AQ-SC11** that would require the project owner to develop and implement a leak detection and repair (LDAR) plan to reduce VOC emissions from the proposed three natural gas compressors. The District does not require that these compressors be permitted and so has not included any conditions to ensure that the VOC emissions from these units will meet the levels used to determine the net emissions for the amended CECP. Staff recommends this condition to ensure that the ozone precursor

[1] The ARB Carl Moyer Web page has the following description of the program: "The Carl Moyer Memorial Air Quality Standards Attainment Program (Carl Moyer Program) provides grant funding for cleaner-than-required engines and equipment. Grants are administered by local air districts. ARB works collaboratively with the districts and other stakeholders to set Guidelines and ensure the Program reduces pollution and provides cleaner air for Californians. The Carl Moyer Program achieves reductions in emissions of key pollutants which are necessary for California to meet its clean air commitments under regulatory requirements. Eligible projects include cleaner on-road, off-road, marine, locomotive, lawn& garden, light duty passenger vehicles being scrapped and agricultural equipment." (ARB 2014d).

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

emissions mitigation levels proposed under Condition of Certification **AQ-SC10** are based on accurate VOC emissions estimates.

Staff has determined that the proposed emission controls and emission levels, along with the project owner 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 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 FSA for the licensed CECP discusses all of these plans except two new plans that have been approved by the District since that FSA. There are no specific differences between the amended CECP and the licensed CECP in regards to compliance with the plans discussed in the licensed CECP's FSA. The summary of findings in regards to those plans remains as follows (CEC 2009b):

> *"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."*

The two new adopted air quality plans are summarized below.

Redesignation Request and Maintenance Plan for the 1997 National Ozone Standard for San Diego County.
Link: http://www.sdapcd.org/planning/8_Hour_O3_Maint-Plan.pdf

2009 Regional Air Quality Strategy Revision
Link: http://www.sdapcd.org/planning/2009-RAQS.pdf

Redesignation Request and Maintenance Plan for the 1997 National Ozone Standard for San Diego County

This plan was prepared after 2009 to 2011 ambient monitoring data showed that the SDAB came into compliance with the 1997 federal 8-hour ozone standard. This plan does not propose any new rules or regulations or other control measures that are applicable to the amended CECP. 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 8-hour ozone maintenance plan.

2009 Regional Air Quality Strategy Revision

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 emission reduction measures proposed in this plan, which includes a Best Available Retrofit Control Technology (BARCT) measure for existing stationary combustion turbines that has been adopted in amended Rule 69.3.1, would impact the new gas turbines and internal combustion engines that would be installed as part of this project.

These two new 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 these air quality plans.

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 project owner) 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 6 miles of the project site. Based on staff's modeling experience, beyond 6 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 project owner) works with the air district and local counties to identify any new area sources within 6 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, provide 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 Station). 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 amended CECP if the high impact area is the result of high fence line concentrations from another stationary source and the amended 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 project owner 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 may assist the project owner 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 project owner to complete. There are several reasons for this: modeling analyses take time to perform and require significant expertise, the project owner has already performed a modeling analysis of the project alone (see the "Operational Modeling Analysis" subsection), and the project owner 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 project owner (see the "Mitigation" subsection).

The list of possible new sources from the SDAPCD included only one source within 6 miles of the CECP project site that would have the potential to emit more than 5 tons per year of any criteria pollutant (LL 2014e, Appendix 5.1H). That source, a digester gas fueled engine located in Oceanside approximately 3.5 miles from the project site, could emit up to approximately 10 tons per year of CO, but would not emit more than 5 tons of any other pollutant. Given the current state of CO attainment in the project area staff does not believe there is a potential for significant cumulative impacts from this source and the amended CECP.

There are other proposed construction projects near the proposed project site such as the I-5 widening project; 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, including emissions generated from vehicles on the I-5 freeway, and emissions from 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.

Considering that there are no major off-site cumulative stationary sources, or other nearby projects with known emissions estimates that could cause cumulative impacts with the amended CECP, the only quantitative cumulative analysis that can be performed is the concurrent emissions from various on-site emissions sources within the Encina property. The project owner prepared two cumulative air dispersion modeling analyses that included concurrent on-site emissions sources. The first of these analyses is the construction emissions modeling analysis that included the concurrent amended CECP construction and EPS operation. The results of this analysis are presented in **Air**

Quality Table 21. The second project owner cumulative impact air dispersion modeling analysis included the cumulative initial commissioning operation of the amended CECP and operation of the EPS. The results of this analysis are not presented because the District also completed this air dispersion modeling analysis, and the District's analysis is presented below.

The District completed a cumulative modeling analysis for the amended CECP during initial commissioning and the continued operation of the EPS boilers and gas turbine. The results of that cumulative analysis are provided in **Air Quality Table 29**. This modeling analysis assumed the same worst-case initial commissioning activities as those assumed in the initial commissioning modeling analysis that was presented in **Air Quality Table 27**, and added the EPS boilers and gas turbines emissions as inputs to determine the maximum combined impacts during initial commissioning.

Air Quality Table 29
Amended CECP Commissioning and EPS Operation Short-Term Maximum 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 [b]	1 hour	NA [b]	152	214.1	339	CAAQS	63%
	1 hour NAAQS	NA [b]	96	140.5	188	CAAQS	75%
PM10	24 hour	3.8	42	45.8	50	CAAQS	92%
PM2.5	24 hour	3.8	21.3	25.1	35	NAAQS	72%
CO	1 hour	664	5,039	5,703	23,000	CAAQS	25%
	8 hour	219	4,352	4,571	10,000	CAAQS	46%
SO_2	1 hour	5	34	39	196	NAAQS	20%
	24 hour	0.7	8	8.7	105	NAAQS	8%

Source: SDAPCD 2014, Appendix C Tables 4-3 and 4-4
[a] Background values are adjusted, based on the District's evaluation in their AQIA, as presented in **Air Quality Table 10**.
[b] NO_2 impacts provided in the District's AQIA are presented with background.

The results of this modeling effort, **Air Quality Table 29**, show that the amended CECP's initial commissioning, along with the existing Encina Power Station (EPS), would not contribute to new short-term AAQS violations. The EPS would be decommissioned after initial commissioning and the amended CECP begins commercial operation.

After the EPS is decommissioned, it will undergo demolition. The project owner did not complete a cumulative impacts analysis that included the concurrent operation of the amended CECP and EPS demolition. Additionally, to respond to staff's questions about the EPS demolition, the project owner completed and submitted a demolition plan on October 1, 2014 (LL 2014cc), and subsequently revised the EPS demolition emissions estimate in mid-November (LL 2014uu). Staff will be completing additional analysis of the potential cumulative air quality impacts of concurrent amended CECP operation and EPS demolition. This analysis may include screening or refined air dispersion modeling and the results of this analysis will be provided in the Final Staff Assessment (FSA). Staff is reserving opinion regarding cumulative impacts, including environmental justice issues, pending this analysis.

COMPLIANCE WITH LORS

The San Diego Air Pollution Control District issued a Preliminary Determination of Compliance (PDOC) for the amended CECP on December 12, 2014, with public notice occurring from December 17, 2014 through January 16, 2015 (SDAPCD 2014). The District will issue a Final Determination of Compliance (FDOC) after the end of the public comment period after consideration of the comments received from responsible agencies and the public. Compliance with all District Rules and Regulations was demonstrated to the District's satisfaction in the PDOC. The District's PDOC conditions are presented in the conditions of certification. Staff will review the PDOC and will provide comments to the District as necessary. The District's FDOC conditions will be provided in the Final Staff Assessment.

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 project owner has stipulated to emission levels that ensure that the amended project's net emission increase of pollutants would be below PSD permit trigger levels. The District's PDOC permit conditions have been designed to ensure that the amended project would 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 project owner would demonstrate that the amended 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 generator and emergency diesel fire pump engines with Air Toxic Control Measure (ATCM) requirements under Title 17 of the California Code of Regulations. The District has determined with their PDOC permit conditions that these engines will comply with the ATCM requirements.

LOCAL

The project owner provided an air quality permit application to the SDAPCD in May 2014 (LL 2014f), and information request responses including air dispersion modeling files to the District in June 2014 (LL 2014i); and the District issued a PDOC (SDAPCD 2014), which states that the amended 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 amended 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 amended project. Compliance with the District's new source requirements would ensure

that the amended project would be consistent with the strategies and future emissions anticipated under the District's air quality attainment and maintenance plans.

As part of the Energy Commission's licensing process, in lieu of issuing a construction permit to the project owner for the amended 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 December 12, 2014 with the public notice period occurring from December 17, 2014 to January 16, 2015. The FDOC will be issued after the public comment period for the PDOC. The DOC evaluates whether and under what conditions the amended 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 in the District. PSD permitting program authority is not currently delegated from U.S. EPA to the District. However, the District has made a determination that this permitting action does not trigger PSD permitting. U.S. EPA will evaluate this determination in their review of the District's PDOC. While the District does not have federal PSD authority, they still evaluate compliance with their approved PSD rules. 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). Based on the project's emissions limits, the gas turbines are subject to BACT for NOx, VOC, PM10, and SOx, but not for CO. 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 amended 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, SO_2, and PM10, LAER does not apply to these pollutants (District Rule 20.3(d)(1)(v)). The amended project is not defined as a major modification to an existing major source because net emissions increases of NOx and VOC would be below 25 tons per year due to permit emissions limits. Therefore, the gas turbines are not subject to LAER. The emergency engines are not subject to BACT or LAER; and the natural gas compressors are not subject to permitting under SDAPCD rules and regulations.

The District has determined the following normal operations BACT requirements for the gas turbines:

NOx – 2.5 ppm @15% O_2, one-hour average

VOC – 2.0 ppm @15% O_2, one-hour average

PM10 – Natural gas fuel with 5.0 lbs/hour on a short-term basis and 3.5 lbs/hour on a facility-wide annual average basis

SOx – Pipeline quality natural gas with fuel sulfur content of 0.75 gr/100 scf on a short term basis and 0.25 gr/100 scf on an annual average basis.

The District also concluded that the gas turbine start-up and shutdown emissions limits and durations proposed by the project owner meet BACT.

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 District also included an analysis of secondary PM2.5 impacts for this project.
The District prepared an AQIA for NOx, CO, PM10 and PM2.5 that was evaluated as part of the PDOC analysis. The results of the Districts AQIA are presented in the preceding "Impacts" section.

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 amended CECP will start after newspaper notice publication on December 17, 2014 and will end on January 16, 2015. Rule 20.3(d)(4)(i) requires that the District consider all comments received before issuing 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 amended project's net emissions increase more than 25 tons per year for either of these two pollutants. The amended CECP permitted emission increase of NOx will be limited to just below the offset threshold and the project would create a net emissions decrease for VOC emissions. Therefore, offsets are not required by the District for NOx or VOC emissions. (Note: Energy Commission staff recommend that the Energy Commission require NOx mitigation for CEQA purposes; see condition **AQ-SC10**.)

Rule 20.3(e)(1) – Compliance Certification

The District has determined in the PDOC that a compliance certification is not required due to the project not requiring LAER or offsets.

Rule 20.5 – Power Plants

This rule requires that the District prepare 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 will prepare the FDOC following the District’s noticed public comment period.

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 period. Compliance with this requirement is expected for the gas turbines and emergency engines.

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 engines.

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 0.018 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 SO_2) 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 CO_2. The District calculated the worst-case shutdown condition amended project’s gas turbine particulate concentration to be 0.018 grains per dry standard cubic foot, which is well below the rule’s limit of 0.1 grains per dry standard cubic foot. 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 from reaching 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. 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 amended 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 on a lower heating value [LHV] basis). The District calculated this NOx standard to be equivalent to 22.6 ppm when uncontrolled and 13.6 ppm when controlled, based on a thermal efficiency for the turbines of 41.85 percent, LHV. 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 requirement of Rule 20.3(d)(1) for normal operation. The District has included conditions for the amended project to meet these emission limits at all times when the gas turbines are not subject to the normal operating emissions limit of 2.5 ppm.

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 record-keeping requirements, and requires the use of California diesel fuel. NOx emissions are limited to 6.9 grams/bhp-hr, while the proposed emergency generator and fire pump engines would meet this limit by having NOx emission guarantees of 2.7 grams/bhp-hr and 2.6 grams/bhp-hr, respectively. CO emissions are limited to 4500 ppmv at 15 percent oxygen, where each engine's CO emissions were found to be below this value by the District based on the engine manufacturers' specifications. This rule also exempts emergency engines from periodic source testing. The proposed engines meet the emission limits of this regulation and the District has included conditions to ensure compliance with the other applicable provisions of this rule.

Regulation X – Standards of Performance for New Stationary Sources

This regulation adopts federal New Source Performance Standards (NSPS, 40 CFR, Part 60) by reference. The relevant criteria pollutant NSPS subparts for the amended CECP are Subpart KKKK (Stationary Combustion Turbines) and Subpart IIII (Stationary Compression Ignition Internal Combustion Engines). The emission limits from Subpart KKKK are less stringent than the BACT/LAER requirement of Rule 20.3(d)(1) for normal operation. The project owner is proposing newer diesel engines that meet appropriate regulation specified U.S. EPA engine tier emissions standards (Tier 3 for the fire water pump engine and Tier 4 for the emergency generator engine) that would meet the performance requirements of Subpart IIII. The District's conditions would ensure compliance with the monitoring and record-keeping requirements of this regulation.

Regulation XI – National Emission Standards for Hazardous Air Pollutants

This regulation adopts federal standards for hazardous air pollutants (HAPs) by reference. The amended project, 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 the two applicable subparts of this regulation.

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 10 in a million. The District found that the amended 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 Preliminary Staff Assessment provides additional information on toxic air contaminants.

Regulation XIV – Title V Operating Permits

Rule 1401 – General Provisions

This rule contains the requirements for federal Title V Operating Permits. The project owner 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 project owner will be required to submit an application to the District to modify its Title V operating permit to decommission the EPS and to cover the amended CECP.

Rule 1412 – Federal Acid Rain Program Requirements

This rule contains the requirements for participation in the federal Acid Rain Program. The project owner is required in the DOC conditions to submit an Acid Rain Program application to the District 24 months prior to initial startup of the gas turbines.

NOTEWORTHY PUBLIC BENEFITS

The existing EPS power boilers (Units 1 through 5) and a stationary gas turbine that total 963 MW of generation capacity would be shut down following the commissioning of the amended CECP units. The existing EPS units would need to be shut down once the new gas turbines are in commercial operation in order for the new emissions of the amended CECP to be allowed by the SDAPCD.

The amended project would improve the overall thermal efficiency of the power plant due to the higher efficiency of the six new General Electric LMS100 gas turbines compared to the existing Encina Power Station boilers and gas turbine. This, along with an improved emission control system for the new gas turbines, leads to a reduction in emissions of most pollutants emitted per unit of electricity produced. It also leads to a reduction in the amount of natural gas fuel consumed to generate each megawatt hour of power. Additionally, peaking facilities of this nature, which can be shut down when not needed and with quick-start capabilities and a high level of generating flexibility/turndown ratios, are needed to support California's efforts to increase use of renewable resources that will reduce system-wide criteria pollutant emissions from power generation.

CONCLUSIONS

Staff concludes that:

- The amended 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 PDOC conditions as Conditions of Certification **AQ-1** through **AQ-116**.
- The amended project's construction and demolition activities requested under the PTR and PTA, if unmitigated, would likely contribute to significant adverse PM10 and ozone impacts. Therefore, staff recommends **AQ-SC1** to **AQ-SC5, AQ-SC12** and **AQ-SC13** to mitigate these potential impacts.
- The amended project's operation would not cause new violations of any NO_2, SO_2, PM2.5, or CO ambient air quality standards; therefore, the amended project's direct operation NOx, SOx, PM2.5, and CO emission impacts are not significant.
- With the mitigation proposed by staff and the air district, no significant direct, indirect, or cumulative adverse impacts to air quality should occur from the construction or operation of amended CECP
- With the mitigation proposed by staff and compliance with applicable air district rules, no significant direct, indirect, or cumulative adverse impacts to air quality should occur from the demolition of EPS.
- With the conditions of certification recommended by staff, including all requirements in the air district's PDOC, the project will comply with all applicable LORS.
- The amended 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 not require offsets to mitigate the permitted

NOx emission increase; therefore, staff recommends **AQ-SC10** to mitigate the potential combined NOx/VOC emission increase that do not require District offsets, so that all nonattainment pollutant and precursor emissions be offset at least one-to-one.

- Staff has considered the minority population surrounding the site (see Socioeconomics Figure 1). Since the amended 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 proposes 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 on-site contaminated soil remediation activities, other than transport, as on-site soil remediation was not proposed or analyzed as part of the amended project. Condition **AQ-SC8** is a quarterly compliance reporting requirement. Condition **AQ-SC9** limits gas turbine operations between the hours of 2400 and 0600 as proposed by the project owner. **AQ-SC11** requires the project owner to prepare and implement a leak-detection and repair program to reduce emissions from the proposed on-site natural gas compressors. **AQ-SC12** specifies the major construction and demolition work phases that are not allowed to occur concurrently so that project impacts are not higher than evaluated. Finally, **AQ-SC13** restricts implosion and felling as demolition methods for large concrete or masonry structures during the EPS demolition.

Global climate change and greenhouse gas (GHG) emissions from the amended project are discussed and analyzed in **Appendix AQ-1**. The amended CECP, as a peaking project with an enforceable operating capacity factor of less than 60 percent is not subject to the requirements of SB1368, the Emission Performance Standard. Additionally, the enforceable operating capacity factor for the amended CECP would be below the 33 percent capacity factor trigger for applicability of the federal New Source Performance Standard Subpart TTTT and that rule's CO_2 emissions standards for gas turbines. The amended project would be licensed to emit as much as 0.85 million metric tons of carbon dioxide equivalent emissions and therefore it would be subject to the State cap-and-trade regulation and mandatory state and federal GHG reporting requirements.

PROPOSED CONDITIONS OF CERTIFICATION

Staff recommends the following modified conditions of certification to address the impacts associated with the construction and operation of the amended CECP. These conditions include the SDAPCD proposed conditions from the DOC, with appropriate staff-proposed verification language added for each condition, as well as Energy Commission staff-proposed conditions. The temporary activities covered under approval of the PTR would be subject to the construction/demolition conditions only, while the temporary and long-term operation activities covered under approval of the PTA for the amended CECP are subject to all of the proposed conditions of certification. (Note: Deleted text is in ~~strikethrough~~, new text is **bold and underlined**.)

STAFF CONDITIONS

AQ-SC1 Air Quality Construction**/Demolition** 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**/demolition**. 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**/demolition** activities as warranted by applicable construction**/demolition** 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**/Demolition** 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**/demolition** 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**/demolition** sites.

C. The construction**/demolition** site entrances shall be posted with visible speed limit signs.

D. All construction**/demolition** 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**/demolition** site shall be graveled or treated to prevent track-out to public roadways.

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

H. Construction**/demolition** 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**/demolition** site shall be swept at least twice daily (or less during periods of precipitation) on days when construction**/demolition** activity occurs to prevent the accumulation of dirt and debris.

J. At least the first 500 feet of any public roadway exiting the construction**/demolition** 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**/demolition** activity occurs or on any other day when dirt or runoff from the construction**/demolition** 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**/demolition** 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.

O. Haul trucks used during the Encina Power Station demolition shall be limited to traveling on paved or graveled surfaces at all times within the boundary of the Encina Power Station property.

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**/demolition**, 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**/demolition** 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 **within 50 feet** 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 **fugitive dust** 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 Engine Control: The AQCMM shall submit to the CPM, in the Monthly Compliance Report, a construction**/demolition** mitigation report that demonstrates compliance with the AQCMP mitigation measures for purposes of controlling diesel construction**/demolition**-related emissions. The following off-road diesel construction**/demolition** equipment mitigation measures shall be included in the Air Quality Construction Mitigation Plan (AQCMP) required by AQ-SC2, and any deviation from the AQCMP mitigation measures shall require prior CPM notification and approval.

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

b. All construction**/demolition** diesel engines with a rating of 50 hp or higher shall meet, at a minimum, the Tier ~~3~~**4 or 4i** California Emission Standards for Off-Road Compression-Ignition Engines, as specified in California Code of Regulations, Title 13, section 2423(b)(1), unless a good faith effort to the satisfaction of the CPM that is certified by the on-site AQCMM demonstrates that such engine is not available for a particular item of equipment. In the event that a Tier ~~3~~3**4 or 4i** engine is not available for any off-road equipment larger than 50 hp, that equipment shall be equipped with a Tier ~~2~~**3** engine, or an engine that is equipped with retrofit controls to reduce exhaust emissions of nitrogen oxides (NOx) and diesel particulate matter (DPM) to no more than Tier 2**3** levels unless certified by engine manufacturers or the on-site AQCMM that the use of such devices is not practical for specific engine types. For purposes of this condition, the use of such devices is “not practical” for the following, as well as other, reasons.

1. There is no available retrofit control device that has been verified by either the California Air Resources Board or U.S. Environmental Protection Agency to control the engine in question to Tier ~~2~~**3** equivalent emission levels and the highest level of available control

using retrofit or Tier ~~1~~**2** engines is being used for the engine in question; or

2. The construction**/demolition** equipment is intended to be on site for 10 **working** days or less.

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

c. The use of a retrofit control device may be terminated immediately, provided that the CPM is informed within 10 working days of the termination and that a replacement for the equipment item in question meeting the controls required in item "b" occurs within 10 days of termination of the use, if the equipment would be needed to continue working at this site for more than 15 days after the use of the retrofit control device is terminated, if one of the following conditions exists:

1. The use of the retrofit control device is excessively reducing the normal availability of the construction**/demolition** equipment due to increased down time for maintenance, and/or reduced power output due to an excessive increase in back pressure.

2. The retrofit control device is causing or is reasonably expected to cause engine damage.

3. The retrofit control device is causing or is reasonably expected to cause a substantial risk to workers or the public.

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

d. All heavy earth-moving equipment and heavy duty construction**/demolition**-related trucks with engines meeting the requirements of (b) above shall be properly maintained and the engines tuned to the engine manufacturer's specifications.

e. All diesel heavy construction**/demolition** equipment shall not idle for more than five minutes. Vehicles that need to idle as part of their normal operation (such as concrete trucks) are exempted from this requirement.

f. Construction**/demolition** equipment will employ electric motors when feasible.

Verification: The AQCMM shall include in **a table in** the Monthly Compliance Report the following to demonstrate control of diesel construction**/demolition**-related emissions:

A. A summary of all actions taken to control diesel construction**/demolition**-related emissions;

B. 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

C. Any other documentation deemed necessary by the CPM, and the 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 **project air permit** 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 off-site 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~~**conditions** of ~~Certification~~**certification** herein. The Quarterly Operation Report will specifically **state that the facility meets all applicable conditions of certification or** note or highlight **all** 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 The gas turbines shall only be operated between the military time hours of 0600 to 2400, except in the event of a California Independent System Operator declared emergency.

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 that demonstrate the operating hours and that provide documentation regarding declared emergency events when the gas turbines are operated between the hours of 2400 and 0600, military time.

~~**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~~ **NOx** emission increase~~s~~ at a ratio of 1:1. **This**~~These~~ emission reduction~~s~~ **mitigation requirement is**~~are~~ based on the following maximum annual emissions NOx emission **increase** for the facility (tons/yr).

Emission Reduction Credits/Pollutant	Tons/yr
~~PM10~~**NOx**	**21.56**~~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.~~

1~~2~~. The project owner can fund enforceable emission reductions through the Carl Moyer Fund in the amount of $**17,720**~~16,000~~/ton, or the applicable ARB Carl Moyer Program Guideline cost**-**effectiveness **limit**~~cap~~ value, **if different,** 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 percent 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 **by the local administering agency,** within the funding guideline value of $**17,720**~~16,000~~/ton of reduction, or revised **ARB Carl Moyer Program Guideline cost-effectiveness limit value, if different at the time of funding**~~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 **2014**~~2008~~, or later year as applicable, Carl Moyer funding guideline value,

2~~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 **by the local administering agency** 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 project owner can be used to partially offset the PM emissions increase.~~

3~~5~~. ERC certificates from other emission reductions occurring in the San Diego Air Basin can be purchased and used to offset **NOx emissions**~~each pollutant~~ on a 1:1 offset ratio basis **for NOx ERCs and on a 2:1 offset ratio basis for VOC ERCs.** ~~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 SO_x for PM10 and NO_x 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 SO_x 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. **If ERCs are proposed to be used to offset all or part of the NOx emissions offset requirements of this condition the project owner shall provide the list of specific ERCs from the SDAPCD offset bank that are proposed to be used to the CPM prior to initiation of construction activities and shall update that list within 10 days of known changes to the proposed ERC list.** 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.

AQ-SC11 The project owner shall develop and implement a Leak Detection and Repair (LDAR) plan for the onsite natural gas compressors.

Verification: The project owner shall provide the LDAR plan to the CPM for review and approval at least 60 days prior to installation of the natural gas compressors. The LDAR plan shall follow the general procedures outlined in the U.S. EPA's "Leak Detection and Repair – A Best Practices Guide" document. If requested the project owner shall provide records of the implementation of the LDAR plan.

~~**AQ-SC11** Prior to the start of construction, the Project Owner shall provide proof of US EPA's approval of a Prevention of Significant Deterioration (PSD) Permit for CECP or certification that no such permit is required.~~

~~**Verification:** The project owner shall provide a report of its progress toward obtaining the PSD permit or the CPM CEMS data demonstrating compliance with this condition as part of monthly compliance reports.~~

AQ-SC12 The project owner shall not allow the overlap of specific construction and demolition phase activities. The following activities shall not be conducted concurrently with any of the other listed activities:

1. **ASTs 5, 6, and 7 demolition (licensed CECP activity)**
2. **ASTs 1, 2, and 4 demolition and berm removal (PTR described activities).**
3. **Amended CECP construction (PTA described activities).**
4. **EPS demolition (PTA and Encina Power Station Demolition Plan described activities.**

In addition, the gas turbines initial commissioning activity and the EPS demolition activity shall not be performed concurrently.

Verification: The project owner shall identify the start and conclusion of the work phases described above in the monthly compliance reports.

AQ-SC13 The project owner shall not implode or fell any concrete or mortar structure, such as the main exhaust stack or the power plant building, during the demolition of the Encina Power Station.

Verification: The project owner shall provide updates on the demolition progress and the demolition methods used in the monthly compliance reports.

DISTRICT PRELIMINARY DETERMINATION OF COMPLIANCE CONDITIONS (SDAPCD 2014)

Changes in the District conditions and staff verifications are shown in **bold/underline** and ~~strikeout~~. Considering the change in the gas turbine types and that fact that the District produced a new DOC rather than amending the old DOC, the District conditions for the amended CECP have many conditions that are substantially changed. In that

case, an entirely new condition is provided in **bold/underline** and the entire District condition for the licensed CECP that it is replacing is provided directly after in ~~strikeout~~.

~~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 NO_x (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 NO_x (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 The equipment authorized to be constructed under this permit is described in Application Nos. APCD2014-APP-003480, APCD2014-APP-003481, APCD2014-APP-003482, APCD2014-APP-003483, APCD2014-APP-003484, APCD2014-APP-003485, APCD2014-APP-003486, APCD2014-APP-003487.

Verification: The project owner shall provide copies of any applications to alter the equipment or the permit conditions for the equipment covered by the permit applications numbered above to the CPM within 5 days of sending such applications to the District. The project owner shall make the site available for inspection of equipment and records by representatives of the District, ARB, and the Energy Commission.

AQ-2 The project owner shall cancel all applications for permits and/or retire all permits to operate for all of the equipment authorized to be constructed under this permit on or before the date construction commences for any equipment authorized for construction under Application Numbers APCD2007-APP-985745, APCD2007-APP-985747, or APCD2007-APP-985748.

Verification: This condition applies to the canceling of the amended CECP permit applications if the project owner decides to build the previously licensed CECP. The project owner shall provide to the CPM documentation of the cancellation of the 2014 permit applications, if the project approved under the 2007 permit applications is built, by the time any construction activity approved under the 2007 permit applications commences.

AQ-3 The project owner shall cancel permit Application Nos. APCD2007-APP-985745, APCD2007-APP-985747, and APCD2007-APP-985748 on or before the date construction commences for any equipment authorized for construction under this permit.

Verification: This condition applies to canceling of the previously licensed CECP permit application if the project owner decides to build the amended licensed CECP. The project owner shall provide to the CPM documentation of the cancellation of the 2007 permit applications, if the project approved under the 2014 permit applications is built, by the time any construction activity approved under the 2014 permit applications commences.

AQ-~~1~~4 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~~5 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. **2014-APP-003480, 2014-APP-003481, 2014-APP-003482, 2014-APP-003483, 2014-APP-003484, 2014-APP-003485, 2014-APP-003486, and 2014-APP-003487**. [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-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 (NO_x) to offset the net maximum allowable increase of 39.9 tons per year of NO_x 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-~~3~~6 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~~6~~7 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-~~6~~8 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 the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.~~ **None required.**

AQ-~~7~~9 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~~10 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 **combustion turbine generator (**CTG**)** annual **SO_2 emission total**~~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~~11 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.

AQ-12 The fire pump and emergency diesel engines shall not be operated for maintenance and testing purposes at the same time that any combustion turbine is operating during a commissioning period. [Rule 20.3(d)(2)]

Verification: The project owner shall maintain records of the fire-pump and emergency diesel engine operation during the combustion turbine initial commissioning period that shows compliance with this condition and shall

provide that data with the Monthly Compliance Reports required during any commissioning period.

COMBUSTION TURBINE CONDITIONS

District Application Number 2014-APP-003482
Unit #6: One nominal 104 MW natural-gas-fired simple-cycle General Electric LMS 100 PA combustion turbine generator with demineralized water injection, S/N TBD; maximum heat input of 984 MMBtu/hr (HHV) at average site-specific ambient conditions; an inlet-air evaporative cooler; combustion turbine exhaust ducted to an oxidation catalyst and selective catalytic reduction (SCR) system with aqueous ammonia injection.

District Application Number 2014-APP-003483

Unit #7: One nominal 104 MW natural–gas-fired simple-cycle General Electric LMS 100 PA combustion turbine generator with demineralized water injection, S/N TBD; maximum heat input of 984 MMBtu/hr (HHV) at average site-specific ambient conditions; an inlet-air evaporative cooler; combustion turbine exhaust ducted to an oxidation catalyst and selective catalytic reduction (SCR) system with aqueous ammonia injection.

District Application Number 2014-APP-003484

Unit #8: One nominal 104 MW natural-gas-fired simple-cycle General Electric LMS 100 PA combustion turbine generator with demineralized water injection, S/N TBD; maximum heat input of 984 MMBtu/hr (HHV) at average site-specific ambient conditions; an inlet-air evaporative cooler; combustion turbine exhaust ducted to an oxidation catalyst and selective catalytic reduction (SCR) system with aqueous ammonia injection.

District Application Number 2014-APP-003485

Unit #9: One nominal 104 MW natural-gas-fired simple-cycle General Electric LMS 100 PA combustion turbine generator with demineralized water injection, S/N TBD; maximum heat input of 984 MMBtu/hr (HHV) at average site-specific ambient conditions; an inlet-air evaporative cooler; combustion turbine exhaust ducted to an oxidation catalyst and selective catalytic reduction (SCR) system with aqueous ammonia injection.

District Application Number 2014-APP-003486
Unit #10: One nominal 104 MW natural-gas-fired simple-cycle General Electric LMS 100 PA combustion turbine generator with demineralized water injection, S/N TBD; maximum heat input of 984 MMBtu/hr (HHV) at average site-specific ambient conditions; an inlet-air evaporative cooler; combustion turbine exhaust ducted to an oxidation catalyst and selective catalytic reduction (SCR) system with aqueous ammonia injection.

District Application Number 2014-APP-003487
Unit #11: One nominal 104 MW natural-gas-fired simple-cycle General Electric LMS 100 PA combustion turbine generator with demineralized water injection, S/N TBD; maximum heat input of 984 MMBtu/hr (HHV) at average site-specific ambient conditions; an inlet-air evaporative cooler; combustion turbine exhaust ducted to an oxidation catalyst and selective catalytic reduction (SCR) system with aqueous ammonia injection.

DEFINITIONS

AQ-~~10~~13 For purposes of determining compliance with the emission limits of this permit, a shutdown period is the **13 minute period preceding the moment at which fuel flow ceases.** ~~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~~14 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 **25**~~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~~15 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~~16 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~~17 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 **213**~~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 **provide commissioning event data that shows compliance with the commissioning period operation limits for each combustion turbine in the Monthly Compliance Reports and 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. 985747, 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-~~21~~18 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~~**. None required.**

~~**AQ-19** Turbine B is the combustion turbine as described on Applications 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 gas turbine 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.~~

GENERAL CONDITIONS

AQ-~~22~~19 The exhaust stack~~s~~ for each combustion turbine shall be at least **90**~~139~~ feet in height above site base elevation**, and with an interior exhaust stack diameter of no more than 13.5 feet at the point of release unless it is demonstrated to the District that all requirements of District rules 20.3 and 1200 are satisfied with a different stack configuration**. [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~~ **initial construction** of the stack.

AQ-~~23~~20 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)] **Natural gas sulfur content records must be kept with a minimum reporting limit of 0.25 grains sulfur compounds per 100 dscf of natural gas.** [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~~21 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~~. **None required.**

EMISSION LIMITS

AQ-~~25~~22 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~~23 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~~24 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 **except as specified in the District approved CEMS Protocol**. [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~~25 When a combustion turbine is combusting fuel (operating), the emission concentration of oxides of nitrogen (NO_X), calculated as nitrogen dioxide (NO_2), shall not exceed **2.5**~~2.0~~ parts per million by volume on a dry basis (ppmvd) corrected to 15~~%~~ **percent** oxygen **averaged over a 1-clock-hour period**, except during commissioning, ~~low load operation,~~ startup, **and** 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~~26 When a combustion turbine is operating, the emission concentration of carbon monoxide (CO) shall not exceed **4.0**~~2.0~~ ppmvd corrected to 15 percent oxygen, **averaged over a 1-clock-hour period,** except during commissioning, ~~low load operation,~~ startup, **and** 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~~27 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 percent oxygen **and averaged over a 1-clock-hour period**, except during commissioning, ~~low load operation,~~ startup, **and** shutdown~~, or tuning~~ periods for that turbine. For purposes of determining compliance based on the CEMS, the District approved CO/VOC surrogate relationship~~,~~ **and** the CO CEMS data, **averaged over a 1-clock-hour period,** ~~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~~28 When a combustion turbine is operating, the ammonia concentration (ammonia slip), shall not exceed 5.0 ppmvd corrected to 15 percent oxygen **and averaged over a 1-clock-hour period**, except during commissioning, ~~low load operation,~~ startup, **and** 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-~~34~~29 When a combustion turbine is operating, the emission concentration of ~~oxides of nitrogen (~~NO_X~~)~~, calculated as nitrogen dioxide (NO_2) shall not exceed 42 ppmvd calculated over each clock-hour period and corrected to 15 percent oxygen~~, on a dry basis,~~ except **for**~~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-~~32~~30 When a combustion turbine is operating with post-combustion air pollution control equipment that controls oxides of nitrogen (NO_X) emissions, the emission concentration **of** NO_X, calculated as nitrogen dioxide (NO_2), shall not exceed **13.6**~~12.9~~ ppmvd calculated over each clock-hour period and corrected to 15 percent 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~~31 When a combustion turbine is operating without any post-combustion air pollution control equipment that controls oxides of nitrogen (NO_X) emissions, the emission concentration of NO_X calculated as nitrogen dioxide (NO_2) from each turbine shall not exceed **22.6**~~21.6~~ parts per million by volume on a dry basis (ppmvd) calculated over each clock-hour period and corrected to 15

percent 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-~~35~~32 For each rolling 4 unit operating hour 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 percent 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 calculated in accordance with 40 CFR Section 60.4380(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 4 unit operating hour period including the operating-hour and three unit operating-hours immediately preceding. For any unit operating hour where multiple emission standards would apply based on load of the turbine, the applicable standard shall be the higher of the two limits. The hourly emission concentration limit and emission rate limit shall be as follows based on the load of the turbine over the 4 unit operating hour period:

Case	Emission Limit, ppm	Emission Limit, lb/MWh
i. All 4 hrs at or above 75% Load	15	0.43
ii. All 4 hrs below 75% Load	96	4.7
iii. Combination of hrs	(a x 15+b x 96)/4	(a x 0.43+b x 4.7)/4

Where: a = no. unit operating hrs in 4-hr-period with all operation above 75% load and b = 4-a.

The averages shall exclude all clock hours occurring before the Initial Emission Source Test but shall include emissions during all other times that the equipment is operating including, but not limited to, emissions during startup and shutdown 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. For the purposes of this condition, unit operating hours shall have the meaning as defined in 40 CFR 60.4420. [40 CFR Part 60 Subpart KKKK]

~~For each rolling 30-day-unit-operating-day period, average emission concentration of oxides of nitrogen (NO_x) for each turbine calculated as nitrogen dioxide (NO_2) in parts per million by volume dry (ppmvd) corrected to 15 percent oxygen or, alternatively, as elected by the project owner, the average NO_x emission rate in pounds per megawatt-hour (lb/MWh) shall not exceed an average emission limit calculated in accordance with 40 CFR Section 60.4380(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 percent 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 percent oxygen and 4.7 lb/MWh for all other clock hours when the combustion turbine is operating, respectively. The averages shall exclude all clock hours occurring before the Initial Emission 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 NO_x 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~~33 The emissions of particulate matter less than or equal to 10 microns in diameter (PM10) shall not exceed **5.0**~~9.5~~ pounds per hour for each combustion turbine. [Rule 20.3(d)**(1),**(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-34 The emissions of particulate matter less than or equal to 10 microns in diameter (PM10) shall not exceed 3.5 pounds per hour per turbine, averaged over all six combustion turbines, calculated as the arithmetic average of the most recent source test for each turbine. [Rule 20.3(d)(1),(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~~35 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~~36 Visible emissions from the lube oil vents and the exhaust stack of each combustion turbine shall not exceed 20 percent 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~~37 Mass emissions from each combustion turbine of oxides of nitrogen (NO_X), 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, **and** shutdown **operations**~~, 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. NO_X	***9.1~~15.1~~***
b. CO	***8.8~~9.2~~***
c. VOC	***2.5~~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~~38 Excluding any minutes that are coincident with a shutdown period, cumulative mass emissions of oxides of nitrogen (NO_x), 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. NO_X	***14.7~~69.2~~***
b. CO	***7.45~~45~~***
c. VOC	***2.0~~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~~39 Cumulative mass emissions of oxides of nitrogen (NO_X), 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. NO	***0.6***~~*25.7*~~
b. CO	***3.4***~~*277*~~
c. VOC	***2.4***~~*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**40** The oxides of nitrogen (NO_X) emissions from each combustion turbine shall not exceed **90**~~200~~ pounds per hour ~~and total aggregate NO_x 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.~~**calculated as nitrogen dioxide and measured over each 1-clock-hour period. In addition, the emission concentration of NOx calculated as nitrogen dioxide (NO_2) from each turbine shall not exceed 100 parts per million by volume on a dry basis (ppmvd) calculated over each clock-hour period and corrected to 15 percent oxygen.** These emission limits shall apply during all times ~~one or both~~**a** turbine~~s are~~ **is** operating, including, but not limited to, emissions during commissioning, ~~low load operation,~~ startup, **and** 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**41** The carbon monoxide (CO) emissions from each combustion turbine shall not exceed **248**~~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.~~**measured over each 1-clock-hour period. In addition, the emission concentration of CO from each turbine shall not exceed 400 parts per million by volume on a dry basis (ppmvd) calculated over each clock-hour period and corrected to 15 percent oxygen.** This emission limit shall apply during all times that ~~one or both~~ **a** turbine~~s are~~ **is** operating, including, but not limited to**,** emissions during commissioning, ~~low load operation,~~ startup, **and** shutdown~~, and tuning~~ periods. [Rule 20.3(d)(2)(i)]

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-4442 ~~Beginning with the earlier of the initial startup dates for either combustion turbine, aggregate emissions of oxides of nitrogen (NO_x), 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 (SO_x), 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:~~

Total emissions from the equipment authorized to be constructed under this permit, 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, beginning with the 12-calendar-month period beginning with the month in which the earliest initial startup among the equipment authorized to be constructed under this permit occurs:

Pollutant	***Emission Limit, tons per year***
a. NO_X	***84.8**~~72.11~~*
b. CO	***77.8**~~339.9~~*
c. VOC	***24.1**~~23.7~~*
d. PM10	***28.4**~~39.0~~*
e. SO_X (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**. All calculations performed to show compliance with this limit shall be performed according to a protocol approved in advance by the District.** ~~including, but not limited to, emissions during commissioning, low load operation, startup, shutdown, and tuning periods.~~ [Rules 20.3(d)~~(3)~~**(2), 20.3(d)(5)**, 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-43 Total emissions from each combustion turbine shall not exceed 14.3 tons per year of NOx calculated as nitrogen dioxide and shall not exceed 4.73 tons per year of PM10. For the purposes of this condition emissions shall be calculated on a rolling 12-calendar month basis beginning with the calendar month in which the initial start of the turbines occurs. All calculations performed to show compliance with this limit shall be performed according to a protocol approved in advance by the District.

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-44 Total emissions from the equipment permitted under APCD2003-PTO-001267, APCD2003-PTO-000791, APCD2003-PTO-000792, APCD2003-

PTO-000793, APCD2003-PTO-001770 and APCD2003-PTO-005238 shall not exceed any of the following limits in quantities and according to the schedule based on the number of turbines that have undergone their initial startup as described in the following table:

Number of Turbines Started	NOx (ton/yr)	PM_{10} (ton/yr)
1 gas turbine	No Limit	No Limit
Total of 2 gas turbines	56.4	No Limit
Total of 3 gas turbines	42.2	No Limit
Total of 4 gas turbines	28.1	38.5
Total of 5 gas turbines	13.9	33.8
Total of 6 gas turbines	0.0	29.1

For the purposes of this condition, emissions shall be calculated on a rolling 12-calendar-month basis beginning with the calendar month in which 180 days has passed since the latest initial start from among the indicated number of turbines. All calculations performed to show compliance with this limit shall be performed according to a protocol approved in advance by the District.

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-45 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 mass emissions during each calendar month **and rolling 12-calendar-month period** of NO_X (calculated as NO_2), CO, VOCs (calculated as methane), PM10, and SO_X (calculated as SO_2), in tons, from each emission unit **located at this stationary source** ~~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 combustion turbine, the number of annual operating hours in each calendar year shall not exceed 2700. For the purposes of this condition, the number of operating hours shall be calculated as the total number of unit operating minutes divided by 60. [Rules 1200, 20.3(d)(2) 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).

~~**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 NO_x (calculated as NO_2), CO, VOCs (calculated as methane), PM10, and SO_x (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 **400**~~1460~~. [Rules 1200 **, 20.3(d)(2)** 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, **catalyst material, catalyst manufacturer,** 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 percent ~~(with steam injection)~~ and **25**~~60~~ percent 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 **540**~~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 percent 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 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

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 §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 to 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 90 days before the construction of the turbine stacks.

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 NO_X, 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 NO_X, 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 percent 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 NO_X, CO, VOC, PM10 and ammonia concentrations and emissions, as applicable, shall be conducted concurrently with the NO_X 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 NO_X and CO Relative Accuracy Test Audit (RATA) shall be periodically conducted on each combustion turbine to demonstrate compliance with the NO_X, 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 NO_X and CO RATAs shall be conducted in accordance with the applicable RATA frequency requirements of 40 CFR 75, 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. [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 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 NO_X 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 ~~r~~**R**ule 1200 **and quantify toxic emissions**:

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**, California H&S Code §41510**]

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~~**earliest** ~~of the~~ initial startup date~~s~~ for **any**~~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-65** 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 (NO_X) uncorrected and corrected to 15 percent oxygen, in parts per million (ppmvd), necessary to demonstrate compliance with the NO_X limits of this permit;

B. Hourly average concentration of carbon monoxide (CO) uncorrected and corrected to 15 percent 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 (NO_x) for each continuous rolling 3-hour period, in parts per million (ppmv) corrected to 15 percent oxygen;~~

D. Hourly mass emissions of oxides of nitrogen (NO_x) **calculated as NO_2**, in pounds;

E. Cumulative mass emissions of oxides of nitrogen (NO_x) **calculated as NO_2** in each startup and shutdown period, in pounds;

F. Daily mass emissions of oxides of nitrogen (NO_X) **calculated as NO_2**, in pounds;

G. Calendar monthly mass emissions of oxides of nitrogen (NO_X) **calculated as NO_2**, in pounds;

H. Rolling ~~30-unit-operating-day~~ **4-unit-operating-hour** average concentration of oxides of nitrogen (NO_X) corrected to 15 percent oxygen, in parts per million (ppmvd);

I. Rolling ~~30-unit-operating-day~~ **4-unit-operating-hour** average oxides of nitrogen (NO_X) emission rate, in pounds per megawatt-hour (MWh);

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

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

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

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

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

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

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

Q. Average emission rate in pounds per hour of oxides of nitrogen (NO_x) **calculated as NO_2** 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-65**, 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 initial startup of each combustion turbine.

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**d** completed on ~~the~~ that turbine's NO_x 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 NO_X 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 **Region 9** 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**, the U.S. EPA Region 9,** 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 **and the U. S. EPA Region 9** 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 (NO_X) 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**s** 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-65**, 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** ~~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 20.3(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 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 NO_x 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 **R**~~r~~ule 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. [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 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. **Water injection rate in gallons per minute (gpm) or pounds per hour (lb/hr)**~~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 20.3(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 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**s**

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 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 NO_X 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 **periods**, the emissions of NO_X and CO during startup and shutdown **periods**, and the emissions of NO_X 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 (NO_X) uncorrected and corrected to 15~~%~~ **percent** oxygen, in parts per million (ppmvd);

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

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

D. Mass emissions of oxides of nitrogen (NO_x) **calculated as NO_2,** in pounds;

E. Cumulative mass emissions of oxides of nitrogen (NO_x) **calculated as NO_2** 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;

K. SCR outlet temperature, in degrees Fahrenheit; and

L. **Water injection rate in gallons per minute (gpm) or pounds per hour (lb/hr).**~~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-~~89~~81 For each combustion turbine, the project owner shall submit the following notifications to the District and U.S. EPA, Region ~~IX~~**9**:

a. A notification in accordance with 40 CFR Section 60.7(a)(1) delivered or postmarked not later 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 project owner 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.

[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.]

Verification: The project owner shall provide notification to the District and U.S. EPA Region ~~IX~~**9** 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.

~~**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 (NO_x), 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 (SO_x), 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. NO_x*~~	~~*36.05*~~
~~*b. CO*~~	~~*169.95*~~

~~*c. VOC 11.85*~~

~~*d. PM10 19.5*~~

~~*e. SO_x 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 shall 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 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 NO_x (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 NO_x (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 NO_x (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. 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-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 (NO_x), 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.

REPORTING

AQ-82 The project owner shall file semiannual reports in accordance with 40 CFR §60.4375. [40 CFR Part 60 Subpart KKKK]

Verification: None required.

AQ-83 Each semiannual report must cover the semiannual reporting period from January 1 through June 30 or the semiannual reporting period from July 1 through December 31. Each such semiannual compliance report shall be postmarked or delivered no later than January 30 or July 30, whichever date is the first date following the end of the semiannual reporting period. [40 CFR Part 60 Subpart KKKK and Rule 21]

Verification: The project owner shall provide the District's Compliance Division the semi-annual reports required in this condition within the due dates specified in this condition, shall provide summaries of these semi-annual reports in the Quarterly Operation Reports (AQ-SC8) following each semi-annual report, and shall provide full copies of these reports to the CPM upon request.

AQ-84 All semiannual compliance reports shall be submitted to the District Compliance Division [40 CFR §60.7]

Verification: None required.

AQ-85 Within 120 days of startup of each gas turbine, the owner or operator shall submit an initial notification to US EPA Region 9 in accordance with 40 CFR 63.6145(c) with the information specified in 40 CFR 63.6145(d). [40 CFR 63 Subpart YYYY]

Verification: The project owner shall provide a copy of the initial notification required by this condition to the CPM as part of the Quarterly Operation Reports (AQ-SC8).

CONDITIONS FOR EMERGENCY FIRE PUMP ENGINE

~~**District Application Number 985093**~~

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

2014-APP-003481

Emergency fire-pump diesel engine: John Deere/Clark model JW6H-UFADF0; S/N TBD; EPA certified Tier 3, family EJDXL09.0114; 327 bhp rated at 1760 rpm; turbocharged with charge air cooler for emission control; driving an emergency fire-pump.

AQ-86 The exhaust stack for the emergency fire pump engine shall be a minimum of 20 feet in height above grade and a maximum of 0.5 feet in

diameter at the point of release and shall not be equipped with a rain cap unless it is of flapper valve design. [Rules 1200, 20.3(d)(2)]

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-~~90~~87 The engine shall be EPA certified to the **applicable ~~emissions~~**~~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**, based on the power rating of the engine and the engine model year**. [~~Rule 20.3(d)(1),~~ 40 CFR Part 60 Subpart IIII, and 40 CFR Part 63 Subpart ZZZZ**, 17 CCR §93115**]

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-88 This EPA certified engine shall be installed, configured, operated and maintained according to the manufacturer's emission related instructions. The owner or operator may not change any emission related settings unless those changes are permitted by the manufacturer and do not affect the engine's compliance with the emission standards to which it is certified. [40 CFR 60 subpart IIII]

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

AQ-89 The engine shall be operated exclusively during emergencies as defined in Rule 69.4.1, 40 CFR Part 60 Subpart IIII or 17 CCR §93115 as applicable, or for maintenance and testing.

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

AQ-~~91~~90 Engine operation for maintenance and testing purposes shall not exceed **35**~~50~~ hours per calendar year **unless otherwise required by the National Fire Protection Association (NFPA) Section 25**. ~~(ATCM reportable)~~ [Rule**s** ~~20.3(d)(1) and~~ **69.4.1, 40 CFR Part 60 Subpart IIII,**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~~91 The engine shall only use CARB Diesel Fuel. [Rule**s** 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~~92 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~~93 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~~94 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~~95 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. [Rule~~s~~ 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~~96 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 **and 40 CFR Part 60 Subpart IIII**]

Verification: The project owner 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 keep manuals of recommended maintenance as provided by the engine and control equipment manufacturers for at least the same period of time as the engine to which the records apply is located on site. [Rule 69.4.1 and 40 CFR Part 60 Subpart IIII]

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 this engine shall maintain records of all maintenance conducted on the engine, including a description of the maintenance and date the maintenance was performed. [Rule 69.4.1 and 40 CFR Part 60 Subpart IIII]

~~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 shall maintain documentation for all fuel deliveries identifying the fuel as CARB diesel. [Rule 69.4.1, 17 CCR §93115, and 40 CFR Part 60 Subpart IIII]

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~~100 The owner or operator of this **engine**~~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 **compliance with the testing requirements of National Fire Protection Association (NFPA) ~~25~~**~~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, **40 CFR 60 subpart IIII** 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.

CONDITIONS FOR EMERGENCY ENGINE (GENERATOR)

District Application Number 2014-APP-003480
Emergency diesel engine generator: Caterpillar model C15 ATAAC; S/N TBD; EPA Certified Tier 4i, family ECPXL15.2HZA; 779 bhp rated; turbocharged with charge air cooler and exhaust gas recirculation for emission control; driving a 500 kW generator.

AQ-101 The exhaust stack for the emergency generator engine shall be a minimum of 70 feet in height above grade and a maximum of 0.46 feet in diameter at the point of release and shall not be equipped with a rain cap unless it is of flapper valve design. [Rules 1200, 20.3(d)(2)]

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-102 The engine shall be EPA certified to the applicable emissions requirements for emergency engines of 40 CFR Part 60 Subpart IIII, Standards of Performance for Stationary Compression Ignition Internal Combustion Engines, based on the power rating of the engine and the engine model year. [40 CFR Part 60 Subpart IIII, and 40 CFR Part 63 Subpart ZZZZ, 17 CCR §93115]

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-103 This EPA certified engine shall be installed, configured, operated and maintained according to the manufacturer's emission related instructions. The owner or operator may not change any emission related settings unless those changes are permitted by the manufacturer and do not affect the engine's compliance with the emission standards to which it is certified. [40 CFR 60 subpart IIII]

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

AQ-104 The engine shall be operated exclusively during emergencies as defined in Rule 69.4.1, 40 CFR Part 60 Subpart IIII or 17 CCR §93115 as applicable, or for maintenance and testing.

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

AQ-105 Engine operation for maintenance and testing purposes shall not exceed 50 hours per calendar year. [Rule 69.4.1, 40 CFR Part 60 Subpart IIII, 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-106 The engine shall only use CARB Diesel Fuel. [Rules 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-107 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-108 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-109 This engine shall not operate for nonemergency 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. [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-110 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. [Rule 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-111 **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 and 40 CFR Part 60 Subpart IIII]**

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

AQ-112 **The owner or operator shall keep manuals of recommended maintenance as provided by the engine and control equipment manufacturers for at least the same period of time as the engine to which the records apply is located on site. [Rule 69.4.1 and 40 CFR Part 60 Subpart IIII]**

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

AQ-113 **The owner or operator of this engine shall maintain records of all maintenance conducted on the engine, including a description of the maintenance and date the maintenance was performed. [Rule 69.4.1 and 40 CFR Part 60 Subpart IIII]**

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

AQ-114 **The owner or operator shall maintain documentation for all fuel deliveries identifying the fuel as CARB diesel. [Rule 69.4.1, 17 CCR §93115, and 40 CFR Part 60 Subpart IIII]**

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

AQ-115 **The owner or operator of this engine shall maintain a monthly operating log containing, at a minimum, the following:**
(a) dates and times of engine operation; 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, 40 CFR 60 subpart IIII 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-116 Within 120 days of startup of this engine, the owner or operator shall submit a notification to the District indicating that this source is a major source of HAP. [40 CFR 63 Subpart ZZZZ]

Verification: The project owner shall provide the notification as required to the District within the timeframe required and shall provide a copy of this notification to the CPM in the Quarterly Operation Report that follows the timing of the notification (AQ-SC8).

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
AST	Aboveground Storage Tank
ATC	Authority to Construct
ATCM	Airborne Toxic Control Measure
BACT	Best Available Control Technology
BARCT	Best Available Retrofit Technology
bhp	brake horsepower
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	(Energy Commission) Compliance Project Manager
DAHS	Data Acquisition and Handling System
DPM	Diesel Particulate Matter
dscf	dry standard cubic foot
dscm	dry standard cubic meter
EIR	Environmental Impact Report
EPA	Environmental Protection Agency (same as U.S. EPA)
EPS	Encina Power Station
ERC	Emission Reduction Credit
FDOC	Final Determination Of Compliance
FSA	Final Staff Assessment
GHG	Greenhouse Gas
gpm	Gallons per minute
gr	Grains (1 gr $\cong$ 0.0648 grams, 7000 gr = 1 pound)
HAP	Hazardous Air Pollutant
hp	horsepower
H_2S	Hydrogen Sulfide
LAER	Lowest Achievable Emission Rate
lbs	pounds
LORS	Laws, ordinances, regulations and standards
MCR	Monthly Compliance Report
mg/m^3	milligrams per cubic meter

MMBtu	Million British thermal units
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
PTA	Petition to Amend
PTO	Permit to Operate
PTR	Petition to Remove
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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AIR QUALITY APPENDIX AQ-1
Greenhouse Gas Emissions
Testimony of William Walters and David Vidaver

SUMMARY

The amended Carlsbad Energy Center Project (amended CECP) is a proposed addition to the State's electricity system. It would be a set of efficient, new, dispatchable, natural gas-fired simple-cycle peaker power generation units that would provide fast-start capabilities but would produce greenhouse gas (GHG) emissions while generating electricity for California consumers. The amended CECP proposal includes the use of General Electric LMS100 gas turbines, the most efficient simple-cycle gas turbines currently known to be in operation. Its addition to the system would displace other less efficient, higher GHG-emitting peaker power plant generation, facilitate the retirement of the Encina facility and facilitate the integration of renewable resources. Because the project would improve the efficiency of existing system resources, the addition of the amended CECP would contribute to a reduction of the California GHG emissions and GHG emission rate average. The relative efficiency of the amended CECP and the system build-out of renewable resources in California would result in a net cumulative reduction of GHG emissions from new and existing fossil sources of electricity. Electricity is produced by operation of an interconnected system of generation sources. Operation of one power plant, like the amended CECP, affects all other power plants in the interconnected system.

While the amended CECP would burn natural gas for fuel and thus would produce GHG emissions that contribute cumulatively to climate change, it would have a beneficial impact on system operation and facilitate a reduction in GHG emissions in several ways:

- When dispatched,[1] the amended CECP would displace less efficient (and thus higher GHG-emitting) generation. Because the project's GHG emissions per megawatt-hour (MWh) would be lower than those power plants that the project would displace, the addition of the amended CECP would contribute to a reduction of California and overall Western Electricity Coordinating Council system GHG[2] emissions and GHG emission rate average.

- The amended CECP would replace capacity and generation provided by aging, high GHG-emitting power plants, which are likely to retire in order to comply with the State Water Resource Control Board's (SWRCB) policy restricting the use of once through cooling (OTC).

[1] The entity responsible for balancing a region's electrical load and generation will "dispatch" or call on the operation of generation facilities. The "dispatch order" is generally dictated by the facility's electricity production cost, efficiency, location or contractual obligations.

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

- The amended CECP would replace less efficient peaker power plant generation in the California Independent System Operator - (CA ISO) designated San Diego Local Capacity Area (LCA), reducing the GHG emissions associated with providing local reliability services and facilitating the retirement of the Encina Power Station (EPS), an aging, high GHG-emitting resource in the LCA.

- The amended CECP would provide fast start and dispatch flexibility capabilities necessary to integrate expected additional amounts of variable renewable generation (also known as "variable" or "intermittent" energy resources) to meet the State's renewable portfolio standard (RPS) and GHG emission reduction targets.

INTRODUCTION – WILLIAM WALTERS

GHG emissions are not criteria pollutants; they are discussed in the context of cumulative impacts. In December 2009, the U.S. Environmental Protection Agency (EPA) declared that greenhouse gases (GHGs) threaten the public health and welfare of the American people (the so-called "endangerment finding"), and this became effective on January 14, 2010.

Federal rules that became effective December 29, 2009 (40 CFR 98) require federal reporting of GHGs. As federal rulemaking evolves, staff at this time focuses on analyzing the ability of the project to comply with existing federal- and state-level policies and programs for GHGs. The state has demonstrated a clear willingness to address global climate change though research, adaptation,[3] and GHG inventory reductions. In that context, staff evaluates the GHG emissions from the proposed project, presents information on GHG emissions related to electricity generation, and describes the applicable GHG standards and requirements.

Generation of electricity using any fossil fuel, including natural gas, can produce greenhouse gases along with the criteria air pollutants that have been traditionally regulated under the federal and state Clean Air Acts. For fossil fuel-fired power plants, the GHG emissions include primarily CO_2, 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) for ease of comparison.

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

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

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

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

Applicable Law or Regulation	Description
Federal	
40 Code of Federal Regulations (CFR) Parts 51 and 52	A new stationary source that emits more than 100,000 TPY of greenhouse gases (GHGs) is also considered to be a major stationary source subject to Prevention of Significant Determination (PSD) requirements. As of June 23, 2014 the US Supreme Court has invalidated this requirement as a sole PSD permitting trigger. However, PSD still applies to GHGs if the source is otherwise subject to PSD (for another regulated NSR pollutant) and the GHG emissions exceed this value. The proposed facility modifications are not subject to the PSD analysis for other NSR pollutants and are therefore not subject to GHG PSD analysis.
40 Code of Federal Regulations (CFR) Part 60 Subpart TTTT	This rule sets annual CO_2 emissions performance standards, based on gross output, for new stationary combustion turbines. The emissions standards are 0.45 MT CO_2/MWh for gas turbines with maximum heat input greater than 850 MMBtu/hr. As currently proposed, this rule is triggered for facilities that would operate with a capacity factor of 33 percent or higher. The amended CECP would be limited to a capacity factor below 33 percent, so this emissions performance standard would not apply.
40 Code of Federal Regulations (CFR) Part 98	This rule requires mandatory reporting of GHG emissions for facilities that emit more than 25,000 metric tons of CO_2 equivalent emissions per year. This requirement is triggered by this facility.
State	
California Global Warming Solutions Act of 2006, AB 32 (Stats. 2006; Chapter 488; Health and Safety Code sections 38500 et seq.)	This act requires the California Air Resource Board (ARB) to enact standards to reduce GHG emission to 1990 levels by 2020. Electricity production facilities are included. A cap-and-trade program became active in January 2012, with enforcement beginning in January 2013. Cap-and-trade is expected to achieve approximately 20 percent of the GHG reductions expected under AB 32 by 2020.
California Code of Regulations, Title 17, Subchapter 10, Article 2, sections 95100 et. seq.	These ARB regulations implement mandatory GHG emissions reporting as part of the California Global Warming Solutions Act of 2006 (Stats. 2006; Chapter 488; Health and Safety Code sections 38500 et seq.)
Title 20, California Code of Regulations, Section 2900 et seq.; CPUC Decision D0701039 in proceeding R0604009	The regulations prohibit utilities from entering into long-term contracts with any base load facility that does not meet a greenhouse gas emission standard of 0.5 metric tonnes carbon dioxide per megawatt-hour (0.5 MTCO_2/MWh) or 1,100 pounds carbon dioxide per megawatt-hour (1,100 lbs CO_2/MWh). The amended CECP would not be a base load facility and this regulation would not apply.

Applicable Law or Regulation	Description
Local	
City of Carlsbad Draft Climate Action Plan	This draft planning document identifies greenhouse gas emissions reduction measures. These measures are generally designed for residential, commercial, and traffic based GHG emissions reduction measures that would not specifically apply to the project. At this time none of the measures in this draft plan appear to have been added as ordinances within the City Municipal Code.

GHG ANALYSIS

California is actively pursuing policies to reduce GHG emissions that include adding low-GHG emitting renewable electricity generation resources to the system. The GHGs evaluated in this analysis include carbon dioxide (CO_2), nitrous oxide (N_2O), methane (CH_4), sulfur hexafluoride (SF_6), hydrofluorocarbons (HFC), and perflurocarbons (PFC). CO_2 emissions are far and away the most common of these emissions; as a result, even though the other GHGs may have a greater impact on climate change on a per-unit of mass basis due to their greater global warming potential as described more fully below, GHG emissions are often "normalized" in terms of metric tons of CO_2-equivalent (MTCO2E) for simplicity. Global warming potential (GWP) is a relative measure, compared to carbon dioxide, of a compound's ability to warm the planet, taking into account each compound's expected residence time in the atmosphere. By convention, carbon dioxide is assigned a global warming potential of one. In comparison, for example methane has a GWP of 25,[4] which means that it has a global warming effect 25 times greater than carbon dioxide on an equal-mass basis. The carbon dioxide equivalent (CO2E) for a source is obtained by multiplying each GHG by its GWP and then adding the results together to obtain a single, combined emission rate representing all GHGs in terms of CO2E.

GHG emissions are not included in the class of pollutants traditionally called "criteria pollutants." Since the impact of the GHG emissions from a power plant's operation has global rather than local effects, those impacts should be assessed not only by analysis of the plant's emissions, but also in the context of the operation of the entire electricity system of which the plant is an integrated part. Furthermore, the impact of the GHG emissions from a power plant's operation should be analyzed in the context of applicable GHG laws and policies, especially Assembly Bill (AB) 32, California's Global Warming Solutions Act of 2006.

GLOBAL CLIMATE CHANGE AND CALIFORNIA

Worldwide, with the exception of 1998, over the past 134-year record, the 11 warmest years all have occurred since 2002, with the two hottest years on record being 2010 and 2005 (NCDC 2014). According to "The Future Is Now: An Update on Climate Change Science Impacts and Response Options for California," an Energy Commission document, the American West is heating up faster than other regions of the United States (CEC 2009c). The California Climate Change Center (CCCC) reports that, by the end of

[4] Updated global warming potential values became effective January 1, 2014.

this century, average global surface temperatures could rise by 4.7°F to 10.5°F due to increased GHG emissions.

The accumulation of GHGs in the atmosphere regulates the earth's temperature. Without these natural GHGs, the earth's surface would be approximately 61°F (34°C) cooler (CalEPA 2006); however, emissions from fossil fuel combustion for activities such as electricity production and vehicular transportation have elevated the concentration of GHGs in the atmosphere above natural levels. ARB estimated that the mobile source sector accounted for approximately 37 percent of the GHG emissions generated in California from 2009 through 2012, while the electricity generating sector accounted for approximately 20 to 22 percent of the 2009 to 2012 California GHG emissions inventory with just more than half of that on average from in-state generation sources (ARB 2014).

The Fourth U.S. Climate Action Report concluded, in assessing current trends, that CO_2 emissions increased by 20 percent from 1990 to 2004, while methane and nitrous oxide emissions decreased by ten percent and two percent, respectively. The Intergovernmental Panel on Climate Change (IPCC) constructed several emission trajectories of GHGs needed to stabilize global temperatures and climate change impacts. It concluded that stabilization of GHGs at 450 ppm carbon dioxide equivalent concentration is required to keep the global mean warming increase below 3.8°F (2.1°C) from year 2000 base line levels (IPCC 2007a).

GHGs differ from criteria pollutants in that GHG emissions from a specific project do not cause direct adverse localized human health effects. Rather, the direct environmental effect of GHG emissions is the cumulative effect of an overall increase in global temperatures, which in turn has numerous indirect effects on the environment and humans. The impacts of climate change include potential physical, economic, and social effects. These effects could include inundation of settled areas near the coast from rises in sea level associated with melting of land-based glacial ice sheets, exposure to more frequent and powerful climate events, and changes in suitability of certain areas for agriculture, reduction in Arctic sea ice, thawing permafrost, later freezing and earlier break-up of ice on rivers and lakes, a lengthened growing season, shifts in plant and animal ranges, earlier flowering of trees, and a substantial reduction in winter snowpack (IPCC 2007b). For example, current estimates include a 70 to 90 percent reduction in snow pack in the Sierra Nevada mountain range. Current data suggests that in the next 25 years, in every season of the year, California could experience unprecedented heat, longer and more extreme heat waves, greater intensity and frequency of heat waves, and longer dry periods. More specifically, the CCCC predicted that California could witness the following events (CCCC 2006):

- Temperature rises between 3 and 10.5 ºF
- 6 to 20 inches or greater rise in sea level
- 2 to 4 times as many heat-wave days in major urban centers
- 2 to 6 times as many heat-related deaths in major urban centers
- 1 to 1.5 times more critically dry years

- Losses to mountaintop snowpack and water supply (e.g., according to the CCCC, Sierra Nevada snowpack could be reduced by as much as 70 to 90 percent by 2100 [CEC 2009c])
- 25 to 85 percent increase in days conducive to ozone formation
- 3 to 20 percent increase in electricity demand
- 10 to 55 percent increase in the risk of wildfires

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 GHGs, if not sufficiently curtailed, are likely to contribute further to continued increases in global temperatures. Indeed, the California Legislature found 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).

The state has demonstrated a clear willingness to address global climate change (GCC) through research, adaptation, and GHG emission reductions. In that context, staff evaluates the GHG emissions from the proposed project, presents information on GHG emissions related to electricity generation (see **Electricity System GHG Impacts** below), and describes the applicable GHG policies and programs.

In April 2007, the U.S. Supreme Court held that GHG emissions are pollutants within the meaning of the Clean Air Act (CAA). In reaching its decision, the Court also acknowledged that climate change results, in part, from anthropogenic causes (Massachusetts et al. v. Environmental Protection Agency 549 U.S. 497, 2007). The Supreme Court's ruling paved the way for the regulation of GHG emissions by U.S. Environmental Protection Agency (U.S. EPA) under the CAA.

In response to this Supreme Court decision, on December 7, 2009 the U.S. EPA Administrator signed two distinct findings regarding GHGs under Section 202(a) of the CAA:

- Endangerment Finding: That the current and projected concentrations of the GHGs in the atmosphere threaten the public health and welfare of current and future generations; and
- Cause or Contribute Finding: That the combined emissions of GHGs from new motor vehicles and new motor vehicle engines contribute to the GHG pollution, which threatens public health and welfare.

As federal rulemaking evolves, staff at this time focuses on analyzing the ability of the project to comply with existing federal- and state-level policies and programs for GHGs. As of June 23, 2014, the US Supreme Court has validated that GHG emissions should continue to be regulated, but only for those facilities that are already regulated under Prevention of Significant Deterioration (PSD) for NSR pollutants.

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 GHGs or global climate change[5] 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 ARB to adopt standards that will reduce 2020 statewide GHG emissions to 1990 levels.

AB 32 includes a number of specific requirements:

ARB shall prepare and approve a scoping plan for achieving the maximum technologically feasible and cost-effective reductions in greenhouse gas emissions from sources or categories of sources of greenhouse gases by 2020 (Health and Safety Code (HSC) §38561). The scoping plan, approved by the ARB on December 12, 2008, provides the outline for actions to reduce greenhouse gases in California. The approved scoping plan indicates how these emission reductions will be achieved from significant greenhouse gas sources via regulations, market mechanisms, and other actions. In early 2014, ARB completed its five-year update to the Scoping Plan, tracking progress towards the 2020 emission goals and proposing new measures as appropriate.

The adopted Scoping Plan anticipates that four-fifths of the planned reductions will come from cost-effective programs and regulations, with the remainder provided by economy-wide cap-and-trade. Measures that affect the electricity sector directly include a 33 percent Renewable Portfolio Standard, alternative transportation fuels such as vehicle and ship electrification, building energy efficiency, and combined heat and power. Most of these measures have been implemented, such as Senate Bill X1 2 (Simitian, Chapter 1, Statutes of 2011-12), which established a firm goal requiring all retail providers have 33 percent of California's electricity supplies by renewable sources by 2020.

Identify the statewide level of greenhouse gas emissions in 1990 to serve as the emissions limit to be achieved by 2020 (HSC §38550). In December 2007, the ARB approved the 2020 emission limit of 427 million metric tons of carbon dioxide equivalent (MMTCO2E) of greenhouse gases. In 2013, ARB used EPA's updated information to re-calculate that level to 431 million metric tons.

Adopt a regulation requiring the mandatory reporting of greenhouse gas emissions (HSC §38530). In December 2007, the ARB adopted a regulation requiring the largest electric power generation and industrial sources to report and verify their greenhouse gas emissions. The reporting regulation serves as a solid foundation to determine greenhouse gas emissions and track future changes in emission levels. Facilities that emit more than 25,000 metric tons per year are covered. That includes most emitting power plants of 5 megawatts or larger. Reported emissions from individual facilities may be found on the Mandatory Reporting website, http://www.arb.ca.gov/cc/reporting/ghg-rep/reported-data/ghg-reports.htm.

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

Adopt a regulation that establishes a system of market-based declining annual aggregate emission limits for sources or categories of sources that emit greenhouse gas emissions, applicable from January 1, 2012, to December 31, 2020 (HSC §38562(c)). In 2011, the ARB adopted the cap-and-trade original regulation.The cap-and-trade program covers major sources of GHG emissions in the state such as refineries, power plants, industrial facilities, and transportation fuels. The cap-and-trade program includes an enforceable emissions cap that will decline over time. The state will distribute allowances, which are tradable permits, equal to the emissions allowed under the cap. Sources under the cap will need to surrender allowances and offsets equal to their emissions at the end of each compliance period.

Individual in-state generating facilities and the first deliverers of imported electricity are the point of regulation. They are responsible for measuring their GHG emissions using ARB and U.S. EPA regulations, and purchasing either carbon allowances or offsets to meet their emissions obligation. Third party verification is required. If facilities find that it is not economic to operate and to purchase sufficient compliance instruments to cover its GHG obligations, facilities must lower their annual energy output. Further information on cap-and-trade may be found at:

http://www.arb.ca.gov/cc/capandtrade/capandtrade.htm.

The first mandatory compliance period[6] with cap-and-trade requirements commenced on January 1, 2012, although enforcement was delayed until January 2013.

Convene an Environmental Justice Advisory Committee (EJAC) to advise the Board in developing the Scoping Plan and any other pertinent matter in implementing AB 32 (HSC §38591). The EJAC met between 2007 and 2010, providing comments on the proposed early action measures and the development of the scoping plan, public health issues, and issues for impacted communities and cap-and-trade. To advise the ARB on the 2013 Scoping Plan Update, ARB reconvened a new EJAC on March 21, 2013. The committee met three times in 2013 and will continue in 2014 to provide advice to the ARB.

It is likely 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 GHG reduction for the least cost). For example, ARB proposes a 40 percent reduction in statewide GHG emissions from the electricity sector even though that sector currently only produces about 20 to 22 percent of the state's GHG emissions.

SB 1368,[7] enacted in 2006, and regulations adopted by the Energy Commission and the California Public Utilities Commission (CPUC) pursuant to that bill, prohibit California utilities from entering into long-term commitments with any base load facilities

[6] A compliance period is the time frame during which the compliance obligation is calculated. The years 2013 and 2014 are known as the first compliance period and the years 2015 to 2017 are known as the second compliance period. The third compliance period is from 2018 to 2020. At the end of each compliance period each facility will be required to turn in compliance instruments, including allowances and a limited number of ARB offset credits, equivalent to their total GHG emissions throughout the compliance period. (http://www.arb.ca.gov/cc/capandtrade/guidance/chapter1.pdf)

[7] Public Utilities Code § 8340 et seq.

that exceed the Emission Performance Standard (EPS) of 0.5 metric tonnes CO_2 per megawatt-hour[8] (1,100 pounds CO_2/MWh). Specifically, the SB 1368 EPS applies to new California utility-owned power plants, new investments in existing power plants, and new or renewed contracts with terms of 5 years or more, including contracts with power plants located outside of California, where the power plants are "designed or intended" to operate as base load generation.[9] If a project, in state or out of state, plans to sell electricity or capacity to California utilities, those utilities will have to demonstrate that the project meets the EPS. *Base load* units are defined as units that are expected to operate at a capacity factor higher than 60 percent. Compliance with the EPS is determined by dividing the annual average carbon dioxide emissions by the annual average net electricity production in MWh. This determination is based on capacity factors, heat rates, and corresponding emissions rates that reflect the *expected* operations of the power plant and not on full load heat rates [Chapter 11, Article 1 §2903(a)].

The amended CECP would be required to participate in California's GHG cap-and-trade program. This cap-and-trade program is part of a broad effort by the State of California to reduce GHG emissions as required by AB 32, which is being implemented by ARB. As currently implemented, market participants, such as the amended CECP, are required to report their GHG emissions and to obtain GHG emissions allowances (and offsets) for those reported emissions by purchasing allowances from the capped market and offsets from outside the AB 32 program. As new participants enter the market and as the market cap is ratcheted down over time, GHG emission allowance and offset prices will increase encouraging innovation by market participants to reduce their GHG emissions. Thus, the amended CECP, as a GHG cap-and-trade participant, would be consistent with California's landmark AB 32 Program, which is a statewide program coordinated with a region-wide Western Climate Initiative (WCI) program to reduce California's GHG emissions to 1990 levels by 2020.

On January 8, 2014, in the Federal Register, the U.S. EPA proposed New Source Performance Standard (NSPS) for GHG emissions for new electric power plants (Federal Register, Volume 79, No. 5); the requirement is effective on the date of publication unless it is significantly revised. This new requirement would limit large natural gas-fired stationary combustion turbines to no more than 1,000 lbs CO_2 per MWh and small natural gas-fired stationary combustion turbines to no more than 1,100 lbs CO_2 per MWh. Large natural gas-fired stationary combustion turbines are those with heat input ratings greater than 850 MMBtu/h and small natural gas-fired stationary combustion turbines are those with heat input ratings less than 850 MMBtu/h. According to U.S. EPA, the proposed NSPS limits apply to an electric generating unit if it supplies more than one-third of its potential electric output and more than 219,000 MWh net electric output to the grid per year.

The project owner has proposed operating limits that would keep the maximum potential electric output at just below one-third of its potential output; therefore, the amended CECP would not be subject to this NSPS GHG emissions standard. Specifically, the

[8] The Emission Performance Standard only applies to carbon dioxide and does not include emissions of other greenhouse gases converted to carbon dioxide equivalent.
[9] See Rule at http://www.cpuc.ca.gov/PUBLISHED/FINAL_DECISION/64072.htm

maximum capacity factor that will be licensed and permitted under the San Diego Air Pollution Control District (SDAPCD) air quality permit would be equivalent to 30.8 percent, just under one-third or 33.3 percent regulation applicability trigger. The expected normal capacity factor for this facility, based on the actual capacity factors of other peaking facilities, including other high-efficiency General Electric LMS100 peaker facilities within California, is expected to normally be well below this permitted maximum annual capacity factor.

ELECTRICITY PROJECTED GREENHOUSE GAS EMISSIONS

While 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. It operates as an integrated whole to reliably and effectively meet demand, such that the dispatch of a new source of generation unavoidably 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[10] 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.

GHG EMISSIONS FROM THE PROPOSED FACILITY

The specifics of the two petitions that are being evaluated, including the differences with the approved project, are described more fully within the Air Quality Section.

Project Construction

Construction of industrial facilities such as power plants requires coordination of numerous equipment and personnel. The concentrated on-site activities result in temporary, unavoidable increases in vehicle and equipment emissions that include greenhouse gases. Construction of the amended CECP project would involve four primary construction and demolition phases: 1) a tank demolition and remediation phase; 2) the amended CECP construction; 3) a 12-month Encina decommissioning phase during initial operation of the amended CECP; and 4) the Encina demolition that would occur after the amended CECP is built and operating as proposed under the PTA. The project owner provided GHG emissions estimates for each of these construction/demolition phases.

The GHG emissions estimate for project construction is presented below in **Greenhouse Gas Table 2**. The term CO2E represents the total GHG emissions after weighting by the appropriate global warming potential.

[10] See CEC 2009d, page 95.

Greenhouse Gas Table 2
Amended CECP Estimated Construction Greenhouse Gas Emissions

Construction Element	CO_2 Equivalent (MTCO2E) [a]
Amended CECP Tank Demolition	299
Amended CECP Berm Construction	55
Petition to Remove Subtotal	**354**
Amended CECP Construction	3,088
Amended CECP Encina Demolition	3,390
Petition to Amend Subtotal	**6,478**
Construction Total	**6,832**
Licensed CECP Construction Total	4,686

Source: (CEC 2009a/2009b; LL 2014b, Appendix 5.1F; LL 2014e, Appendix 3.1; LL 2014uu, Table 5.1F-15)
Note:
[a] One metric tonne (MT) equals 1.1 short tons or 2,204.6 pounds or 1,000 kilograms.

There are certain elements of the licensed CECP not proposed or included in the GHG amended CECP GHG emissions estimate, such as the demolition of Tanks 5 through 7 not being included and the on-site desalination plant no longer being proposed. Also, since the time of the original construction GHG emissions estimate, several underlying assumptions including ARB recommended load factors for off-road equipment have been revised. Therefore, while there is considerably more total construction/demolition work proposed than was proposed for the licensed CECP, the total emissions estimate for the amended CECP construction is lower than estimated for the licensed CECP and the total emissions including the EPS demolition is only approximately 46 percent greater than that estimated for the licensed CECP. Secondary and indirect GHG emissions sources have not been estimated, but staff concludes that the balance of those GHG emissions is likely a reduction in GHG emissions given the large amount of steel and concrete that will be recycled.

Project Operations

The amended CECP is a proposed natural-gas fired, simple-cycle, air-cooled, 632 net megawatt (MW) electrical generating facility that would replace the existing Encina Power Station. The amended CECP would consist of six General Electric LMS100 gas turbines. The primary sources of GHG emissions would be the natural gas-fired combustion turbines. The employee and delivery traffic GHG emissions from off-site activities are negligible in comparison with the gas turbine GHG emissions.

Greenhouse Gas Table 3 shows the estimated maximum annual CO_2 and CO2E emissions for the stationary sources and the two fugitive emissions sources (sulfur hexafluoride containing equipment leaks and methane from estimated natural gas compressor leaks). The applicant provided gas turbine heat rate performance data on full load operation and for an expected maximum annual operating scenario that included startup and shutdowns. The former is shown in this table to present the maximum emissions potential and the latter is presented later in this section as a more realistic estimate of annual GHG emissions performance. This table also presents the maximum GHG emissions estimate for the licensed CECP.

Greenhouse Gas Table 3
Amended 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)	845,845	1	845,845
Methane (CH_4)	15.94	25	399
Methane (CH_4) - Fugitive	2.19	25	55
Nitrous Oxide (N_2O)	1.59	298	475
Hexafluoride (SF_6)	0.0054	22,800	123
Maximum Full-Load GHG emissions – MTCO2E per year			846,896
Total MWh per year (net)			1,763,159
Full-Load CO_2 Emissions Performance - $MTCO_2$/MWh[c]			0.4797
Full-Load GHG Emissions Performance - MTCO2E/MWh[c]			0.4802
Expected CO_2 Emissions Performance- $MTCO_2$/MWh			0.5026
Expected GHG Emissions Performance - MTCO2E/MWh			0.5033

Sources: LL 2014e, LL 2014nn, and SDAPCD 2014.
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 analysis uses updated global warming potential values that became effective January 1, 2014.
[c] Based on full load gas turbine emissions and corresponding gross energy production.

The emissions totals noted above in **Greenhouse Gas Table 3** are maximum permitted values, while actual annual emissions are likely to be well below these levels based on experience that peaking power plants do not operate at capacity factors near the 30.8 percent proposed maximum capacity factor for the amended CECP. So, while the amended project would have the permit limit based potential to emit greater than the recent existing EPS baseline, which SDAPCD calculated to be 600,926 MTCO2E (SDAPCD 2014), it is likely that the amended CECP would have actual annual GHG emissions that are below the EPS baseline and the EPS has a much higher effective GHG emissions permit limit. Additionally, the amended CECP would be much more efficient than EPS, with an expected GHG emissions performance of approximately 0.5033 MTCO2E/MWh versus the actual calculated annual GHG emissions performance for EPS that has ranged from 0.656 to 0.724 MTCO2E/MWh from 2008 to 2013 (CEC 2014a).

The amended CECP would be a peaking facility that would not be subject to SB1368 Emission Performance Standard of 0.500 $MTCO_2$/MWh or the new federal NSPS of 0.454 $MTCO_2$ per MWh gross. The estimated operating gross and net efficiency for the gas turbines, not including the other emissions sources at the site that are shown in the table above, is expected to just be above these values (approximately 0.503 $MTCO_2$/MWh net, and 0.486 $MTCO_2$/MWh gross – LL 2014nn). However, this performance is only an estimate; real performance may be somewhat better or worse than this depending on the actual operating conditions. However, these won't be known until after the facility becomes operational, if it is approved and constructed.

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.

METHOD AND THRESHOLDS FOR DETERMINING SIGNIFICANCE

The CEQA guidelines provide three factors for lead agencies to consider when assessing the significance of impacts for the analysis of GHG emissions impacts (CEQA Guidelines, tit. 14, §15064.4).

- *The extent to which the project may increase or reduce greenhouse gas emissions as compared to the existing environmental setting;*
- *Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project.*
- *The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of greenhouse gas emissions. Such requirements must be adopted by the relevant public agency through a public review process and must reduce or mitigate the project's incremental contribution of greenhouse gas emissions. If there is substantial evidence that the possible effects of a particular project are still cumulatively considerable notwithstanding compliance with the adopted regulations or requirements, an EIR must be prepared for the project.*

Staff evaluates the emissions of the project in the context of the electricity sector as a whole and the AB 32 Scoping Plan implementation efforts for the sector, including the Cap and Trade regulation that implements the state's primary approach to reducing GHG emissions from the electricity sector. The Energy Commission's assessment approach does not include a specific numeric threshold of significance for GHG emissions; rather the assessment is completed in the context of how the project will affect the electricity sector's emissions based on its proposed role and its compliance with applicable regulations and policies.

Included in this sector-wide GHG emission analysis method is the determination of whether a project is consistent with the Avenal precedent decision, which requires a finding as a conclusion of law that any new natural gas-fired power plant certified by the Energy Commission "must:

- not increase the overall system heat rate for natural gas plants;
- not interfere with generation from existing renewables or with the integration of new renewable generation; and
- taking into account the two preceding factors, reduce system-wide GHG emissions"[11]

CONSTRUCTION/DEMOLITION IMPACTS

Staff believes that the small GHG emission increases from construction/demolition activities would not be significant for several reasons. First, staff is recommending a condition of certification in the Waste Management section (**Waste-5**) that requires construction/demolition wastes be recycled during the amended CECP construction and during the Encina demolition. Second, the intermittent emissions during the construction phase are 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 will increase efficiency and reduce GHG emissions and be compatible with low-carbon fuel (e.g., bio-diesel and ethanol) mandates that will likely be part of future ARB regulations to reduce GHG from construction vehicles and equipment.

DIRECT/INDIRECT OPERATION IMPACTS AND MITIGATION

Operational impacts of the proposed project are described in detail in a later section titled "**Project Impacts on Electricity System**" since the evaluation of these effects must be done by considering the project's role(s) in the integrated electricity system. In summary, these effects include reducing the operation and greenhouse gas emissions from the older, existing power plants; potentially displacing local electricity generation; the penetration of renewable resources; and accelerating generation retirements and replacements, including facilities currently using once-through cooling. Additionally, operation GHG emissions impacts are mitigated through compliance with the state's Cap and Trade regulation, which is designed to reduce electricity sector GHG emissions to meet AB 32 statewide GHG emissions reduction goals.

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

[11] Final Commission Decision, Avenal Energy Application for Certification (08-AFC-1) December 2009, p. 114.

may be relatively minor and incremental, yet still be significant because of the existing environmental background, particularly when one considers other closely related past, present, and reasonably foreseeable future projects.

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

CALIFORNIA ELECTRICITY AND GREENHOUSE GASES – DAVID VIDAVER

California's commitments to dramatically reduce greenhouse gas (GHG) emissions over the next four decades include moving to a high-renewable/low GHG electricity system. However, natural gas-fired power plants--and the GHG emissions associated with their output--will still be integral to the reliable operation of the electricity system at the outset of this period. In the long-run, zero- and low-carbon resources, including demand-side and storage resources may provide a majority, if not all of the balancing services needed to integrate variable[12] renewable resources. However, the technologies that are needed to do so are not expected to be available in sufficient quantities by the early- to mid-2020s to obviate the need for dispatchable, flexible, natural gas-fired electricity generation. Furthermore, the 2017–2020 retirements of natural gas-fired generation resources in the Los Angeles and San Diego regions that use OTC technologies and the closure of the San Onofre Nuclear Generating Station (SONGS) will require the development of natural gas-fired generation as part of the set of resources that will maintain local reliability.

The amount of new natural gas-fired capacity needed to provide reliable service to the customers of the state's investor-owned utilities, direct access providers, and community choice aggregators, over a ten-year planning horizon is determined in the California Public Utilities Commission's (CPUC's) Long-term Procurement Planning (LTPP) proceeding. The resulting portfolio of demand- and supply-side resources satisfies the state's loading order, which mandates development of cost-effective preferred resources (zero- and low-GHG emitting resources, such as energy efficiency, demand response, and renewable generation) in support of the state's climate change policies before authorizing the development/financing of conventional fossil resources.[13] It is also consistent with Commission direction to investor-owned utilities to procure energy storage resources in support of a high-variable generation resource system.[14]

[12] Variable and intermittent are often used interchangeably, but variable more accurately reflects the integration issues of renewables into the California grid. Winds can slow across a wind farm or cloud cover can shade portions of a solar field, temporarily reducing unit or facility output, but not shut down the unit or facility.

[13] The loading order is set forth in California's Energy Action Plans. Energy Action Plan I was adopted by the state's energy agencies in April/May 2003 and Energy Action Plan II in September 2005, An update to these plans was issued in February 2008.

[14] D.13-10-040 (October 17, 2013) established a procurement target of 1,325 MW in total for the state's three largest investor-owned utilities.

THE ROLE OF NATURAL GAS-FIRED GENERATION IN A LOW-GHG ENVIRONMENT

The need for natural gas-fired generation to reliably operate the electricity system is well established. On October 8, 2008, the Energy Commission adopted an Order Instituting Informational Proceeding (08-GHG OII-1) to solicit comments on how to assess the greenhouse gas impacts of proposed new power plants in accordance with the California Environmental Quality Act (CEQA).[15] A report prepared as a response to the GHG OII (CEC 2009e) defines the roles that natural gas-fired power plants fulfill in an evolving high-renewables, low-GHG system (CEC 2009d, pp 93 and 94). Such new facilities serve to:

1. Provide variable generation and grid operations support;

2. Meet extreme load and system emergency requirements;

4. Meet local capacity requirements; and,

4. Provide general energy support.

Variable Generation and Grid Operations Support

California's renewable portfolio standard (RPS) requires that the state's energy service providers meet 33 percent of retail sales with renewable energy by 2020; meeting GHG emission-reduction targets for 2050 will likely require a far higher percentage. Much of this energy will come from variable wind and solar resources to be developed in California, or on an "as generated" basis from neighboring states.

The CA ISO has identified an increased need for regulation services, "load-following" generation, and multi-hour ramping as a result of the increase in these variable (intermittent-energy) renewable resources, whose output changes over the course of the day, often in a sudden and unpredictable fashion. Dispatchable capacity must provide "regulation," small changes in output over a five-minute period at CA ISO direction, requiring that the generator be equipped with automated generation control (AGC). "Load following" requires larger changes in output by the generation portfolio over a five-minute to one-hour period. Multi-hour ramping needs require that units be dispatched, at CA ISO direction if necessary, over time periods of one to nine hours and wider ranges of output in aggregate, requiring dispatchable generation that can start and ramp up and down quickly and be capable of operating at relatively low load levels if the amount of dispatchable capacity and associated energy needed from these resources is to be minimized.

Natural gas-fired power plants are currently the only type of new facility that can provide these "ancillary" services in the quantities needed now and in the near future. While dispatchable hydroelectric plants can also provide them, the potential for adding hydroelectric resources to the system is limited. Nuclear, coal, and geothermal facilities

[15] This need for gas-fired generation to reliably operate the system was reaffirmed in the CPUC decision authorizing SDG&E to procure from 300 MW to 600 MW of generation from any resource. D.14-03-004, See Decision Authorizing Long-Term Procurement for Local Capacity Requirements Due to Permanent Retirement of the San Onofre Nuclear Generation Stations, March 13, 2014, p. 4.

are generally more economic if operated at or near their design point (i.e., base loaded)[16] and, therefore, are not the preferred technologies for providing ancillary services. While demand-side resources and storage may ultimately provide significant quantities of these ancillary services, only pumped hydro storage facilities are currently capable of doing so on a large scale.

Historically, a large share of California's load-following and ramping needs have been provided by the natural gas-fired steam turbines built on the Pacific Coast and in the San Francisco Bay Delta during the 1960s and 1970s. Very efficient when constructed, these provided baseload energy through the 1980s and 1990s. However, they were supplanted in this role by newer, more efficient combined-cycle technologies built pursuant to the energy crisis of 2000 – 2001. While these natural gas-fired steam turbine units were modified to operate successfully as load following and peaking generation, they are not as efficient or economic as newer technologies. Several of these facilities have retired as a result of the State Water Resource Control Board's (SWRCB's) policy on the use of OTC technologies; others are expected to retire by 2020. This represents a loss of capacity capable of operating at a very wide range of output and thus providing large quantities of flexible generation and other ancillary services.

Local Capacity Requirements

The CA ISO has identified numerous local capacity areas (LCA) and sub-areas in which threshold amounts of capacity are required to ensure reliability. Transmission constraints prevent the import of sufficient energy into these areas under high load conditions to ensure reliable service without requiring specified amounts of local capacity to be generating or available to the CA ISO for immediate dispatch.

Reliable service requires that the CA ISO be able to maintain service under 1-in-10-year load conditions given the sequential failure of two major components (a large power plant and a major transmission line, for example); this requirement is imposed by the North American Electric Reliability Council (NERC). The amount of capacity needed in each of these areas (the local capacity requirement, or "LCR") is determined annually by the CA ISO; the LCR study process culminates in an annual *Local Capacity Technical Analysis*. The need for natural-gas fired capacity in LCAs stems in part from their predominantly urban nature and coastal location (i.e., fewer transmission lines into the coastal region as none are available from the west or ocean side of the basin). The LCRs of the Greater Bay Area, Los Angeles Basin, San Diego, and Big Creek-Ventura are too large to be met solely with non-natural gas fired generation; the renewable development scenarios compiled by the CPUC for use in the 2014 LTPP proceeding and the CA ISO's 2014 – 2015 Transmission Planning Process– indicate that only a share of the new capacity needed in the large LCAs can be expected to come from new renewable resources. This share is not sufficient to eliminate the need for new natural gas-fired generation in the San Diego LCA, as evidenced by the procurement authorization issued in that proceeding.

[16] Issues can arise from: thermal fatigue due to cycling; difficulties starting and stopping solid or geothermal fuel supplies; significant inefficiencies at low loads or standby points used to avoid full shutdowns; and, significant capital outlays that make it necessary to operate the units as much as possible.

Extreme Load and System Emergency Requirements

Sufficient capacity must exist to meet demand under very high load conditions or when generator outages reduce capacity surpluses to levels low enough to threaten reliability. Historically, generation capacity and demand response programs equal to 115 percent to 117 percent of forecasted annual peak demand have been deemed sufficient to meet these system-wide reliability requirements. Given the amount of time it takes to estimate the need for, develop, permit, and construct a large power plant, capacity needs for ten years in the future are assessed in California's planning processes.

General Energy Support

The loading order indicates the resources that the state intends to rely on to meet energy needs while reducing GHG emissions. While energy efficiency, demand response programs, renewable generation, and combined heat and power are preferred resources that are to be developed before natural gas-fired generation, they are not sufficient to meet the state's future energy demand and maintain the electric system's reliability. In addition, a significant share of the state's still-operating generation fleet is expected to shut down to comply with the SWRCB's OTC policy. Energy from natural gas-fired generation will increasingly be needed during a prolonged nuclear plant outage (for refueling for example) or during dry years, in which hydroelectric production is reduced.

QUANTIFYING THE NEED FOR NATURAL GAS-FIRED GENERATION

Prior to the deregulation of the California electricity system during the 1990's, the Energy Commission's power plant siting process considered the need for power plant development. SB 110 (Chapter 581, Statutes of 1999) eliminated the requirement that projects licensed by the Energy Commission be in conformance with an integrated assessment of need that was conducted by the Energy Commission until that time.

The need for new generation capacity to ensure reliable service in the investor-owned utility (IOU) service territories is now determined in the CPUC's biennial LTPP proceeding.[17] This proceeding is the forum in which the state's major IOUs are authorized to finance the development of new "least-cost, best-fit" generation (on behalf of either IOU customers or all ratepayers not served by publicly-owned utilities) needed to reliably meet electricity demand.[18] This need, specified in terms of: (a) the MW of capacity needed; (b) the desired or required operating characteristics of the resource(s) to be financed; and (c) the location of proposed additions if required for local reliability, is a function of planning assumptions that reflect the state's commitment to dramatically

[17] The need for new generation capacity to ensure reliable service by publicly-owned utilities (POU) is determined by the governing authorities of the individual utilities.

[18] These include costs that account for environmental impacts such as the projected emissions allowance costs (those required under the AB 32 cap-and-trade program, as well as those required for criteria pollutants).

reduce GHG emissions from the electricity sector. The MWs of capacity needed are driven by:

- Peak demand growth due to economic and demographic factors;
- Reductions in peak demand due to committed and uncommitted energy efficiency and demand response programs;
- Reserve margins (dependable capacity in excess of peak demand) needed to ensure system reliability, normally assumed to be 15 to 17 percent of peak demand, but also including any additional dispatchable capacity needed to ensure reliability given variation in the output of renewable resources (e.g., wind or solar generation);
- Capacity needed in transmission-constrained areas to ensure local reliability under extreme (1-in-10 year) weather conditions;
- Capacity needed to remedy shortfalls in system ramping and/or turndown ability, (i.e., flexible resources);
- Capacity to be provided by fossil-fired resources being developed by California-based investor-owned utilities pursuant to authorization by the CPUC in previous LTPP proceedings;
- Capacity to be provided by new renewable resources built/contracted with to meet the state's RPS; and,
- Capacity to be lost due to retirement, for example, capacity expected to cease operation as a result of the SWRCB policy regarding the use of OTC.

As noted above, this capacity need is evaluated over a ten-year planning horizon due to the length of time it takes to authorize the financing of, select, permit and construct new power plants,

The planning assumptions adopted for use in the LTPP proceeding, and thus determinant of the amount of new capacity authorized, consider both the state's loading order for resource development, as well as the expected development of specific types of preferred resources, including energy efficiency, demand response, and renewable generation. In other words, in authorizing the procurement/financing of dispatchable, natural gas-fired capacity by an IOU, the CPUC assumes that cost-effective amounts of preferred resources will have been procured.

Authorization for San Diego Gas & Electric (SDG&E) to procure natural gas-fired generation or other least-cost resources to replace the San Onofre Nuclear Generating Station in the San Diego LCA was granted in D.14-03-004 (March 13, 2014) in the CPUC's 2012 LTPP proceeding (R.12-03-014). The decision authorizes SDG&E to procure 500 – 800 MW of capacity, at least 200 MW of which must be preferred resources, including at least 25 MW of storage. This authorization is in addition to that previously granted to contract with the 300-MW Pio Pico Energy Center.

The CPUC does not require Energy Commission certification for a generation project to participate in a utility request for offers (RFOs), nor does the Energy Commission require a PPA for a project to be considered for certification. Requiring the sequencing of these processes would not only lengthen the time needed to bring projects on line and thus threaten system reliability, it would reduce the number of projects that could

compete in utility RFOs. This could lead to non-competitive solicitations, unnecessarily raising ratepayer costs.

Energy Commission certification of fossil generation without a long-term PPA does not result in the development of more fossil generation than that needed to reliably operate the system. It is not expected that developers of new capacity, such as the developer of the amended CECP facility, would bring a project to completion without a long-term PPA with a utility that would guarantee recovery of the investment of several hundred million dollars. Only one so-called "merchant plant" has been developed since the energy crisis (2000 – 2001) without a PPA, and the conditions that led to that merchant plant are specific to that one facility. This merchant plant, in turn, provides capacity and ancillary services that obviates the need for energy and capacity from other, new gas-fired generation and contributes to reduction in GHG emissions.[19] However, if the amended CECP were to be built and come on line without CPUC approval of a PPA, they would still: (a) displace energy from higher GHG-emission facilities, and (b) not "crowd out" renewable generation and demand-side programs (i.e., requirements/targets for the procurement of preferred resources would be unaffected).

ENERGY DISPLACEMENT AND CHANGES IN GHG EMISSIONS

Any assessment of the impact of a new power plant on system-wide GHG emissions must begin with the understanding that electricity generation and demand must be in balance at all times; the energy provided by any new generation resource simultaneously displaces exactly the same amount of energy from an existing resource or resources.[20] The GHG emissions produced by the amended CECP are thus not incremental additions to system-wide emissions, but are partially or totally offset by reductions in GHG emissions from those generation resources that are displaced, depending on the relative GHG emission rates.

At renewable penetration levels of less than 33 percent, new natural gas-fired generation such as the amended CECP displaces less efficient natural gas-fired generation[21] in a very straightforward fashion. It is reasonable to assume that the amended CECP units would be dispatched (called upon to generate electricity) whenever they are a cheaper source of energy than an alternative - i.e., that they will displace a more expensive resource, if not the most expensive resource that would otherwise be called upon to operate. The costs of dispatching a power plant are largely the costs of fuel, plus variable operations and maintenance (O&M) costs, with the former representing the lion's share of such costs (90 percent or more). It follows that

[19] The unwillingness of developers (and lenders) to commit capital to new facilities without a long-term contract follows from the size of the necessary investment and risk that it will prove uneconomic. While some plants built ten plus years ago that no longer have contracts are generating adequate revenue, others are not.

[20] Over time, the development of demand-side and storage technologies that can cost-effectively substitute for dispatchable generation as providers of regulation, load-following, and multi-hour ramping services may obviate the need for gas-fired generation, but this is not expected to occur soon enough to eliminate the need for gas-fired generation to replace a share of the capacity retired at San Onofre.

[21] At very low gas prices relative to coal prices, i.e., when electricity from natural gas is cheaper than that from coal, new gas-fired generation will displace coal-fired generation. In markets such as California, where GHG emissions allowance costs are a component of the market price, coal-fired generation is displaced even sooner due to its higher carbon content.

the amended CECP units would be dispatched when they burn less fuel per MWh than the resource(s) they displace, i.e., when they produce fewer GHG emissions. There are exceptions in theory, but not in practice.[22]

Holding the portfolio of generation resources constant, energy from new natural gas-fired plants displaces energy from existing natural gas-fired plants. In the longer term, the development and operation of the amended CECP would reduce the use of less efficient generation resources, and ultimately, to their retirement. By reducing revenue streams accruing to other resources (for the provision of both energy and capacity-related services, whether through markets or under a bilateral contract), the amended CECP would render these other facilities less profitable and riskier to operate. This follows from the fixed demand for energy and ancillary services; the developers of the amended CECP cannot stimulate demand for energy and other products they provide, but merely provide a share of the energy that is needed to meet demand and the capacity needed to reliably operate the system. In doing so, the amended CECP both discourages the use of, and allows for the retirement of less-efficient generation.

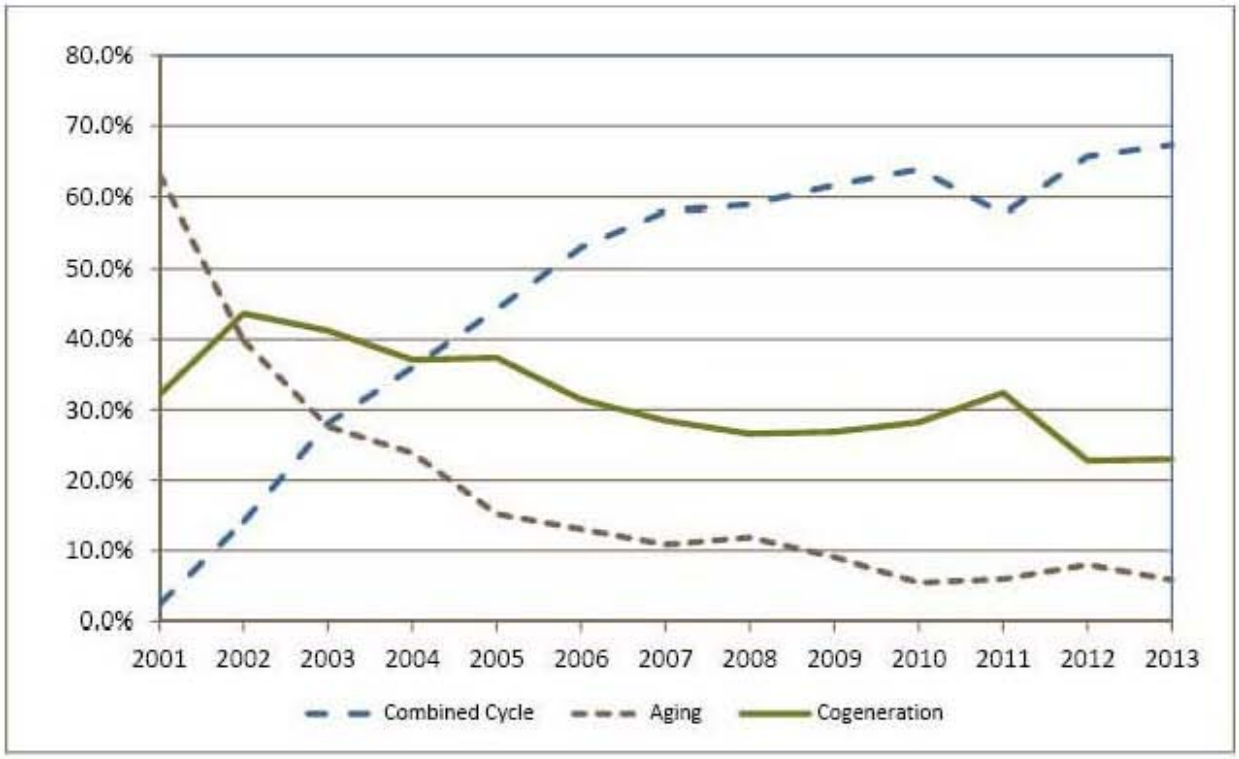
The long-run impact of the natural gas-fired fleet turnover as described here can be seen from historical changes in resources that are providing electricity in California as presented below in **Greenhouse Gas Figure 1** (data includes combined cycles and boilers only). In 2001, approximately 74,000 GWh (62.5 percent of natural gas-fired generation) in California was from pre-1980 natural gas-fired steam turbines, combusting an average of 11,268 Btu per kWh (not shown in the figure). By 2010, this share had fallen to approximately 6,000 GWh (5.4 percent); 64.1 percent of natural gas-fired generation was from new combined cycles with an average heat rate of 7,201 Btu per kWh (CEC 2011, also not shown in the figure).[23] The net change over this period was a 22 percent reduction in GHG emissions (also not shown in the figure), despite a 3.5 percent increase in generation. The post-2000 development of new combined-cycle generation has allowed for the retirement of aging natural gas-fired steam turbines along the California Coast and in the San Francisco Bay Delta. Those that remain in operation have seen a dramatic reduction in their capacity factors[24] and are used primarily as a source of dispatchable capacity.

[22] If a plant's variable O&M costs are so low as to offset the costs associated with its greater fuel combustion, a less efficient (higher GHG emission) plant may be dispatched first. There is no indication that the amended CECP's' variable O&M costs are unusually low and that they would be dispatched before a more efficient facility. If a natural gas-fired plant's per-mmBtu fuel costs are very low, it may be less efficient (higher GHG emitting) but still be dispatched first. Natural gas costs in California, however, are higher than elsewhere in the WECC and thus this scenario is unlikely to occur.

[23] The remaining 30 percent of natural gas-fired generation is largely cogeneration; slightly more than one percent is from peaking units. For a detailed discussion of the evolution of natural gas-fired generation in California since 2000, see *Thermal Efficiency of Gas-Fired Generation in California: 2012 Update* (CEC-200-2013-002; May 2013)

[24] A unit's capacity factor is its output expressed as a share of potential output, the amount it would generate if it were operated continuously at 100 percent of their maximum capacity for every hour of the year.

Greenhouse Gas Figure 1
Annual California Output (GWh), Selected Natural Gas-Fired Generation Technologies, 2001 – 2013



Source: QFER CEC-1304 Power Plant Data Reporting.

Source: Thermal Efficiency of Gas-Fired Generation in California: 2014 Update, CEC-200-2014-005, September 2014 (CEC 2014b).

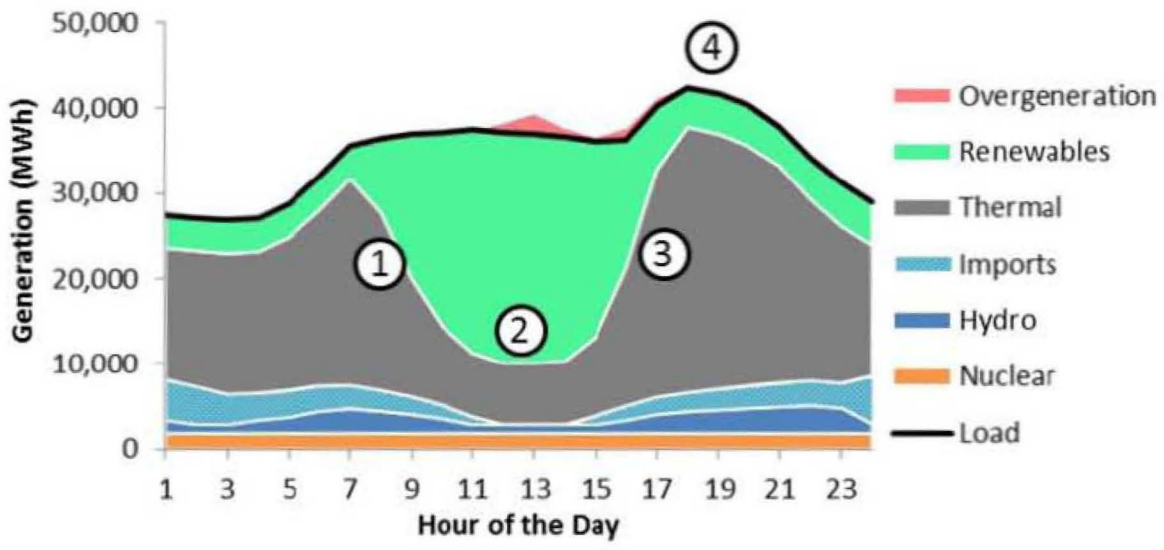
The dispatch of the amended CECP would generally not result in the displacement of energy from renewable resources or large hydroelectric generation. Most renewable resources have must-take contracts with utilities, which must purchase all the energy produced by these renewable generators. Rare exceptions occur due to transmission congestion or seasonal surpluses. Even in those instances where this is not the case (e.g., where renewable generation is participating in a spot market for energy), the variable costs associated with renewable generation are far lower than those associated with the amended CECP (e.g., fuel costs for wind, solar, other renewable generation technologies, and large hydroelectric facilities are zero or minimal); these resources can bid into spot markets for energy at prices far below the amended CECP and other natural gas-fired generators. The amended CECP would not displace energy from operating (zero-GHG emission) nuclear generation facilities, as these resources have far lower variable operating costs as well.

The relationship between a natural gas-fired plant's heat rate and its dispatch in the real world is in fact more complicated than that described above. While natural gas-fired plants differ in their thermal efficiency – the amount of fuel combusted, and thus GHG emissions per unit of electricity generated – very efficient natural gas plants are not necessarily dispatched before less efficient ones. While this would seem to contradict the assertion that output from a new plant will always displace a higher emitting one, a less efficient (e.g., at full output) plant may actually combust less fuel during a duty

cycle than a plant with a lower heat rate, and thus produce fewer GHG emissions. Consider a 30-MW peaking plant with a heat rate of 10,000 Btu/kWh when operated at full output that can be turned on quickly, generating approximately 15 to 30 MW in a matter of minutes. Use of this plant to meet contingency needs (e.g., demand on a hot afternoon) may result in less incremental fuel combustion than a 100-MW plant with a lower heat rate at full output if the latter requires several hours and combusts large amounts of fuel to start up, must be kept on overnight or for several hours in order to be available later the same day or the next day, and/or cannot operate at 30 MW without a marked degradation in thermal efficiency (and thus increases in GHG emissions).

At levels of renewable energy penetration in excess of 33 percent, relatively efficient fast-start, fast-ramping resources such as the amended CECP units, further contribute to GHG emission reductions by increasing the amount of renewable energy that can be integrated into the electricity system. This can be seen in **Greenhouse Gas Figure 2,** which depicts the estimated operating profile of the generating resources of the high-solar electricity system that California will increasingly have over the next three to 15 years and beyond. While the state's Renewable Portfolio Standard is 33 percent of retail sales for 2020, the value for 2030 may be much higher. Much of the additional renewable energy will come from solar resources even if there is limited development of utility-scale solar generation, as the residential and commercial sectors take advantage of falling distributed solar costs and new residential construction post-2020 is required to be zero-net energy, (i.e., include solar panels).

Greenhouse Gas Figure 2
California Generation Typical for a Non-Summer Day ("Duck" Chart)



Source: CA ISO 2014

The large "belly" (Number 2 in the figure) represents solar generation on a typical non-summer day; this gets larger over time as more solar is added to the system. The gray area represents necessary thermal generation, which is increasingly natural gas over time as California portfolios are divested of coal pursuant to the state's Emission Performance Standard. Note that imports are reduced to zero at midday, and hydro

generation is limited to run-of-river (from hydro-generation facilities that do not have water storage, and from water that must be allowed to flow due to recreational needs, flood control, habitat preservation, etc.). A large share of midday generation must also be flexible, dispatchable natural gas as: (a) a threshold amount of thermal capacity needs to be idling (or at least readily available, not unlike a hybrid car) at mid-day at minimum output to protect against sudden component failures (major power plants and transmission lines); and, (b) a large amount of gas-fired generation will be needed four to eight hours later when solar energy is unavailable, and thus must be on line and generating at minimum output at mid-day.

Greenhouse Gas Figure 2 illustrates a case of over-generation; in which renewable output at mid-day and necessary gas-fired generation jointly result in too much energy being produced. There are several ways to deal with overgeneration. In theory, the surplus energy can be exported to neighboring states. But much of the over-generation expected in California will occur during the low-demand months of February to April, when similar surpluses exist in the Pacific Northwest due to the snow melt and the resulting increase in hydroelectric generation in the Columbia River basin. Under these conditions, export potential is likely to be limited and export prices would be near zero.

The long-term solution for overgeneration is expected to be the development of cost-effective, multi-hour storage, allowing the surplus to be stored until it can be used in evening hours. In the interim, however, overgeneration can only be dealt with by curtailing renewable generation or reducing the amount of gas-fired generation that is needed during midday and early afternoon hours. The latter is facilitated by developing gas-fired resources such as LMS100s that can cycle on and off at least twice a day.[25]

While the amended CECP is less thermally efficient than most of the natural gas-fired combined cycles built in California during the past decade, the amended CECP units would be capable of operating at lower levels of output, and doing so without a marked decrease in efficiency. Moreover, they could be off line until moments before being needed in the late afternoon and early evening, as they are able to reach full load within ten minutes of startup (compared to 45 minutes for the licensed CECP facility). As a result, they could allow for more renewable generation than a conventional combined cycle, with the concomitant reduction in GHG emissions serving to offset the impact of their lower efficiency. Finally, the LMS100s could make a greater contribution to meeting the steep evening ramp (Number 3 in the figure) than the combined cycle as they could change output more rapidly (50 MW/minute per unit), compared to the 150 MW/10 minute ramp rate noted for the licensed CECP (LL 2014dd, CEC 2009b).

THE ROLE OF THE AMENDED CECP IN LOCAL GENERATION DISPLACEMENT

As new generation capacity in the CA ISO-defined San Diego – Imperial Valley LCA, the amended CECP would provide local reliability services. The CA ISO has determined in their *2014 Local Capacity Technical Analysis* that the San Diego – Imperial Valley and its San Diego sub-area need 3,910 MW and 3,103 MW of local capacity,

[25] For a detailed discussion of the operational needs for a high-solar portfolio, see Energy and Environmental Economics, *Investigating a Higher Renewables Standard in California*, January 2014, available at http://www.ethree.com/public_projects/renewables_portfolio_standard.php.

respectively.[26] The amended CECP facility would contribute up to 632 MW of local capacity to these areas.

As stated above, local reliability requires generation by resources located within an LCA; the LCR reflects the amount of capacity that must be generating, synchronous to the grid or available within a few minutes under 1-in-10 load conditions.[27] At lower levels of demand, a share of local capacity must be generating, synchronous to the grid or available on a moment's notice as long as reliability cannot be maintained solely with imported energy in the event of major component failures.

The number of hours per year that the amended CECP units would be required to operate in support of local reliability needs and the amount of energy that would be generated as a result are not known; CA ISO operating procedures that result in the dispatch of specific generating units for local reliability purposes are confidential. When called upon to generate for such purposes, however, it is reasonable to expect that the amended CECP units would be the least-cost and thus lowest-emitting natural gas-fired resources able to do so, given the duty cycle that was necessary to provide local reliability. It would thus displace less-efficient resources, reducing GHG emissions resulting from relying on the latter. Should it be dispatched for local reliability needs ahead of units that were thermally more efficient, it would likely be because, able to operate at lower levels of output, it would allow for the integration of a greater amount of renewable energy.

Greenhouse Gas Table 4 illustrates the thermal efficiency of existing peakers in the San Diego LCA and provides the expected thermal efficiency for the amended CECP for comparison.

While the net heat rate for the amended CECP gas turbines will to a small degree depend on their operating profile[28], they have an expected heat rate that is clearly lower than all of the existing peaking resources in the LCA. The proposed Pio Pico Power Plant, which also proposes the use of newer model LMS100 gas turbines, would have a nearly identical expected heat rate as the amended CECP.

COMPLIANCE WITH LORS – WILLIAM WALTERS

Federal

The amended CECP would not be subject to PSD permitting requirements of 40 CFR Parts 51 and 52 (please see the Air Quality Section's Compliance with LORS subsection), including not being subject to a GHG emissions BACT analysis. The amended CECP would also not be subject to the proposed federal power plant GHG emissions NSPS (40 CFR Part 60, Subpart TTTT) due to having a permitted capacity

[26] California ISO, *2015 Local Capacity Technical Analysis: Final Report and Study Results*, April 30, 2014, pp 93 - 101.
[27] 1-in-10 load conditions refer to a level of demand that is expected to be observed on only one day in ten years
[28] The approximate 5 percent difference in full load versus the expected operating profile net heat rates, shown in **Greenhouse Gas Table 3**, are likely the effect of startups and shutdown, variations in ambient temperatures, and off design point operations on optimum full load heat rate.

factor limitation that is below 33 percent. The amended CECP project would have to comply with the federal mandatory GHG reporting regulation (40 CFR Part 98).

Greenhouse Gas Table 4
Heat Rates, Capacity Factors, and GHG Emissions Performance for San Diego Peakers, 2013

Plant Name	Capacity (MW)	Output (MWh)	Heat Rate [a] (Btu/kWh)	Capacity Factor	GHG Performance [b] ($MTCO_2$/MWh)
Miramar Energy Facility	95	143,932	9,669	17.3%	0.511
Larkspur Energy	90	87,575	10,127	11.1%	0.536
El Cajon Energy Center	49	13,154	10,276	3.1%	0.544
Orange Grove	100	38,978	10,474	4.4%	0.554
CalPeak Enterprise	49	12,503	10,873	2.9%	0.575
Cuyamaca Peak Energy Plant	49	40,203	11,178	9.4%	0.591
CalPeak Border	50	8,600	11,250	2.0%	0.595
Kearny 1	15	2,608	14,400	2.0%	0.762
Kearny 2	57	7,891	15,866	1.6%	0.839
Kearny 3	55	5,625	15,953	1.2%	0.844
Encina Gas Turbine	14	2,245	17,123	1.8%	0.906
Miramar 1A 1B	33	2,561	17,390	0.9%	0.920
Chula Vista	44	511	17,821	0.1%	0.943
El Cajon Gas Turbine	13	694	19,333	0.6%	1.023
Total	**713**	**367,080**	**10,520**	**5.9%**	**0.557**
Amended CECP Estimates	632		9,473		0.503

Source: Energy Commission QFER Database (CEC 2014a); LL 2014nn
Notes:
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. GHG performance conversion factor for natural gas of 0.529 $MTCO_2$/MW/10,000 Btu/KWh was used to derive these performance values.

State

The amended CECP would be required to participate in California's GHG cap-and-trade program, which became active in January 2012, with enforcement beginning in January 2013. This cap-and-trade program is part of a broad effort by the state of California to reduce GHG emissions as required by AB 32, which is being implemented by ARB. As currently implemented, market participants such as the amended CECP are required to report their GHG emissions and to obtain GHG emissions allowances (and offsets) for those reported emissions by purchasing allowances from the capped market and offsets from outside the AB 32 program. The amended CECP, as a GHG cap-and-trade participant, would be consistent with California's landmark AB 32 Program, which is a statewide program coordinated with a region wide Western Climate Initiative program to reduce California's GHG emissions to 1990 levels by 2020. ARB staff continues to develop and implement regulations to refine key elements of the GHG reduction measures to improve their linkage with other GHG reduction programs. The project may have to provide additional reports and GHG reductions, depending on the future regulations expected from ARB.

Reporting of GHG emissions would enable the project to demonstrate consistency with the policies described above and the regulations that ARB adopts and to provide the information to demonstrate compliance with any future AB 32 requirements that could be enacted in the next few years.

The amended CECP, due to having a permitted capacity factor of below 60 percent, is not subject to the California's Emission Performance Standard of 1,100 lbs of carbon dioxide per net MWh.

Local

The SDAPCD does not currently have any approved GHG emissions regulations that would apply to the project. The city of Carlsbad has published a Draft Climate Action Plan, but has not yet approved any of the GHG emissions reduction measures as city ordinances. Therefore, currently there are no applicable local LORS for GHG emissions/climate change.

AVENAL PRECEDENT DECISION

The Energy Commission established a precedent decision in the Final Commission Decision for the Avenal Energy Project, finding as a conclusion of law that any new natural gas-fired power plant certified by the Energy Commission "must:

- not increase the overall system heat rate for natural gas plants;
- not interfere with generation from existing renewables or with the integration of new renewable generation; and
- take into account the two preceding factors, reduce system-wide GHG emissions"[29]

The Energy Commission in the recent Final Decision for the Huntington Beach Energy Project[30] noted that the Avenal decision has been augmented by two recent developments. The first is the adoption of CEQA guidelines for the analysis of GHG emissions impacts (CEQA Guidelines, tit. 14, §15064.4). The second development is the enactment of the AB 32 Cap-and-Trade system that implements the state's approach to reducing GHG emissions from the electricity sector. Staff is continuing to analyze this project against that precedent, while also taking into consideration the CEQA guidelines.

The average heat rate for the Western Electricity Coordinating Council (WECC) is presented in **Greenhouse Gas Table 5**, as is the California specific data. These values are an average across all natural gas-fired units that operated in that year. It is interesting to note that the average heat rates in-state versus the average of those across the greater WECC are not that different, and the slight uptick in the average heat rate was seen at the WECC level as well as the California level. This is due to the large contribution of California generation to total WECC generation, and generally similar energy resources and technology types throughout the WECC.

[29] Final Commission Decision, Avenal Energy Application for Certification (08-AFC-1) December 2009, p. 114.
[30] Final Commission Decision, Huntington Beach Energy Project (12-AFC-02) November 2014, pp. 4.1-6,7.

Greenhouse Gas Table 5
Weighted Average Heat Rate for Operating Natural Gas-Fired Plants[1] in the WECC and California 2010-2013

Year	Average WECC Heat Rate [2] (MMBtu/kWh)	Average CA Heat Rate [3] (MMBtu/kWh)
2010	7,784	7,628
2011	7,995	7,879
2012	7,918	7,808
2013	Not available	7,664

[1] Excludes cogeneration facilities
[2] Ventyx, Velocity Suite (compiled from EPA hourly Continuous Emission Monitoring Survey data)
[3] Thermal Efficiency of Gas-Fired Generation in California: 2014 Update, CEC-200-2014-005, September 2014 (CEC 2014b)

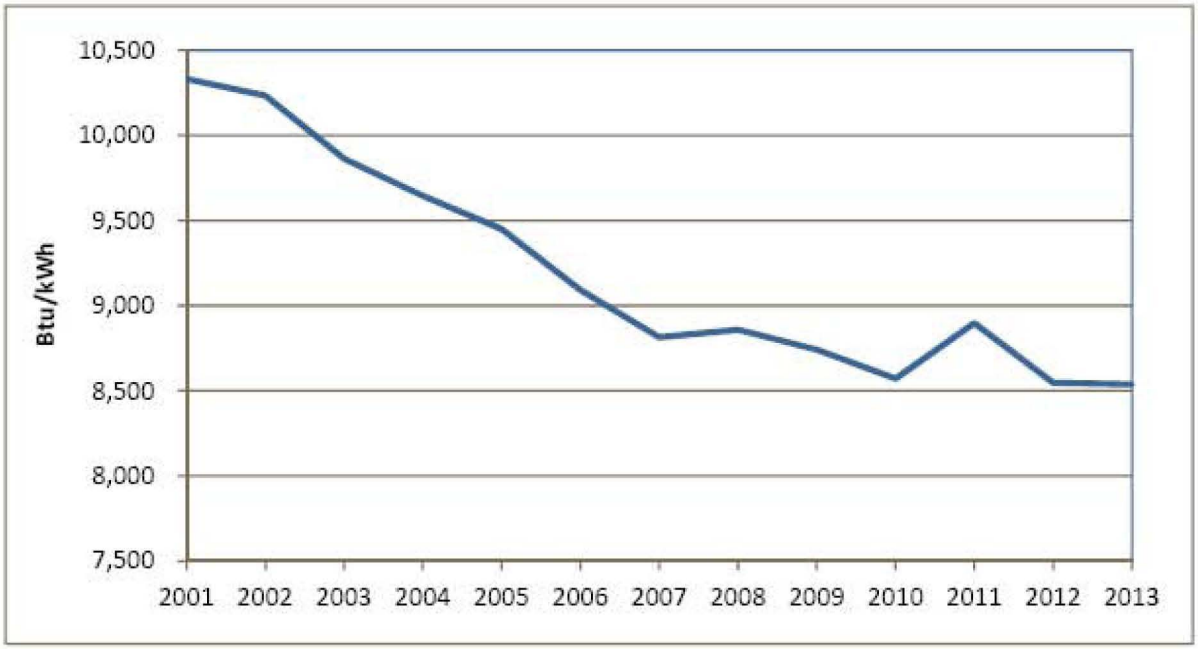
Overall, the average heat rate for natural gas units has been declining for years, as shown in **Greenhouse Gas Figure 3**. The improvement is likely the result of the deployment of modern combustion turbine units, as shown in **Greenhouse Gas Figure 2**. The relationship is exemplified by the slight drop in combined-cycle generation in 2011, shown on Figure 2, and uptick average heat rate on Figure 3. Note also in **Greenhouse Gas Figure 3** that by 2013 combined-cycle output is almost 70 percent of the natural gas output. In other words, the average heat rates in **Greenhouse Gas Table 5** are dominated by the deployment of modern combined cycles in California and the WECC.

While simple-cycle peaking facilities have higher direct heat rates than combined-cycle facilities and the system average heat rates shown in **Greenhouse Gas Table 5**, peaking facilities must be evaluated on their function, and ultimately, their overall effect on the system. In this case, the amended CECP is proposed to operate no more than a 31 percent annual capacity factor. Historically, most peakers have operated at about three to five percent capacity factor, while the listing of local San Diego peaking units in **Greenhouse Gas Table 4** shows an average capacity factor of almost six percent. If the amended CECP displaced the local peaking units in both function and capacity, the amended CECP would operate about six percent, but with a much better heat rate than the displaced peaking units. The amended CECP will also help facilitate the decommissioning of EPS, and it would operate with a much better heat rate than the EPS boilers and gas turbine. With the likely addition of the approved 300 MW Pio Pico (also LMS100 peaking units) in south San Diego county, the amended CECP may operate even less.

However, as California moves to a high renewable/low-GHG system, efficient resources like the amended CECP may operate more than a traditional, less flexible peaker unit. As noted above, the addition of the amended CECP would not interfere with generation from existing renewable facilities or with the integration of new renewable generation. The flexible nature of the amended CECP would in fact serve to facilitate the integration of additional variable renewable resources.

The amended CECP would reduce system-wide GHG emissions as discussed above; this development is consistent with the goals and policies of AB 32 and thus is consistent with the Avenal precedent decision.

Greenhouse Gas Figure 3
Average Heat Rates for Gas Fired Electric Generation Serving California



Source: QFER CEC-1304 Power Plant Data Reporting.

Source: Thermal Efficiency of Gas-Fired Generation in California: 2014 Update, CEC-200-2014-005, September 2014 (CEC 2014b).

CONCLUSIONS

The project would lead to a net reduction in GHG emissions across the electricity system that provides energy and capacity to California. Thus, staff believes that the project would result in a cumulative overall reduction in GHG emissions from the state's power plants, would not worsen current conditions, and would thus not result in impacts that are cumulatively significant. In addition, it would provide flexible, dispatchable, and fast-ramping power in relatively small increments of capacity, which is expected to be necessary to integrate variable-energy renewable generation on the scale projected in the California Public Utilities Commission (CPUC) and CA ISO long-term planning processes.

Staff notes that mandatory reporting of GHG emissions per Federal Government and Air Resources Board greenhouse gas regulations would occur, and these reports would enable these agencies to gather the information needed to regulate the amended CECP project in trading markets, such as those required by regulations implementing the California Global Warming Solutions Act of 2006 (AB 32).

Staff does not believe that the GHG emission increases from construction activities would be significant for several reasons. First, construction emissions would be temporary and intermittent, and not continue during the life of the project. Additionally, the control measures or best practices that staff recommends such as limiting idling times and requiring, as appropriate, equipment that meets the latest emissions standards, would further minimize greenhouse gas emissions. Staff believes that 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 California Air Resources Board (ARB) regulations to reduce GHG from construction vehicles and equipment. For all these reasons, staff concludes that the emission of greenhouse gases during construction would be sufficiently reduced and would, therefore, not be significant.

The amended CECP is proposed as a simple-cycle peaker power plant, and is proposing to use the most efficient simple-cycle gas turbine known to be in operation. The amended CECP would have an expected annual capacity factor well below 60 percent; therefore the amended CECP is not subject to the Greenhouse Gases Emission Performance Standard (Title 20, California Code of Regulations, section 2900 et seq.). Finally, the amended CECP would have an enforced capacity factor limit below the Federal NSPS Subpart TTTT regulatory trigger of 33 percent, so it is not subject to this regulation including the CO_2 emissions limit of this regulation.

Staff has reached the following conclusions about the amended CECP based on CEQA guidelines:

- The amended CECP would have less than significant GHG emissions impacts because:
    - The amended CECP is proposed as a high-efficiency, simple-cycle power plant that would be more efficient and have lower GHG emissions than other simple-cycle power plants currently operating in the San Diego Region;
    - The amended CECP would facilitate the integration of renewable energy resources that would lower the statewide GHG emissions from the electricity sector; and
    - The amended CECP, as shown in **Greenhouse Gas Table 3,** is more efficient than, and would have lower GHG emissions than, the Encina Power Station whose retirement it would help facilitate. The amended CECP has an estimated GHG emissions performance of 0.5033 MTCO2E/MWh versus the actual calculated annual GHG emissions performance for EPS from 2008 to 2013 that has ranged from 0.656 to 0.724 MTCO2E/MWh.

- The amended CECP would have less than significant impacts by complying with applicable regulations and plans related to the reduction of GHG emissions as follows:
    - The amended CECP would be subject to compliance with the AB 32 Cap and Trade regulation that implements the state's regulatory plan for reducing GHG emissions from the electricity sector; and
    - The amended CECP would recycle construction and demolition wastes to reduce GHG emissions from construction and demolition activities (as required by **WASTE-5**) to comply with state policy and local Climate Action Plans.

Additionally, staff has also determined that the amended CECP would be consistent with all three main conditions in the precedent decision regarding GHG emissions established by the Avenal Energy Project's Final Energy Commission Decision (not increase the overall system heat rate for natural gas plants, not interfere with generation from existing or new renewable facilities, and ensure a reduction of system-wide GHG emissions). The amended CECP is not a base-load gas-fired power plant, it is a peaker project; consistent with the Avenal decision, it will displace a higher heat rate peaker, thereby reducing the overall system heat rate. The system-wide heat rate analysis of this peaker power plant factors in the role and purpose of a peaker power plant; including the small effect on the system-wide heat rate average it would have given its expected low operating capacity factor, and the system-wide reduction in GHG emissions and fossil fueled power plant use it would help to achieve given its role in integrating non-dispatchable renewable energy resources.

PROPOSED CONDITIONS OF CERTIFICATION

No Conditions of Certification related to the greenhouse gas emissions from facility operation or construction are proposed. However, the formulation of state and local GHG emissions reduction policies and goals are fairly recent and occurred after the original licensed CECP approval, so staff reviewed the currently known construction emissions related policies and goals that could be appropriate to this project and that also may provide a substantial reduction in GHG emissions. Staff's review determined that to conform to policies and goals related to recycling and waste reduction, it is reasonable to require that the construction and demolition wastes be recycled to the extent feasible. The requirement to appropriately recycle construction and demolition wastes is included in the Waste Management Section (Condition of Certification **WASTE-5**), so no additional conditions related to construction GHG emissions reductions are proposed.

During facility operation, the facility owner would participate in California's GHG cap-and-trade program. The facility owner is required to report GHG emissions and to obtain GHG emissions allowances (and offsets) for those reported emissions by purchasing allowances from the capped market and offsets from outside the AB 32 program. Similarly, the proposed facility modifications would be subject to federal mandatory reporting of GHG emissions. The facility owner may have to provide additional reports and GHG reductions, depending on the future regulations formulated by the U.S. EPA or the ARB.

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ACRONYMS

AB	Assembly Bill
AGC	Automated Generation Control
ARB	Air Resource Board
CAA	Clean Air Act
CAISO	California Independent System Operator
CCCC	California Climate Change Center
CECP	Carlsbad Energy Center Project
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CH_4	Methane
CO_2	Carbon Dioxide
CO2E	Carbon Dioxide Equivalent
CPUC	California Public Utilities Commission
EIR	Environmental Impact Report
EJAC	Environmental Justice Advisory Committee
EPA	Environmental Protection Agency
EPS	Emission Performance Standard
GCC	Global Climate Change
GHG	Greenhouse Gas
GWP	Global Warming Potential
HFC	Hydrofluorocarbons
HSC	Health and Safety Code
IEPR	Integrated Energy Policy Report
IOU	investor-owned utility
IPCC	Intergovernmental Panel on Climate Change
LCA	Local Capacity Area
LTPP	Long-term Procurement Planning
MT	Metric Tonnes
MTCO2E	Metric Tons of CO2-Equivalent
MW	Megawatt
NERC	American Electric Reliability Council
N_2O	Nitrous Oxide
NO	Nitric Oxide
OTC	Once-Through Cooling
PFC	Perflurocarbons

PSD	Prevention of Significant Deterioration
PTA	Petition to Amend
PTR	Petition to Remove
RPS	Renewable Portfolio Standard
SB	Senate Bill
SDAPCD	San Diego Air Pollution Control District
SF_6	Sulfur Hexafluoride
SONGS	San Onofre Nuclear Generating Station
SWRCB	State Water Resource Control Board
WECC	Western Electricity Coordinating Council
U.S. EPA	United States Environmental Protection Agency

ALTERNATIVES

Steven Kerr and Jeanine Hinde

SUMMARY OF CONCLUSIONS

This section evaluates alternatives to the amended Carlsbad Energy Center Project (amended CECP) proposed by Carlsbad Energy Center, LLC (petitioner/project owner). California Energy Commission (Energy Commission) staff has not identified a potentially feasible alternative that would be environmentally superior to the amended CECP, including the "no project" alternative. The range of alternatives considered by staff in addition to the "no project" alternative includes alternative sites and alternative technologies. A discussion of preferred resources as project alternatives, including conservation and demand-side management and distributed generation, is also provided. Each of these alternatives have been eliminated from detailed consideration due to a failure to meet most of the basic project objectives, probable infeasibility, inability to avoid significant environmental impacts, or any combination thereof.

CEQA REQUIREMENTS

As lead agency for the amended CECP, the Energy Commission is required to consider and discuss alternatives to the proposed project. The guiding principles for the selection of alternatives for analysis are provided by the California Environmental Quality Act Guidelines (CEQA Guidelines) (Cal. Code Regs., tit. 14, §15000 et seq.). According to section 15126.6 of the CEQA Guidelines, the alternatives analysis must:

- Describe 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.
- Consider alternatives that would avoid or substantially lessen any significant environmental impacts of the proposed project, including alternatives that would be more costly or would otherwise impede the project's objectives.
- Evaluate the comparative merits of the alternatives.

The lead agency is responsible for selecting a range of project alternatives for examination and must publicly disclose its reasoning for selecting those alternatives (Cal. Code Regs., tit. 14, §15126.6, subd. (a)). CEQA does not require an Environmental Impact Report (EIR) to "consider every conceivable alternative to a project." Rather, CEQA requires consideration of a "reasonable range of potentially feasible alternatives." The reasonable range of alternatives must be selected and discussed in a manner that fosters meaningful public participation and informed decision making (Cal. Code Regs., tit. 14, §15126.6, subd. (f)). That is, the range of alternatives presented in this analysis is limited to ones that will inform a reasoned choice by the Energy Commission. Under the "rule of reason," an agency need not consider an alternative whose effect cannot be reasonably ascertained and whose implementation is remote and speculative (Cal. Code Regs., tit. 14, §15126.6, subd. (f)(3)).

The CEQA lead agency is also required to:

(1) Evaluate a “no project” alternative.

(2) Identify alternatives that were initially considered but then rejected from further evaluation.

(3) Identify an environmentally superior alternative among the other alternatives if the environmentally superior alternative is the “no project” alternative (Cal. Code Regs., tit. 14, §15126.6).

Alternatives may be eliminated from detailed consideration by the lead agency if they fail to meet most of the basic project objectives, are infeasible, or could not avoid any significant environmental effects (Cal. Code Regs., tit. 14, §15126.6, subd.(c)).

ENERGY COMMISSION STAFF’S ALTERNATIVES SCREENING PROCESS

The CEQA Guidelines describe selection of a reasonable range of alternatives and the requirement to include those that could feasibly accomplish most of the basic project objectives while avoiding or substantially lessening one or more of the significant effects (Cal. Code Regs., tit. 14, §15126.6, subd. (c)). The CEQA Guidelines address the requirement for the alternatives analysis to briefly describe the rationale for selecting alternatives to be discussed. The analysis should identify any alternatives that were considered by the lead agency but were rejected as infeasible and briefly explain the reasons underlying the lead agency’s determination.

The CEQA Guidelines list factors that may be considered when addressing feasibility of alternatives: site suitability; economic viability; availability of infrastructure; general plan consistency; other plans or regulatory limitations; jurisdictional boundaries; and whether the proponent can reasonably acquire, control or otherwise have access to the alternative site (or the site is already owned by the proponent). No one of these factors establishes a fixed limit on the scope of reasonable alternatives (Cal. Code Regs., tit. 14, §15126.6, subd. (f)(1)).

Pursuant to CEQA, the purpose of staff’s alternatives analysis is to identify the potential significant impacts of the amended CECP and to focus on alternatives that are capable of avoiding or substantially reducing those impacts while still meeting most of the basic project objectives.

To prepare the analysis of alternatives, staff used the methodology summarized below:

- Describe the objectives of the project and compare those against potentially feasible alternatives to the project.
- Identify any potentially significant environmental impacts of the project.
- Identify and evaluate alternatives to the project that may reduce or avoid environmental impacts.

- Evaluate a “no project” alternative to compare the impacts of approving the project to the impacts of not approving the project.

PROJECT OBJECTIVES

Based upon a review of the project objectives included in the Final Decision for the licensed CECP (CEC 2012a, pg. 3-2) and the May 2, 2014 Petition to Amend (PTA) (LL 2014, pg. 1-6), staff developed the following objectives to guide the amended CECP alternatives analysis. These objectives are consistent with the petitioner’s proposal but are not so narrow as to limit consideration of potentially feasible alternatives to construction of the amended CECP as proposed. The project objectives for the proposed amended CECP are as follows:

- Meet the expanding need for new, highly efficient, reliable electrical generating resources that are dispatchable by the California Independent System Operator (CAISO), and are located in the “load pocket” of the San Diego region.
- Improve San Diego regional electrical system reliability through fast-starting generating technology, creating a rapid responding resource for peak demand situations, and providing CAISO a dependable resource to backup intermittent renewable resources like wind generation and solar.
- 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 energy and environmental agencies in California, including the California Public Utilities Commission (CPUC), State Water Resources Control Board, Energy Commission, CAISO, and utilities.
- Use existing infrastructure to accommodate replacement generation and reduce environmental impacts and costs and avoid greenfield development.
- Meet the commercial qualifications for long-term power contract opportunities in southern California.
- Modify the licensed CECP to include the retirement of all five Encina Power Station (EPS) units allowing for faster and more complete response to both the pending OTC reductions, and better grid support from the June 7, 2013 shutdown of San Onofre Nuclear Generating Station.
- Redevelop brownfield sites in proximity to existing infrastructure.
- Meet the demand for fast response, highly efficient peaking capacity to provide grid stability to accommodate increased renewable energy generation by adding dispatch capabilities to accommodate planned and unplanned grid outages in response to excessive demands and natural disasters.
- Make the project consistent with most laws, ordinances, regulations, and standards (LORS).
- Modify design aspects of the project to reduce potential environmental impacts and to integrate community-desired development on and adjacent to the site.

PREFERRED RESOURCES AS PROJECT ALTERNATIVES

California is rapidly and fundamentally changing its electricity supply system. These changes are driven in large part by the state's programs addressing global climate change and the policy imperative of reducing greenhouse gas (GHG) emissions. Applicable policies include a *loading order* for electric generation that prefers and maximizes energy efficiency, demand side management, and renewable generation to supplant the need for new fossil fuel generation. Consistent with state law, CPUC has held that all utility procurement must be consistent with the established loading order (i.e., the prioritization of energy resources) (Pub. Utilities Code, § 454.5(b)(9)(C)).

At the same time, other environmental factors and state policies dramatically affect the current approach to generating electricity. The state's program to phase out once-through cooling of power plants is forcing the rapid replacement or retirement of a substantial amount of dispatchable generation in coastal areas. In addition, concerns about nuclear safety led to the recent permanent closure of a large nuclear baseload facility that was a critical source of Southern California electricity generation.

All of these factors are considered by the state's energy agencies when determining the need for new electricity generation. The Energy Commission considers them as part of its electricity demand/supply forecast. CAISO considers them as part of its efforts to maintain electric system reliability. In tandem with CAISO concerns, CPUC considers them in determining how much additional fossil-fired generation is required, and should be contracted for by the utilities, to maintain system reliability during this rapid shift away from a system based on fossil fuel-fired generation.

As described below, the state's programs implementing the loading order underlie the energy agencies' assumptions for determining the need for future gas-fired generation to support the shift to a reduced carbon emissions system. State programs to minimize reliance on combustion resources are known to be aggressively pursued through robust implementing efforts. The state's gas-fired generation is needed to maintain electric system reliability and complement the many preferred resources programs, including energy efficiency, demand side management, and rooftop solar. These coordinated programs are necessary to achieve compliance with the state's Renewables Portfolio Standard (RPS) program goals, but they are not considered feasible alternatives to critically located gas-fired generation.

RELIABLE OPERATION OF THE ELECTRICITY SYSTEM

In May 2010, the State Water Resources Control Board (State Water Board) adopted a statewide *Water Quality Control Policy on the Use of Coastal and Estuarine Waters for Power Plant Cooling* (OTC Policy). The OTC Policy requires existing power plant operators to implement measures to reduce impingement mortality and entrainment of marine life. In response to the OTC Policy, and before the permanent retirement of the San Onofre Nuclear Generating Station, CPUC began a decision-making process to identify what share of the capacity ought to be replaced with conventional gas-fired generation versus certain preferred resources (e.g., energy efficiency, demand response, and renewable generation).

The June 2013 closure of the San Onofre Nuclear Generating Station added to the state's concerns about maintaining reliability of the electricity system in Southern California. With the closure of San Onofre, concerns about electricity reliability in Southern California became operational issues rather than planning exercises (Energy Commission 2014a).

CPUC resource decisions and CAISO studies continue to respond to the permanent retirement of San Onofre and replacement or retirement of OTC units. In March 2014, as part of CPUC's 2012 Long-term Procurement Plan (LTPP) proceeding, CPUC approved D.14-03-004 authorizing investor-owned utilities (IOUs) to procure generating capacity from a combination of preferred resources and gas-fired resources to meet local capacity needs stemming from the retirement of San Onofre. The CPUC decision requires Southern California Edison (SCE) to procure up to 60 percent of new local capacity in the Los Angeles Basin from preferred resources. SDG&E is required to procure at least 25 percent, and up to 100 percent, of new local capacity from preferred resources. SCE and SDG&E are required to procure at least 50 megawatts (MWs) and 25 MWs, respectively, from energy storage. The conclusions for D.14-03-004 state the prudence of providing procurement flexibility to the IOUs to ensure consistency with CAISO's reliability standards; the range of procurement should include gas-fired resources, preferred resources, and energy storage. The CPUC decision also concludes that reliability entails a gradual increase in the level of preferred resources and energy storage in the resource mix.

The Energy Commission's 2013 *Integrated Energy Policy Report* (IEPR) discusses the coordinated effort between the state's energy agencies in evaluating reliability needs in Southern California (Energy Commission 2014b). A balanced portfolio of options will support integration of increasing levels of renewables. The 2013 IEPR summarizes the role of preferred policy resources and states that preferred resource additions cannot reduce the need for repowering to satisfy local capacity requirements on a one-for-one basis (Energy Commission 2014b).

CPUC is overseeing SCE's and SDG&E's development of power purchase agreements (PPAs) aimed at constructing new generation in desired locations. The Energy Commission is evaluating applications for proposed natural gas-fired electrical generating facilities in coastal Southern California. CAISO is studying, and in some cases authorizing, transmission system upgrades to address the voltage instability concerns created by the San Onofre retirement.

CONSERVATION AND DEMAND-SIDE MANAGEMENT

The state's loading order established by the energy agencies in 2003 calls for meeting new electricity needs first with efficiency and demand response, followed by renewable energy and distributed generation, and only then with clean fossil generation. Section 454.5(b)(9)(C) of the California Public Utilities Code addresses requirements for an electrical corporation's proposed procurement plan, including the requirement to "first meet its unmet resource needs through all available energy efficiency and demand reduction resources that are cost effective, reliable, and feasible." Energy efficiency practices and products use less energy to do the same job, and demand-response measures involve modifying energy usage when needed for optimal grid operation conditions. Continued development and implementation of comprehensive, long-term

energy efficiency strategies and programs remains the top priority to offset increased energy demand.

Demand-side management includes programs that increase energy efficiency, reduce electricity use, or shift electricity use away from *peak* hours of demand (i.e., the electric load corresponding to a maximum level of electric demand in a specified time period). At the federal level, the Department of Energy has 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 has adopted comprehensive energy efficiency standards for buildings constructed since 1976 and appliance efficiency standards for specific devices not subject to federal appliance standards. These building and appliance standards are generally considered the most stringent in the nation. The Energy Commission also provides grants for energy efficiency research, development and demonstration through the Electric Program Investment Charge (EPIC) program for electricity and the Public Interest Energy Research (PIER) program for natural gas programs.

CPUC oversees the IOU demand-side management programs, and many of the state's municipal utilities administer similar demand-side programs. These efforts are funded by the utilities' ratepayers and include a wide variety of initiatives aiming to move energy-efficient equipment and effective energy management practices into the marketplace at increasing scale. Many local governments have adopted building standards that exceed the state standards for building efficiency. A few jurisdictions have, by ordinance, set retrofit energy efficiency requirements for older buildings. New buildings may combine the need for heat and power using a single fuel source, or may employ district-wide solutions for heating and cooling a number of adjacent buildings, thereby increasing overall efficiency.

On September 25, 2013, CPUC authorized a new rulemaking to develop a path forward for demand response (DR) in the IOU territories (CPUC Demand Response Rulemaking R.13-09-011). DR programs may have some potential to manage load ramps such as those resulting from the integration of variable renewable generation, both through rapid load reductions and by absorbing renewable *over-generation* (i.e., a condition that occurs when total supply exceeds total demand in the CAISO balancing authority area). However, California does not currently have the market structure or mechanisms to enable widespread use of or payment for DR for this purpose. Deployment of DR in the San Onofre area will depend on the development of these mechanisms as well as the nature of customer loads.

Current demand-side programs alone are not sufficient to satisfy future electricity needs, although much more aggressive demand-side programs could potentially accomplish this at the economic and population growth rates that are projected in the state. The 2013 IEPR acknowledges the likely need for additional generating capacity above what is required for local reliability to help integrate increasing levels of renewables and envisions the strong influence of DR programs if successfully deployed at scale (Energy Commission 2014b). 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 are needed in the immediate future and possibly beyond in order to maintain adequate electrical generation supplies. **AIR**

QUALITY APPENDIX AQ-1 in this document discusses the role of natural gas-fired generation in a low GHG environment. Also, renewable energy resources require the integration services provided by dispatchable, natural gas-fired generation like that proposed for the amended CECP.

The IOUs are required to continue to procure preferred resources to the extent they are feasibly available and cost effective. However, preferred resources are not currently sufficient to meet the state's future energy demand and maintain the electric system's reliability. In addition, a significant share of the state's still-operating generation fleet is expected to shut down to comply with the OTC Policy. Energy from natural gas-fired generation will be needed during a prolonged nuclear plant outage (or shutdown, as occurred for San Onofre) or during dry years when hydroelectric production is reduced.

Conservation and Demand-Side Management Are Not Considered Alternatives to the Amended CECP

These preferred resources are not considered viable or feasible alternatives to the amended CECP for these reasons:

- *Failure to Meet Basic Project Objectives* – CEQA does not require consideration of an alternative that would not meet most of the basic project objectives. Implementation of first-choice, preferred resources (e.g., energy efficiency and demand response) would not meet any of the amended CECP project objectives.
- *Policy Goals to Maintain Reliability* – State law repeatedly emphasizes the importance of maintaining the reliability of the electric grid, including sections of the Public Utilities Code addressing the importance of maintaining reliable electric services to the state's citizens and businesses (Pub. Utilities Code, §§ 330(g) and (h), 334, 345.5(b), and 362(a)). The proposed amended CECP is consistent with the project objective to improve the San Diego regional electrical system reliability through fast-starting generating technology.
- *Policy Goals Support a Mix of Resources* – State energy policy does not require substitution of preferred resources for all new natural gas-fired generation.

DISTRIBUTED GENERATION

Governor Jerry Brown set a goal of installing 12,000 MWs of localized electricity generation close to consumer loads and transmission and distribution lines by 2020 (i.e., distributed generation or DG). Distributed solar facilities vary in size from kilowatts to tens of megawatts and do not require transmission to get to the areas where the electricity is used. Renewable DG technologies like small solar photovoltaic (PV) can be located in industrial areas on previously disturbed land or on existing residential, industrial, or commercial buildings. Standards, codes, and fees vary widely for DG projects, and land use requirements for identical systems can vary significantly from jurisdiction to jurisdiction.

Distributed Generation Programs

CPUC oversees two incentive programs for customer-side of the meter DG (also called *on-site generation* or *self generation*) for customers in the territories of Pacific Gas & Electric Company (PG&E), SDG&E, and SCE (CPUC 2014a). The customer-side DG

programs include several existing, new, and emerging distributed energy sources, including solar electric. The Energy Commission oversees related incentive programs.

The programs supporting on-site solar projects include CPUC's California Solar Initiative, the Energy Commission's New Solar Homes Partnership, and a variety of solar programs offered through publicly owned utilities. The overall goal of these programs, known collectively as Go Solar California, is to encourage Californians to install 3,000 MWs of solar energy systems on homes and businesses by the end of 2016 (Go Solar California 2014).

CPUC oversees policies and programs relating to procurement of utility-side DG (also called *wholesale* or *system-side generation*) (CPUC 2014a). Under its IOU solar PV programs, CPUC authorized PG&E, SDG&E, and SCE to own and operate PV facilities and to execute solar PV PPAs with independent power producers through a competitive solicitation process. The energy produced under the solar PV programs will contribute to meeting the state's RPS program goals. Aggressive build-out of DG resources is an underlying assumption of CPUC's LTTP process, a process that addresses the overall long-term need for new system reliability resources, including new or repowered gas-fired generation.

CPUC provides incentives for the development of DG through its Self-Generation Incentive Program (SGIP) (CPUC 2014a). This program provides financial incentives for installing new, qualifying, self-generation equipment that meets all or a portion of the electric energy needs of a facility. SGIP administrators include PG&E, SCE, Southern California Gas Company, and the California Center for Sustainable Energy. Eligible fuels for eligible SGIP generating technologies include several renewable and non-renewable fuels. In 2009, Senate Bill 412 modified SGIP to require identification of distributed energy resources that will contribute to GHG reduction goals.

CPUC's Renewable Auction Mechanism (RAM) was created for the procurement of renewable DG projects generating from 3 MWs up to 20 MWs of electricity. RAM is open to all renewables (e.g., solar PV, small hydro, biogas, wind, and geothermal). CPUC adopted RAM in 2010 to encourage development of resources that can use existing transmission and distribution infrastructure and contribute to the state's RPS program in the near term. CPUC initially authorized the large IOUs to procure 1,000 MWs through RAM by holding four competitive auctions over two years. Total procurement was expanded in early 2012 to 1,299 MWs (CPUC 2014b).

Under three CPUC decisions in 2012 and 2013, CPUC granted, in part, SCE's and SDG&E's respective petitions for modification to merge each utility's solar PV programs into the RAM program. These decisions increased the authorized procurement under RAM to 1,330 MWs. SCE's program targeted small rooftop projects (1–2 MWs), and SDG&E's program targeted small ground-mount projects (1–5 MWs). By merging the utility solar programs into RAM, CPUC is attempting to minimize ratepayer expenditures on renewable DG and provide a more efficient DG procurement process. In May 2013, CPUC passed a resolution authorizing a fifth RAM auction to allow the IOUs to delay some of the previously authorized RAM to better align with the IOUs' demonstrated RPS compliance need.

The Energy Commission tracks progress toward the 12,000 MW goal for DG. Through June 2014, approximately 4,800 MWs of renewable DG projects were operating in California, including approximately 2,650 MWs of wholesale and 2,140 MWs of self generation (Energy Commission 2014c). **Alternatives Table 1** summarizes on-line and pending[1] renewable DG by fuel type.

Alternatives Table 1
Renewable Distributed Generation Resources through June 2014

Resource	On-line (MW)	Pending (MW)	Total (MW)
Biomass	490	70	560
Geothermal	110	0	110
Small Hydropower	1,000	10	1,010
Solar	3,170	2,100	5,270
Wind	20	30	50
Total	4,790	2,210	7,000

Source: Data compiled by Energy Commission staff in 2014.

Distributed Generation Is Not Considered An Alternative to the Amended CECP

The DG category of renewable energy generation is not considered a viable or feasible alternative to the amended CECP for these reasons:

- *Lack of Defined Projects with Sites* – The proposed amended CECP would be constructed and operated at the existing EPS site. By contrast, a renewable DG alternative is indeterminate and impossible to analyze. Some renewable DG projects are carried out by proponents and agencies at defined sites; however, the existence of renewable DG projects does not mean that a DG alternative as a category of renewable energy generation could be a valid alternative to replacing a central station power plant at an existing industrial site. Achieving a level of electrical generation comparable to the amended CECP would require putting together many small-scale (approximately 1–5 MWs each) sites that could, in theory, include rooftop and ground-mount PV systems for a distributed generation photovoltaic project (DGPV). Even if such sites could be identified, it is unreasonable to assume the petitioner could obtain access to and use of multiple small sites that are owned and controlled by other people or organizations. The feasibility of a renewable DG alternative is extremely speculative.
- *Voluntary Participation in On-site Generation Programs* – Participation in the state's on-site generation incentive programs is based on decisions made by individual residents and property and business owners. Participation in the incentive programs is elective; no laws or regulations mandate installation of on-site renewable energy systems; and utilities do not approve or deny DG systems on private property. Although the importance of the state's DG incentive programs cannot be overstated, it is not possible to treat a conglomeration of DGPV (or other types of DG) projects as a potentially feasible alternative to a project at the scale of the amended CECP.

[1] Pending projects include projects with reserved incentive funding from a self-generation incentive program or projects that have secured a PPA.

- *Failure to Meet Basic Project Objectives* – CEQA emphasizes consideration of alternatives that would meet most of the basic project objectives for a project under consideration. The amended CECP includes an objective to improve the regional electrical system reliability through fast-starting generating technology, create a rapid responding resource for peak demand situations, and provide a dependable resource to backup intermittent renewable resources like wind generation and solar. Implementation of a collection of DG projects would not meet this or any of the other project objectives for the amended CECP.
- *Policy Goals to Maintain Reliability* – State law emphasizes the importance of maintaining the reliability of the electric grid, including sections of the Public Utilities Code addressing the importance of maintaining reliable electric services to the state's citizens and businesses (listed above). The proposed amended CECP is consistent with the project objective to improve the San Diego regional electrical system reliability through fast-starting generating technology.
- *Policy Goals Support a Mix of Resources* – State energy policy does not require substitution of preferred resources such as renewable DG for all new natural gas-fired generation.

ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED CONSIDERATION

Section 15126.6, subdivision (c) of the CEQA Guidelines describes selection of a reasonable range of alternatives and the requirement to include those that could feasibly accomplish most of the basic project objectives while avoiding or substantially lessening one or more of the significant effects. The analysis should identify any alternatives that were considered by the lead agency but were rejected as infeasible. CEQA requires a brief explanation of the reasons underlying the lead agency's determination to eliminate alternatives from detailed analysis.

The following alternatives were considered but eliminated from detailed consideration for the amended CECP. Those alternatives that were not carried forward for full analysis include alternative sites and alternative technologies. The following provides staff's reasons for eliminating these alternatives from detailed analysis.

ALTERNATIVE SITES

Relationship of the Proposed Amended CECP to the Project Site

The Warren-Alquist Act addresses aspects of an applicant's site selection criteria for thermal power plants and the use of an existing industrial site for such use when the project has a strong relationship to the existing industrial site. When this is the case, it is "reasonable not to analyze alternative sites for the project" (Pub. Resources Code, § 25540.6, subd. (b)). The analysis below addresses the project's strong relationship to the project site from a regulatory and practical standpoint and provides a framework for staff's selection of the project alternatives.

Use of the Existing EPS Site for Electrical Power Generation

The long-term historical use of the project site for electrical power generation is applicable to the discussion of the project's strong relationship to the site. This analysis recognizes the fact that the amended CECP would be constructed and operated within the existing EPS site at the same location as the licensed CECP.

The EPS Units 1, 2 and 3 were constructed in the 1950s, and feature 100-, 104- and 110-megawatt (MW) General Electric (GE) steam turbines and generators, respectively. EPS Units 4 and 5 were built in the 1970s, and utilize approximately 300-MW and 330-MW Westinghouse steam turbines and generators, respectively. Additionally, a 17-MW GE Frame 5 simple-cycle gas turbine and generator is used for black-start back feed capability. All five units contain steam boilers, and all units are connected to the ocean water intake and discharge systems. The 400-foot-tall exhaust stack is shared by the five units. Other miscellaneous equipment and structures west of the North County Transit District (NCTD) railroad tracks that bi-sect the 95-acre EPS property include administrative, operations, and maintenance buildings and wastewater storage tanks and associated pumps that manage EPS's wastewater system.

The licensed CECP was certified by the Energy Commission on May 31, 2012. The licensed CECP would have permanently retired EPS Units 1, 2, and 3 (but not units 4 and 5) once the licensed CECP was constructed and fully operational. (CEC 2012a)

The amended CECP facility would be located on a 30-acre parcel on the northeast corner of the EPS property in Carlsbad. The 23-acre licensed CECP was permitted at the same location, with the additional seven acres accrued by including all four above-ground fuel oil storage tanks (ASTs) that compose the EPS east tank farm (ASTs 4-7). The seven-acres around and under AST 4 would be added to the previously permitted area of ASTs 5, 6 and 7, resulting in the 30-acre project footprint proposed by the amended CECP.

The amended CECP proposes implementing the following general changes to the licensed CECP:

- Change in generation equipment and technology from Siemens fast response, combined-cycle to GE LMS100 simple-cycle turbines to allow better support of renewable energy integration and local and regional demand.
- Retirement and demolition of EPS units 1 through 5 and demolition of all above-

grade elements of the EPS power and support buildings.

The amended CECP would replace the aging EPS infrastructure with more efficient, effective generating units and ancillary equipment that would all be located east of the NCTD railroad tracks. The amended CECP would be further set back from Carlsbad State Beach when compared to both the existing EPS facilities and the licensed CECP. This would then allow for demolition of all above-ground EPS facilities, and future non-power redevelopment of portions of the EPS property west of the railroad tracks. Refer to the **PROJECT DESCRIPTION** section of this Preliminary Staff Assessment (PSA) for more details on specific components of the modified project and accompanying figures identifying existing and proposed project features and facilities.

Expansion of Existing Coastal Power Plants

The California Coastal Act of 1976 (Coastal Act) protects coastal resources from the major impacts of power plant siting. In 1978, the California Coastal Commission (Coastal Commission) adopted a report that satisfied a requirement of the Coastal Act to designate specific locations in the coastal zone where the location of an electric generating facility would prevent the achievement of the objectives of the Coastal Act (Pub. Resources Code, § 30413, subd. (b)). The 1978 report was revised in 1984 and re-adopted in 1985 (Coastal Commission 1985). In accordance with the Coastal Act, the report designates sensitive resource areas along the California coast as unsuitable for power plant construction and provides “that specific locations that are presently used for such facilities and reasonable expansion thereof shall not be so designated.” This policy encourages expansion of existing power plant sites if new plants are necessary, thereby protecting undeveloped coastal areas (Coastal Commission 1985).

In a related effort, the Energy Commission prepared a 1980 study that examined opportunities for the *reasonable expansion* of existing power plants in the state’s Coastal Zone and reviewed the effects of the designated resource areas on expansion opportunities (Energy Commission 1980). The 1980 study defines *reasonable* in this context to mean the provision or maintenance of land area adequate to satisfy a specific site’s share of the state’s need for increased electrical power generating capacity over the Energy Commission’s planning intervals of 12 and 20 years (Energy Commission 1980). The study also gives practical consideration to coastal power plant expansion and siting opportunities. The ancillary support facilities already exist at the power plant sites, and the industrial-type land use has been established, which are important points to consider from a practical standpoint (Energy Commission 1980).

The expansion areas should be inside or adjacent to the existing site boundaries, or within a distance that would permit the cost effective use of the existing power plant support facilities, where necessary or advisable.

The 1980 study describes expansion opportunities for various combinations of plant types and sizes at 20 of the 25 evaluated sites. The EPS is characterized as having existing expansion opportunities for various plant sizes and fuel types. “Available land and endangered animal habitat impacts are all severe, but not prohibitive, constraints.” “Available land constraints limit lateral expansion opportunities. Expansion opportunities exist on agricultural land owned by SDG&E inland of I-5. Urban land use encroachment is the primary contributor to reduction of availability of land” (Energy Commission 1980).

The proposed amended CECP project would be located inside the existing EPS site boundary, and no off-site expansion of power plant facilities would be required.

Off-site Alternatives Considered in the Previous Analysis for the Licensed CECP

Section 15126.6, subdivision (f)(2)(c) of the CEQA Guidelines describes that where a previous document has sufficiently analyzed a range of reasonable alternative locations and environmental impacts for projects with the same basic purpose, the Lead Agency should review the previous document. The EIR may rely on the previous document to help it assess the feasibility of potential project alternatives to the extent the circumstances remain substantially the same as they relate to the alternative.

A total of five candidate alternative sites were initially identified for analysis for the licensed CECP. In considering potential off-site project alternatives, the previous analysis identified screening criteria to guide the selection of alternatives. For an alternative to be carried forward for full consideration, it would have to meet most of these criteria (CEC 2012a, p. 3-3):

- 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 were required for the original 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.

Of the five alternative sites, the Carlsbad Safety Center Alternative and the Encina Wastewater Authority Site were rejected as not meeting most of the screening criteria; the remaining three were given a full alternative site review.

The remaining three sites that satisfied most of the screening criteria were the Maerkle Alternative, the Carlsbad Oaks North Alternative, and the CATO Alternative. Their locations are plotted on **Alternatives Figure 1**. Brief summaries from the Energy Commission's decision on the licensed CECP evaluating these three alternative sites are provided below. Please refer to the Commission Decision on the licensed CECP (as well as the Final Staff Assessment) for additional details regarding the evaluation of these sites (CEC 2012a, CEC2009a).

Maerkle Alternative

Due to the site's proximate 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, the previous analysis concluded that this alternative would result in an increase in potential environmental impacts when compared to the CECP. Furthermore, development of this site could potentially have involved considerable time for securing required utility rights-of-way (ROWs). It was concluded that the Maerkle site would fail to substantially lessen environmental impacts when compared to the proposed CECP, and might actually have caused impacts that would be worse. The previous analysis also concluded that the Maerkle Alternative site would likely have been infeasible. (CEC 2012a, p. 3-4)

Carlsbad Oaks North Alternative

Due to the visual impacts associated with the elevated topography of the site and required project stacks, the possible intensified use 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 have resulted in an increase in potential environmental impacts when compared to the CECP. Furthermore, development of this site could potentially have involved considerable time in terms of securing the site and obtaining required utility ROWs. The previous analysis concluded that the Oaks North site would fail to substantially lessen environmental impacts when compared to the proposed CECP, and could have caused greater impacts. (CEC 2012a, p. 3-6)

CATO Alternative

Due to the site's 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 an open space site to brownfield development, the necessary change in zoning designations, the uncertainty regarding aviation safety, and the need for significant construction and routing of required utility connections, this alternative would have resulted in an increase in environmental impacts when compared to the CECP. Furthermore, development of this site could potentially have involved considerable time in terms of securing the site and required utility ROWs resulting in time delays involved in project licensing. The previous analysis concluded that the CATO site failed to substantially lessen environmental impacts when compared to the proposed CECP, and could have caused greater impacts. (CEC 2012a, p. 3-8)

Alternative Site Summary

The Commission Decision for the licensed CECP concluded that no site alternative was capable of meeting most of the project objectives (CEC 2012a, p. 21), and the environmental analyses resulted in conclusions that impacts of the off-site alternatives would be greater than those of the licensed CECP. Any alternative that would, in theory, require conversion of some other area of similar acreage to a new electrical power

generation facility would bring into question some of the feasibility issues listed above. The petitioner owns and has full access to the EPS site, and no other site is identified where the facility owner could reasonably acquire site access to allow the timely completion of necessary environmental reviews, permitting, and approvals. Staff's analysis provides evidence of the amended CECP's strong relationship to the project site, and no off-site location has been identified that would avoid or substantially lessen any significant effects of the proposed modified project; therefore, off-site alternatives were eliminated from further detailed consideration.

TECHNOLOGY ALTERNATIVES

In Appendix 5.1C, Evaluation of Best Available Control Technology (BACT) of the CECP PTA, the petitioner evaluated basic equipment alternatives in lieu of the proposed simple-cycle gas turbines including renewable energy sources (e.g., solar, wind, etc.) and combined-cycle turbines. The BACT analysis states that renewable energy facilities require significantly more land to construct, and need to be located in areas with very specific characteristics. Wind and solar facilities have power generation profiles that cannot match demand; conventional power plants are needed in order to follow demand. The capital costs for wind or solar facilities are substantially higher than for a comparable conventional facility, making financing of such a project significantly different. Solar and wind facilities require much more land than is available at the project site (LL 2014, pg. 5.1C-3). Furthermore, the Commission Final Decision for the licensed CECP determined that geothermal, solar, wind or biomass technologies did not present feasible alternatives, and did not meet the following two critical project objectives:

- Meet 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
- Improve San Diego electrical system reliability through fast starting generating technology, creating a rapid responding resource for peak demand situation and providing a dependable resource to backup intermittent renewable resources like wind generation and solar. (CEC 2012a, pg. 3-19)

As an alternative to the amended CECP, retrofitting existing units of the EPS while maintaining the existing boilers would not provide the operating flexibility and efficiency improvement offered by the GE LMS100. Boilers have very high thermal inertia, so are not quick-starting or fast ramping. Boiler technology is generally used for base-load power and not for highly variable demand response power applications. Because boiler technology cannot meet the objectives of the project, it is not considered a technologically feasible alternative. (LL 2014, pg. 5.1C-17)

For additional information regarding the amended CECP power plant configuration and equipment selection, please refer to the **POWER PLANT EFFICIENCY** section of this PSA.

NO PROJECT ALTERNATIVE

This analysis evaluates the "no project" alternative to the amended CECP to fulfill the requirements of Section 15126, subdivision (e) (1) of CEQA. As discussed in the

subsection “Energy Commission Staff’s Alternatives Screening Process,” the Energy Commission is required to compare the impacts of approving the proposed project to the impacts of not approving the project. The “no project” analysis shall discuss the existing conditions at the time the environmental analysis is commenced, as well as what would be reasonably expected to occur in the foreseeable future if the project were not approved (Cal. Code Regs., tit. 14, §15126.6, subd. (e) (2)).

Should the amended CECP not be approved, the “no project” alternative could reasonably be one of two no-project scenarios. The first scenario would be construction of the licensed CECP (“licensed CECP scenario”). The second scenario assumes continuance of current conditions at the EPS site with no new construction (“no-build scenario”).

The technical sections within this PSA provide a detailed comparative analysis of whether the proposed changes included in the amended CECP would result in any new or any increased impacts or any increase in severity of impacts addressed in the licensed CECP proceeding. Under the licensed CECP scenario, key changes included in the amended CECP that would potentially reduce impacts over the licensed CECP would not occur, such as:

- The addition of the shutdown and decommissioning of the EPS’s once-through cooled Units 1 through 5 and small combustion turbine, and the subsequent above-grade removal of those units, the enclosure building that houses them, and other existing buildings and support facilities at the EPS, including the 400-ft exhaust stack. The amended CECP would allow faster and more complete response to both the pending OTC reductions and better grid support from the shutdown of the San Onofre Nuclear Generating Station.
- Redesign of the CECP into a simple-cycle combustion gas turbine power plant that would be able to better serve the region’s electrical need of flexible, fast-start generating technology, to more fully integrate renewable energy and ensure a reliable and stable electrical grid.
- Reduced visibility of the new generating units and exhaust stacks, which would have considerably lower height and profile than the licensed CECP.
- Improved site access, mobility and fire suppression that would satisfy the city of Carlsbad Fire Department.
- Support from the city of Carlsbad that would make the use of reclaimed water much more feasible and likely.
- Improved conformity to local land use ordinances and elimination of overrides of LORS that would no longer be necessary.
- Permanent elimination of seawater OTC at the generating station site.
- Coordination of the project as part of a larger settlement agreement with the city of Carlsbad and SDG&E that would benefit the environment, and promote open space and coastal access for both residents and visitors alike.

According to the petitioner’s BACT analysis, the use of a combined-cycle turbine (as in the licensed CECP Siemens SCC6-5000F natural-gas fired combustion turbines)

instead of the simple-cycle GE LMS 100 turbines proposed in the amended CECP would now be less preferable or appropriate to meet project objectives. As discussed in the **AIR QUALITY** analysis of this PSA, the simple-cycle turbines are needed to effectively handle variable loads and perform multiple startups/shutdowns per day. While advanced combined-cycle turbines can start relatively quickly (within approximately 12 minutes to reach 100 percent rated capacity of the gas turbine generator), they may need as much as two hours to reach full combined cycle output (combined output of gas turbine and steam turbine generator). While operating in simple cycle mode (while waiting for the steam system to warm up), fast-start combined cycle units will have efficiencies that are no better than, and are likely worse than, those achieved with advanced simple cycle turbines such as the GE LMS100. Further, such units cannot perform up to four starts per day, as required for the amended CECP project, without substantially shortening the life of the unit (LL 2014, pg. 5.1C-16). Staff concurs with this information in the **POWER PLANT EFFICIENCY** section of this PSA. For additional information please refer to the "Comparison of Power Plant Alternatives" subsection of the **POWER PLANT EFFICIENCY** section.

In the Commission Decision for the licensed CECP, the Energy Commission concluded that if all of the conditions of certification were implemented, construction and operation of the licensed CECP would not create any significant direct, indirect, or cumulative adverse environmental impacts other than those associated with LORS inconsistency (and required overrides). (CEC 2012a, pg. 3-22). As concluded throughout this PSA, staff has found that if all of the proposed conditions of certification are implemented, the amended CECP also would not create any significant direct, indirect, or cumulative adverse environmental impacts and would include many improvements over the licensed CECP, including the elimination of all but one of the overrides in the area of **LAND USE**. Staff notes that the **TRAFFIC & TRANSPORTATION** section identified greater potential thermal plume impacts from the simple-cycle turbine exhaust stacks (due to increased plume velocities and heat), but the impacts remain less than significant with the implementation of the applicable existing conditions of certification from the licensed CECP.

The Energy Commission also found that even if the licensed CECP was constructed, the CAISO could mandate the continued operation of EPS Units 4 and 5 for electric reliability purposes until further generation or transmission upgrades allowed for their decommissioning. If the amended CECP is not approved and built, the region would not benefit from the relatively efficient source of 92 MW of new generation that the amended CECP (632-MW) would provide over the licensed CECP (540-MW) alternative. Moreover, the amended CECP generation would increase the supply of fast-start, rapid-response energy, better serve load demands in the San Diego Region, and better respond to the retirement of the San Onofre Nuclear Generating Station.

Under the no-build scenario, neither the licensed CECP nor the amended CECP would be constructed. This scenario would be similar to the no project alternative previously analyzed by staff and the Energy Commission in the licensed CECP proceeding. The Energy Commission found that if the CECP was not constructed, the CAISO indicated that EPS Units 4 and 5 would be required to stay on line indefinitely, thereby delaying compliance with the state's OTC policy directed at reducing impacts to the marine environment (CEC 2012a, pg. 3-22).

If no new natural gas plants were constructed, reliance on older power plants could increase. These plants would consume more fuel and emit more air pollutants per kilowatt-hour generated than the proposed modified project. In the near term, the more likely result is that existing plants, many of which produce higher levels of pollutants, would operate more than they do now. The no-build scenario would likely result in other energy projects needed to serve the predicted demand for the service area and electric system, and would not make use of the existing EPS infrastructure. It is assumed that under the no-build scenario, the EPS would continue to operate under existing conditions for an undetermined period of time. It is possible that a project similar to the CECP could be permitted and constructed elsewhere in the San Diego area, although no specific site or project is identified; therefore, the potential impacts of such a project are unknown.

Under both the licensed CECP scenario and the no-build scenario, the "no project" alternative would not achieve most of the basic project objectives of the amended CECP.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Staff has not received comments on aspects of the amended CECP related to alternatives.

CONCLUSIONS

Staff has not identified a potentially feasible alternative that would be environmentally superior to the amended CECP, including the "no project" alternative. Staff considered a reasonable range of alternatives to the proposed modified project, including alternative sites and alternative technologies. Each of these alternatives have been eliminated from detailed consideration due to a failure to meet most of the basic project objectives, infeasibility, inability to avoid significant environmental impacts, or any combination thereof. As determined by Energy Commission staff in this PSA, the demolition, construction, and operation of the amended CECP would not cause potentially significant adverse impacts with the incorporation of staff's recommended modifications to the conditions of certification.

Staff concludes that:

- Conservation and demand-side management and distributed generation are not considered as viable or feasible alternatives to the amended CECP.
- Alternative technologies are not capable of meeting the stated project objectives.
- No site alternative is capable of meeting the stated project objectives.
- No alternative, including the "no project" alternative would avoid or substantially lessen potentially significant environmental impacts.
- The licensed CECP "no project" scenario would not achieve key changes included in the amended CECP that would potentially reduce impacts over the licensed CECP.
- The no-build "no project" scenario would not provide electrical system benefits,

including support for the integration of renewable energy.

- Installation of photovoltaic projects or other local renewable generation is not capable of providing the local reliability needs that the amended CECP, as a project objective, is intended to satisfy.
- Coastal Commission policy encourages expansion of existing power plant sites if new plants are necessary, thereby protecting undeveloped coastal areas (Coastal Commission 1985).
- If all conditions of certification contained in the PSA are implemented, construction and operation of the CECP would not create any significant direct, indirect, or cumulative adverse environmental impacts except the one LORS inconsistency identified in the **LAND USE** section of this PSA.

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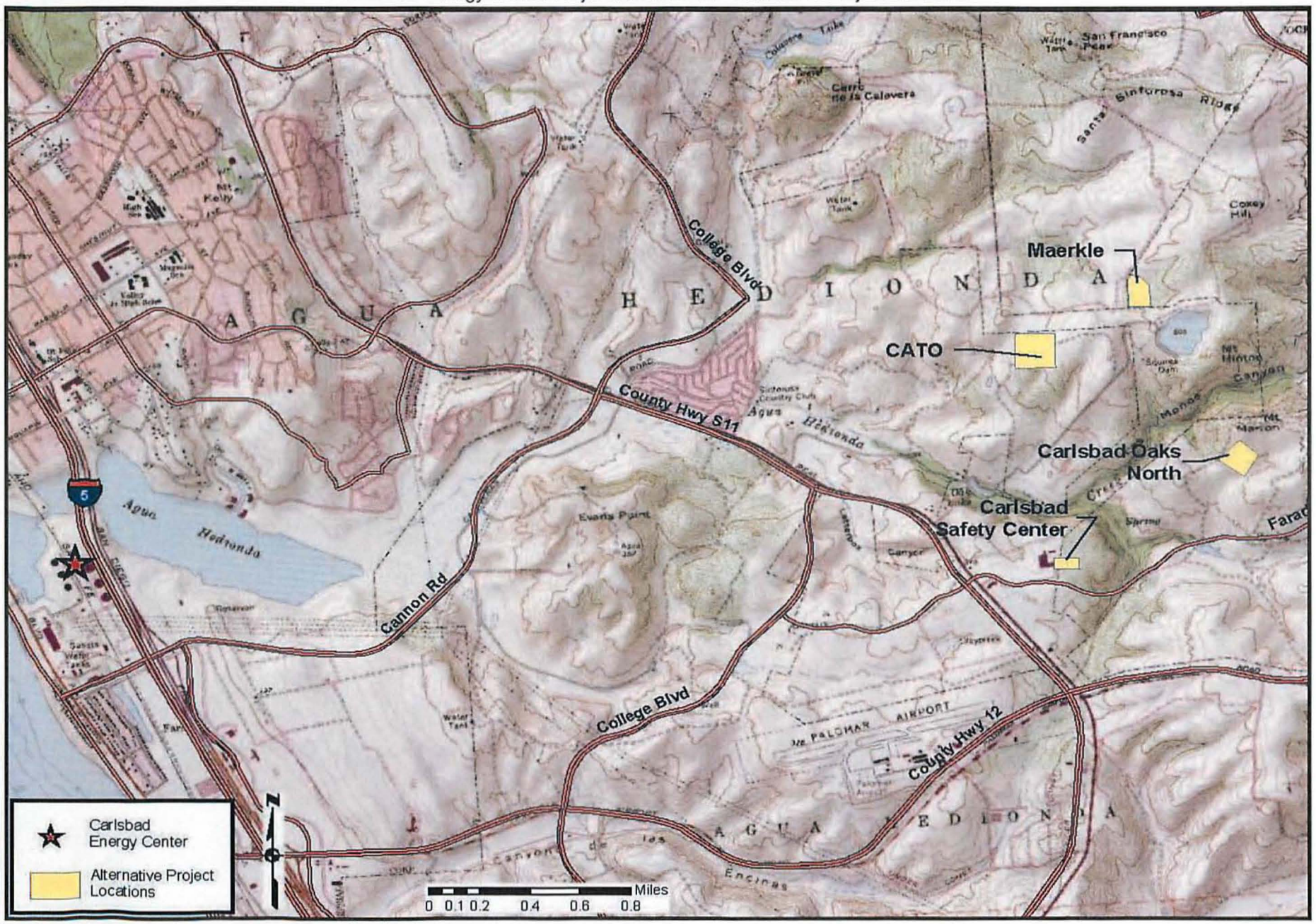
ALTERNATIVES - FIGURE 1

Carlsbad Energy Center Project Amendment - Alternative Project Locations



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Califoria Energy Commission Statewide Power Plant Maps 2008, Tele Atlas2008, National Geographic Topo Maps, City of Carlsbad

BIOLOGICAL RESOURCES

Carol Watson

SUMMARY OF CONCLUSIONS

The Carlsbad Energy Center Project Amendment (amended CECP or project) is a 632-MW natural-gas-fired electrical generating facility that would be constructed on the site of the existing 95-acre Encina Power Station (EPS) in the city of Carlsbad, California. Carlsbad Energy Center, LLC (petitioner/project owner), seeks modifications to the licensed CECP, which was permitted by the Energy Commission on May 31, 2012.

The amended CECP 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), which covers a portion of San Diego County. Under the auspices of the MHCP, the city of Carlsbad adopted the Habitat Management Plan (HMP) for Natural Communities in the city of Carlsbad (HMP) in 2004. The HMP directs habitat management practices for several special-status species. The U.S. Fish and Wildlife Service (USFWS) has designated critical habitat for the federally threatened coastal California gnatcatcher (*Polioptila californica californica*) approximately one mile of the amended CECP site.

The amended CECP would be air-cooled and would not employ once-through ocean water cooling. Water would be supplied by the city of Carlsbad. The amended CECP would not withdraw water from Agua Hedionda Lagoon, and therefore would not result in impingement or entrainment of aquatic species.

Staff proposes deleting Condition of Certification **BIO-9**, for the potential use of desalinated seawater, as the project's proposed industrial water use was withdrawn by the petitioner on September 29, 2014. Implementation of the remaining conditions of certification would avoid or minimize potential direct and indirect impacts to biological resources on the project site and other special status resources in the vicinity. Therefore, staff concludes that the amended CECP would not result in any significant unmitigated impacts to biological resources, and with implementation of the conditions of certification, it would comply with applicable laws, ordinances, regulations, and standards (LORS).

INTRODUCTION

This section provides the California Energy Commission (Energy Commission) staff's analysis of potential impacts to biological resources from demolition of ASTs 1, 2, and 4, construction and operation of the amended CECP power plant, and the decommissioning and demolition of EPS Units 1-5 and above-ground ancillary buildings west of the railroad tracks. This analysis addresses potential impacts to sensitive species and other areas of biological concern.

To determine environmental effects of the proposed modifications, and to determine consistency with applicable LORS, staff has reviewed the CECP Final Staff Assessment

(November 2009), staff's August 12, 2011 Supplement Testimony, and the CECP Commission Final Decision (May 31, 2012). The Final Decision consisted of the Revised Presiding Member's Proposed Decision (RPMPD), dated March 28, 2012, the Committee Revisions to the RPMPD, dated May 16, 2012, and the May 31, 2012 Errata, and additional changes described within the Commission Adoption Order. Additionally, staff reviewed proposed modification information submitted by the petitioner on April 29, 2014 and May 2, 2014. Staff's analysis was also based on information gathered during a public workshop session on Biological Resources held on September 25, 2014, the project owner's data responses to staff and intervenor data requests, and staff's own independent literature review and analysis. Staff has also sought feedback and information from the numerous wildlife agencies, including the California Department of Fish and Wildlife (CDFW), the US Fish and Wildlife Service (USFWS), the California Coastal Commission (CCC), the National Oceanic and Atmospheric Agency (NOAA) and the National Marine Fisheries Service (NMFS). Additionally, this analysis determines compliance with applicable LORS and recommends conditions of certification such that the amended project would continue to meet all LORS.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

During all four phases of the amended CECP, the project owner shall abide by the LORS listed in **Biological Resources Table 1**. There are no new or changed biological resource LORS since the original project was certified in 2012 that would affect the amended project.

Biological Resources Table 1
Laws, Ordinances, Regulations, and Standards

Applicable LOR	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 Section 404 permit. Section 401 requires a permit from a regional water quality control board (RWQCB) for the discharge of pollutants. The administering agency is the USACE.
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 agencies are USFWS and the National Marine Fisheries Service (NMFS).
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 CDFW.
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 CDFW.
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 CDFW.
Native Plant Protection Act (Fish and Game Code, section 1900 et seq.)	Designates rare, threatened, and endangered plants in California and prohibits take of endangered or rare native plants. The administering agency is CDFW.
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 CDFW.
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 CDFW.
Migratory Birds (Fish and Game Code, section 3513)	Prohibits take or possession of any migratory nongame bird as designated in the Migratory Bird Treaty Act or any part of such migratory nongame bird. The administering agency is CDFW.
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). The administering agency is the State Water Resources Control Board (SWRCB).

Applicable LOR	Description
Porter-Cologne Water Quality Control Act California Water Code, Division 7, section 13142.5(b)	Regulates discharges of waste and fill materials to waters of the state, including "isolated" waters and wetlands.
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 amended CECP 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 amended 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 inner Agua Hedionda Lagoon southern shore
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 those portions of the city in the Coastal Zone. The Agua Hedionda Lagoon LCP meets the requirements and implements the provisions and policies of the California Coastal Act. The amended CECP is located within planning area of the Agua Hedionda LUP, which has been incorporated into the Agua Hedionda Lagoon 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.

PROJECT DESCRIPTION

The 632-MW amended CECP would be located at the same, slightly larger northeastern parcel of the 95-acre EPS as the licensed CECP. The amended CECP would involve four phases over a 64-month period. These phases would include the initial demolition of above-ground fuel oil storage tanks (ASTs) 1, 2, and 4 (which would follow demolition of those ASTs permitted by the licensed CECP in 2012, namely ASTs, 5, 6, and 7). The next phase would involve the construction, commissioning and operation of the amended CECP power plant, comprising six simple-cycle General Electric LMS100 natural gas-fired combustion turbines (designated amended CECP Units 6, 7, 8, 9, 10, and 11). Following commercial operation of the amended CECP, the third phase would begin (on or before December 31, 2017); a 12-month EPS shutdown and decommissioning phase that would result in the cessation of all 837 million gallons per day of permitted once-through seawater cooling (OTC), by December 31, 2017, per State Water Resources Control Board's OTC mandate. The final phase (IV) of the amended CECP would be the demolition of EPS Units 1-5, the 200-ft. tall concrete enclosure building, the 400-ft tall exhaust stack, and other above-ground ancillary facilities located west of the North Coast Transit District railroad tracks. The ocean-water intake system would be isolated from the lagoon, and aboveground elements

demolished and removed, while some intake canals and underground circulating piping would be isolated and remain intact for purposes of Poseidon's Carlsbad Seawater Desalination Project. A majority of concrete from the exhaust stack and enclosure building would be crushed and reused onsite for fill to restore subgrade areas to grade. Please see the **PROJECT DESCRIPTION** section of this document for further project details.

SETTING

REGIONAL SETTING

The amended CECP site is located within the existing 95-acre EPS 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 EPS, which began commercial operations in 1954. The nearest significant natural habitat areas are the Pacific Ocean, west of the CECP site, the adjacent Agua Hedionda Lagoon and the coastal California gnatcatcher critical habitat, less than a mile inland from the project site (please refer to **Biological Resources Figure 1**).

PROJECT SITE AND VICINITY DESCRIPTION

The amended CECP site is located within the City Subarea Plan MHCP. The MHCP is a regional plan under the California Natural Community Conservation Planning (NCCP) Act of 1991 (SANDAG, 2003). 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 requires the preparation of subarea plans in order for specific jurisdictions in the region to obtain Take Authorization. The Habitat Management Plan (HMP) for Natural Communities in the city of Carlsbad was developed in cooperation with CDFW and the USFWS and provides the mechanism for a federal 10(a)(1)(B) permit and a state 2835 permit (City of Carlsbad, 2004) and allows for take of Covered Species.

The amended CECP site is bordered to the east by Interstate 5 (I-5), to the south by the San Diego Gas and Electric (SDG&E) 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 amended CECP site, consists primarily of structures and facilities for electricity generation, transmission and associated access or staging areas. The amended CECP site is disturbed or developed by large above-ground storage fuel oil storage tanks (ASTs) that comprise the east tank farm. The 30-acre parcel is low-quality habitat for plant and wildlife species. However, the adjacent Agua Hedionda Lagoon provides high-quality habitat for a wide variety of species.

Agua Hedionda Lagoon

The lagoon is the terminus of ephemeral Agua Hedionda Creek, which drains a largely developed watershed. Originally, the lagoon was smaller and would often dry over the summertime, until dredging was started to facilitate the flow of seawater into the outer Agua Hedionda Lagoon, to be used for cooling purposes by the EPS. Currently, the

three segments of the lagoon (outer, middle and inner), totaling 400 acres, are divided by Interstate-5 and the North County Transit District Railroad. The EPS, sited along the outer and middle basins, pulls its cooling water from the southern end of the outer lagoon. Cabrillo Energy (owner/operator of EPS and subsidiary of NRG, Inc.) leases land for various uses including aquaculture of mussels, oysters, and sea bass. The middle lagoon has a YMCA youth camp, private marina, and public boat launch. The inner lagoon is extensively used for recreational purposes (please refer to **Biological Resources Figure 2**). The Lagoon's connection to the Pacific Ocean occurs at the northwest end of the Outer Lagoon, where a rock jetty inlet (which along with the seawater intake channel and power plant discharge channel are on sovereign lands under State Lands Commission jurisdiction) allows free exchange of water between the ocean and the lagoon system. This inlet and the lagoon system are kept open by routine maintenance dredging which first began in 1952 by SDG&E before Cabrillo Power purchased EPS and continued the process (which Poseidon Industries will continue for purposes of the daily seawater needs. The Carlsbad Seawater Desalination Project (CSDP) needs to produce 50 million gallons per day of potable water).

Local habitats include open water, sand and mud substrates, rock revetment, pilings, and aquaculture grow-out floats, which support diverse wildlife, bird, and fish communities. Recent independent impingement surveys at the EPS 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 (especially the southern and eastern shores of the inner lagoon) provide 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.

CRITICAL HABITAT

Critical habitat is a formal designation under the Endangered Species Act. In accordance with section 3(5)(A)(i) of the Act and the regulations at Title 50, Code of Federal Regulations, section 424.12, in determining which areas occupied by the species at the time of listing to designate as critical habitat, factors considered are those physical and biological features essential to the conservation of the species that may require special management considerations or protection. Critical habitat for the following federally listed species is located in the regional vicinity of the amended CECP.[1]

Coastal California gnatcatcher (*Polioptila californica californica*)

Critical habitat for the coastal California gnatcatcher is located approximately one mile east of the amended CECP site (USFWS 2013). There is no critical habitat for the coastal California gnatcatcher within 10 miles of the offsite laydown area. The coastal California gnatcatcher habitat within this designation includes upland sage scrub habitat

[1] The Final Staff Assessment for the licensed CECP incorrectly identified the Agua Hedionda Lagoon as being critical habitat for the federally endangered tidewater goby. Only the coastal California Gnatcatcher has USFWS-designated critical habitat identified within one mile of the amended CECP project.

such as sage scrub, succulent scrub, Riversidean alluvial fan scrub, or coastal sage chaparral scrub.

JURISDICTIONAL WETLANDS AND WATERS

The project area is actively maintained to facilitate operation of existing power generation and therefore does not support wetlands of other waters potentially under the jurisdiction of USACE, CDFW, and/or the CCC.

EXISTING VEGETATION AND WILDLIFE

Surveys of the amended CECP site and vicinity include an aquatic survey of Agua Hedionda Lagoon for SDG&E in 1994 and 1995, a biological resource survey of the entire EPS property in 2003, and a reconnaissance-level survey conducted by the project owner, which included the project site and a one-mile buffer, in August 2007. The project owner's survey of the proposed project 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. Most recently, the project owner's biological consultant conducted a site visit in February 2014 and an additional site visit and reconnaissance survey in March 2014 (Carlsbad Energy Center, 2014).

The amended CECP site is highly disturbed and/or developed due to ongoing heavy industrial work and operations within the existing 30-acre project footprint. Among ongoing industrial uses, is construction activity of the CSDP, which will be located on six acres within the EPS parcel west of the railroad corridor. Additionally, as part of the licensed CECP project, demolition and removal of ASTs 5, 6, and 7 is scheduled to commence late in 2014. The project owner's site visits and the reconnaissance surveys showed that there is minimal vegetation in the area not currently under construction. The majority of the amended 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 amended CECP site, and serve as visual screening of the EPS facilities. These plantings include mature eucalyptus trees greater than 45 feet in height and of sufficient canopy cover to potentially support nesting raptors.

On March 10, 2014, the project owner conducted a site reconnaissance and nesting bird survey and no evidence of roosting, nesting birds, new habitats, wetlands, or special status species were observed. Due to the frequency and intensity of disturbance from operation of the EPS, the amended 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 amended CECP site drains Cannon Lake, located to the east and off the project site and EPS property. An existing storm drains runs through the project site and empties into the lagoon. This drain onsite contains hydrophytic 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 are plant and wildlife species that have been afforded special recognition by federal, state, or local resource agencies or organizations. Listed and special-status species are of relatively limited distribution and typically require unique habitat conditions. Special-status species are defined as meeting one or more of the following criteria:

- Federally or state-listed, proposed, or candidate for listing, as rare, threatened or endangered under the Endangered Species Act or California Endangered Species Act;
- Protected under other state or federal regulations (e.g., Migratory Bird Treaty Act);
- Identified as a California Species of Special Concern by the CDFW;
- California Fully Protected Species;
- A plant species considered by the California Native Plant Society and CDFW to be "rare, threatened, or endangered in California" (California Rare Plant Rank [CRPR] 1A, 1B, and 2) as well as CRPR 3 and 4 species;
- A plant listed as rare under the California Native Plant Protection Act;
- A locally significant species, that is, a species that is not rare from a statewide perspective but is rare or uncommon in a local context such as within a county or region or is so designated in local or regional plans, policies, or ordinances; or
- Any other species receiving consideration during environmental review under the California Environmental Quality Act (CEQA).

Special-status plant and wildlife species were not observed within the amended CECP site during biological surveys, and the project area does not provide suitable habitat for special-status species. However, the adjacent Agua Hedionda Lagoon does provide suitable nesting and foraging habitat for various special-status species that have the potential to be affected by construction activity and noise, and future operations of the power plant. **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 amended 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*	CRPR List 2
Coast woolly-heads	*Nemacaulis denudata* var. *denudate*	CRPR List 2
Cliff spurge	*Euphorbia misera*	CRPR List 2; HMP
Orcutt's pincushion	*Chaenactis glabriuscula* ssp. *Orcuttiana*	CRPR List 1B
South Coast saltscale	*Atriplex pacifica*	CRPR List 1B
Wart-stemmed ceanothus	*Ceanothus verrucosus*	CRPR List 2; HMP
Del Mar manzanita	*Arctostaphylos glandulosa var. crassifolia*	FE, CRPR 1B.1
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, CDFW 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/California Rare Plants Ranking (CRPR)
CRPR List 1B = Plants rare, threatened, or endangered in California and elsewhere
CRPR 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

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

A significant impact is defined under CEQA as "a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project" (Cal. Code Regs., tit. 14, [hereinafter CEQA Guidelines] section 15382). In this analysis, the following impacts to biological resources are considered significant if the project would result in:

- a substantial adverse effect to wildlife species that are federally-listed or state-listed or proposed to be listed; a substantial adverse effect to wildlife species of special concern to CDFW, candidates for state listing, or animals fully protected in California;
- a substantial adverse effect to plant species considered by CDFW, USFWS, or CNPS to be rare, threatened, or endangered in California or with strict habitat requirements and narrow distributions; a substantial impact to a sensitive natural community (i.e., a community that is especially diverse; regionally uncommon; or of special concern to local, state, and federal agencies);
- substantial adverse effects on habitats that serve as breeding, foraging, nesting, or migrating grounds and are limited in availability or that serve as core habitats for regional plant and wildlife populations;
- interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites;
- substantial adverse effect on important riparian habitats or wetlands and any other "Waters of the U.S." or state jurisdictional waters; or
- conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

DIRECT/INDIRECT IMPACTS AND MITIGATION

According to the CEQA 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 direct and indirect impacts of construction, demolition, operation, and decommissioning of the proposed project to biological resources and suggests mitigation, as necessary, in an effort to reduce the severity of potentially adverse impacts to less than significant levels.

Petitioner-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). All petitioner-proposed mitigation measures were incorporated by reference into staff's conditions of certification within the Commission Decision of the licensed CECP (CEC, 2012).

Construction and Demolition Impacts and Mitigation

Construction and demolition activities are similar in the direct and indirect impacts they create; and therefore are discussed together in the following paragraphs. Staff continues to recommend 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 and Demolition Impacts to Vegetation

The amended CECP would have similar impacts to vegetation as were previously analyzed for the licensed CECP. 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 amended 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 and Demolition Impacts to Common Wildlife

The amended CECP would have similar impacts to wildlife as were previously analyzed for the licensed CECP. Direct loss of small mammals, reptiles, and other less mobile species could occur during construction of the amended project. This would result primarily from the use of vehicles and other heavy equipment at the amended 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 amended 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 site; however, these groves of trees are already aging out, and several trees have been thinned since the CECP was licensed in 2012. Tree removals can be expected to continue to occur due to age and ongoing drought conditions. Also, the future widening

of I-5 by Caltrans could result in the elimination of the earthen berm and existing trees that currently separate the eastern edge of the project site and Interstate 5.

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 Commission Final Decision for the licensed CECP (CEC 2012, page 7.1-4) has the following provisions the project owner has also agreed to implement for the amended CECP:

- 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 believes these mitigation measures, which are incorporated by reference into Condition of Certification **BIO-6** (Biological Resources Mitigation Implementation and Monitoring Plan), would also reduce impacts from modifications associated with the amended CECP. 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 mitigation measures above and Conditions of Certification **BIO-6** and **BIO-8**, significant impacts to nesting birds would not result from amended CECP activities.

Wildlife could become entrapped in open trenches during Phase II 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 and Demolition Impacts to Special-Status Species

Plants

The amended CECP would have similar impacts to special-status plant species as those previously analyzed for the licensed CECP. Special-status plants are not expected to occur in the project area. Six special-status plants are known to occur within one mile of the project area, but none were identified during field surveys of the project site. Habitat suitability for special-status plants is generally poor at the amended 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 amended CECP.

Wildlife

The amended CECP would have similar impacts to special-status wildlife species as those previously analyzed for the licensed CECP. The amended project area does not provide suitable habitat for special-status wildlife species, and none were identified during a February 2014 survey of the amended project area by the project owner. 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 amended 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 the “General Construction and Demolition Impacts” subsection below.

Critical Habitat

Critical habitat is a formal designation under the 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 coastal California gnatcatcher exists within one mile of the amended CECP site; and approximately 3,200 feet east of the amended CECP site. Similar to the licensed CECP, the amended CECP would have no adverse impacts on upland habitat associated with Agua Hedionda Lagoon. Therefore, there would be no impacts to critical habitat for the coastal California gnatcatcher.

General Construction and Demolition Impacts

Construction activities, including noise and lighting impacts, have the potential to create a variety of temporary impacts to biological resources, as discussed below.

Noise

The amended CECP would include the demolition of ASTs 1, 2, and 4 (the licensed CECP includes demolition of ASTs 5, 6, and 7) and demolition of the EPS, which includes Units 1-5, the concrete enclosure building housing the units (power plant

building), the 400-foot-tall exhaust stack and other above-ground ancillary facilities. Demolition and removal of the EPS and ASTs 1, 2, and 4 would utilize similar construction equipment and consist of activities similar to those demolition and removal activities approved for the licensed CECP. Active demolition activities for the EPS are anticipated to occur after construction of the amended CECP is complete, and would last approximately 24 months.

Existing operations at the EPS, traffic on Interstate 5, the NCTD rail corridor, and ongoing construction of the CSDP and Sewer Lift Station could 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, or in adjacent natural habitat that buffers the Lagoon and surrounding developments.

To evaluate the impacts associated with demolition and removal of the EPS, staff issued data requests 67-72 (CEC 2014kk), to which the petitioner responded (LL 2014pp). **Biological Resources Table 3** below shows the maximum predicted noise impact at the nearest sensitive biological receptor, (measured as the shortest distance from the noise source to the edge of the Lagoon) as a result of construction and demolition activities.

Biological Resources Table 3
Predicted Demolition Noise Impacts on Nearest Biological Receptors

Phase	Distance from Nearest Biological Receptor (feet)	Highest Noise Level[a] (dBA L_{eq})
Demo AST 1,2, 4	~350 feet from Lagoon	73
Demolition EPS	~600 feet from Lagoon	68

Sources: LL2014d; LL2014pp; and Noise and Vibration staff calculations.
Notes:
a. Construction and demolition equipment estimated to be 90 dBA at 50 feet (LL2014pp).

The project owner commits to performing noisy demolition/construction work during the times specified in the city of Carlsbad Noise Ordinance, to the hours of 7:00 a.m. to 6:00 p.m. Mondays through Fridays, and 8:00 a.m. to 6:00 p.m. on Saturdays, with no construction allowed on Sundays and federal holidays (LL2014d, PTA § 5.7.4). These restrictions are incorporated into staff's proposed Condition of Certification **NOISE-6**. To ensure the project's construction and demolition activities would create less than significant adverse impacts at the most noise-sensitive receptors, the project owner and its contractors would develop reasonable and feasible measures to reduce the level of noise associated with demolition and construction activities (LL 2014pp). These measures can include:

- Using temporary noise or moveable task barriers;
- Reorienting or relocating construction equipment to minimize noise on sensitive habitats;
- Avoiding pile driving or confining pile driving to areas of the project furthest from sensitive habitats especially during the nesting season;

- Reducing the number of noisy construction and demolition activities that occur simultaneously; and
- Using blasting mats or similar structures that may reduce the impact of falling debris inside the stack (LL 2014pp).

Staff believes these measures, in conjunction with staff's proposed conditions of certification, would provide appropriate and effective mitigation.

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). The project owner has suggested that the provisions developed for the licensed CECP, and incorporated by reference into Condition of Certification **BIO-6** (Biological Resources Mitigation Implementation and Monitoring Plan), would adequately mitigate noise generated by the amended CECP. These applicant-proposed mitigation measures in the Application for Certification of the licensed CECP (CECP 2007, page 5.2-13), and included in the Commission Decision (CEC 2012, page 7.1-5) are as follows:

- To avoid the riparian bird nesting season, excessively noisy construction and demolition 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 and demolition 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.

The implementation of the staff's proposed mitigation measures in Conditions of Certification **BIO-6** and **NOISE-6** would not only mitigate Phase II construction, but also the Phase I and Phase IV demolition of ASTs 1, 2, and 4 and the EPS facilities west of the railroad tracks.

Lighting

Project construction and demolition activities are generally planned to occur between 7:00 a.m. and 7:00 p.m.; however, during some construction and demolition 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 EPS 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 downcast, 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 Lagoon must be directed away from the lagoon (Carlsbad 2004). These measures are incorporated into Condition of Certification **BIO-7** (Impact Avoidance Mitigation Features). Staff believes that the amended CECP would not introduce impacts beyond that which were already analyzed for the licensed CECP; and therefore, with implementation of these measures, impacts to wildlife from temporary night lighting would be less than significant.

Stormwater Runoff

The Agua Hedionda Lagoon and marine habitat adjacent to the amended CECP site could be impacted from stormwater runoff during demolition and construction if appropriate measures are not taken to prevent water from draining off site. Please refer to the **SOIL & WATER RESOURCES** section of this Preliminary Staff Assessment (PSA) for more information and staff's proposed conditions of certification. With implementation of these measures and the project owner's commitment to the impact minimization measures listed above, project impacts to biological resources from stormwater runoff would be less than significant.

Operation Impacts and Mitigation

Potential impacts resulting from operation of the amended CECP power plant include bird collision with, and/or electrocution by, the interconnection transmission facilities and towers (with heights ranging from 98 to 106 feet). Disturbance to wildlife due to increased noise and lighting, and impacts to aquatic resources in Agua Hedionda Lagoon due to industrial wastewater discharge could also occur. However, the amended CECP would have operational impacts similar to the licensed CECP; and introduces no new impacts from proposed modification that would go beyond those analyzed previously and mitigated accordingly.

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 the amended CECP exhaust stacks, transmission

lines and towers, support structures, and appurtenant buildings. Similar to the licensed CECP, the amended CECP units would interconnect with SDG&E's 138-kV and 230-kV switchyard facilities, and would consist of a 2,200-foot-long, 138-kV transmission line and 4,000-foot-long, 230-kV transmission line located along the eastern and southern boundary of the CECP site before crossing the railroad tracks and tying into the SDG&E Encina switchyards. All transmission support structures would range in height between 98 and 106 feet, and they would be sited within the existing EPS complex. The amended project would include six units, each with an associated 90-foot-tall, 14.25-foot-diameter exhaust stack. The tallest existing exhaust stack at the existing EPS is approximately 400 feet tall.

Collision

It is possible that bird collisions with the amended CECP exhaust stacks and other facilities would occur. The six proposed exhaust stacks, which would be the tallest component of the amended CECP, would be approximately 90-feet tall and the existing EPS exhaust stacks are approximately 400-feet tall. The amended CECP reduces the likelihood of collision with the stacks as compared to the licensed project. 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 amended CECP exhaust stacks would be significantly shorter than the existing 400-foot-tall EPS exhaust stack, the amended CECP exhaust stacks would pose a reduced collision risk to migrating birds, as compared to the licensed CECP

It is likely that lighting as required by the Federal Aviation Administration (FAA) or other regulations exacerbates mortality at structures taller than 200 feet. Because of its proximity to Palomar Airport, the amended CECP exhaust stacks may require FAA aviation strobe lighting. 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 (other than aviation warning lights) 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. Please refer to the **VISUAL RESOURCES** section of this PSA for more information.

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 amended 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 stack), 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 line conductors have also been reported as a significant man-made cause of bird mortality (APLIC 2006). Transmission line ground wires are smaller in diameter and significantly less visible than transmission line conductors. The project owner 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

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 project owner 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. No additional impacts outside of those analyzed for the licensed project are expected.

Noise

The amended CECP site is surrounded by a variety of industrial and commercial land uses. Wildlife species near the amended project are accustomed to elevated ambient noise levels because of operation of the existing EPS, ongoing construction of the CSDP, traffic on Interstate 5, and the BNSF Santa Fe Railway. Although operation of the amended CECP would have impacts similar to those analyzed for the licensed CECP, significant impacts to biological resources are not expected. Condition of Certification **NOISE-4** requires the project design and implementation shall include appropriate noise mitigation. No new pure-tone components shall be caused by the project. No single piece of equipment shall be allowed to stand out as a source of noise that draws legitimate complaints. For more details, see the **NOISE & VIBRATION** section of the Staff Assessment.

Light

Condition of Certification **VIS-4** recommends lighting be designed so that it does not illuminate the night sky or cause excessive reflected glare. Operation of the amended CECP would have similar lighting impacts, 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. The amended project would use no more than 336-acre-feet per year (afy) of California Code of Regulations, title 22 reclaimed water provided by the city of Carlsbad Water

Recycling Facility (CWRF). As opposed to the licensed CECP, the amended CECP would be provided water by the city, and all intake of lagoon water would cease.

The Final Decision for licensed CECP includes Condition of Certification **BIO-9**, designed to direct the retirement of EPS Units 4 and 5 and associated service and auxillary water pumps; as well as the necessity of using intake water from Agua Hedionda Lagoon. As the amended project would obtain potable or recycled water from the city, **BIO-9** is no longer necessary, and therefore staff proposes deleting this condition.

Stormwater Runoff

Staff's proposed Condition of Certification **SOIL&WATER-3** would require preparation of a report of water discharge and acquisition of a National Pollutant Discharge Elimination System (NPDES) permit for operational industrial water discharge. The petitioner would also develop and implement a Storm Water Pollution Prevention Plan for the operation of the amended CECP. Additionally, **SOIL&WATER-4** would require the petitioner to acquire a Waste Discharge Requirements (WDR) Order from the SDRWQCB for the discharge of amended CECP industrial wastewater to the Pacific Ocean. Implementation of Conditions of Certifications **SOIL&WATER-3** and **SOIL&WATER-4** would maintain stormwater quality and reduce impacts to local aquatic organisms to less than significant. Further, implementation of these conditions would ensure consistency with LORS pertaining to water quality. Refer to the **SOIL & WATER RESOURCES** section of this Staff Assessment for additional information regarding water quality.

Air Emissions- Nitrogen Deposition

The total nitrogen emission levels (based on NOx and NH3 emissions) for the amended CECP would be reduced by the shutdown of EPS Units 1–5 and the peaker gas turbine. The PTA (Table 5.1-41) demonstrates that there is a significant net reduction in nitrogen emissions when comparing the amended CECP to the licensed CECP. Therefore, staff concludes that there would be no significant impacts on the sensitive biological resources from the nitrogen deposition of the amended CECP.

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. Since the licensed CECP, the largest and most impactful nearby project—the CSDP—has already gone into construction.

Due to ongoing operation of the EPS, the proposed CECP site within the EPS property is highly disturbed and largely devoid of native vegetation, and does not provide suitable habitat for special-status species. Although the amended 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. Therefore, staff concludes that impacts related to the CECP would not contribute significantly to cumulative effects on biological resources in the region.

COMPLIANCE WITH LORS

The amended project is subject to several LORS including the MHCP and the HMP 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, with the implementation of the Conditions of Certification **BIO-1** through **BIO-8** and **SOIL&WATER-3** and **SOIL &WATER-4**, the amended project would not result in significant impacts to special status species or sensitive habitat. Therefore, the amended CECP would comply with federal, state, and local LORS pertaining to biological resources, notwithstanding ongoing analysis of noise impacts associated with demolition of the EPS stack and units.

CONCLUSIONS

The amended 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 EPS, 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 for several special-status species. Potential impacts to special-status species, including migratory birds, would be mitigated to less than significant level by implementation of staff's proposed conditions of certification, which recommend minimization of light pollution, installation of bird flight diverters, and nesting bird surveys among other measures.

Additionally, the proposed project would be air-cooled and would not employ once-through cooling. Staff concludes that the amended 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

Staff recommends including all the biological resources conditions of certification from the Commission Decision for the licensed CECP, with the exception of BIO-9, which is not applicable to the amended CECP. Staff has proposed minor edits to **BIO-6**, **BIO-7** and **BIO-8**. (Note: ~~Strikethrough~~ is used to indicate deleted language).

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 ten working days prior to the termination or release of the preceding designated biologist. In an emergency, the project owner shall immediately notify the CPM to discuss the qualifications and approval of a short-term replacement while a permanent Designated Biologist is proposed to the CPM for consideration.

Designated Biologist Duties

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

1. advise the project owner's construction and operation managers on the implementation of the **BIOLOGICAL RESOURCES** Conditions of Certification;

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

3. be available to supervise, conduct, and coordinate mitigation, monitoring, and other biological 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 five working days after receipt of notice that corrective action is completed, or the project owner will be notified by the CPM that coordination with other agencies will require additional time before a determination can be made.

Worker Environmental Awareness Program

BIO-5 The project owner shall develop and implement a CPM-approved Worker Environmental Awareness Program (WEAP) in which each of its employees, as well as employees of contractors and subcontractors who work on the project site or any related facilities during site mobilization, ground disturbance, grading, construction, operation and closure, 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 ten 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 six months after the start of commercial operation.

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

Biological Resources Mitigation Implementation and Monitoring Plan

BIO-6 The project owner shall submit two copies of the proposed BRMIMP to the CPM (for review and approval) and to ~~CDFG~~ **CDFW** 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~~ **CDFW**, and USFWS within five days of their receipt, and the BRMIMP shall be revised or supplemented to reflect the permit condition within ten days of their receipt by the project owner. Ten days prior to site (and related facilities) mobilization, the revised BRMIMP shall be resubmitted to the CPM.

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

Any changes to the approved BRMIMP must also be approved by the CPM in consultation with ~~CDFG~~ **CDFW**, 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~~ **CDFW**;

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~~ **CDFW** 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 the auxiliary pumps for EPS Units 4 and 5 that supply discharge water for desalination and use by the CECP cease to operate, and the CECP would require intake of ocean water, the project owner shall inform the resource agencies (i.e., NMFS, USFWS, and CDFG) and coordinate regarding compliance with Clean Water Act Section 316(b) and/or 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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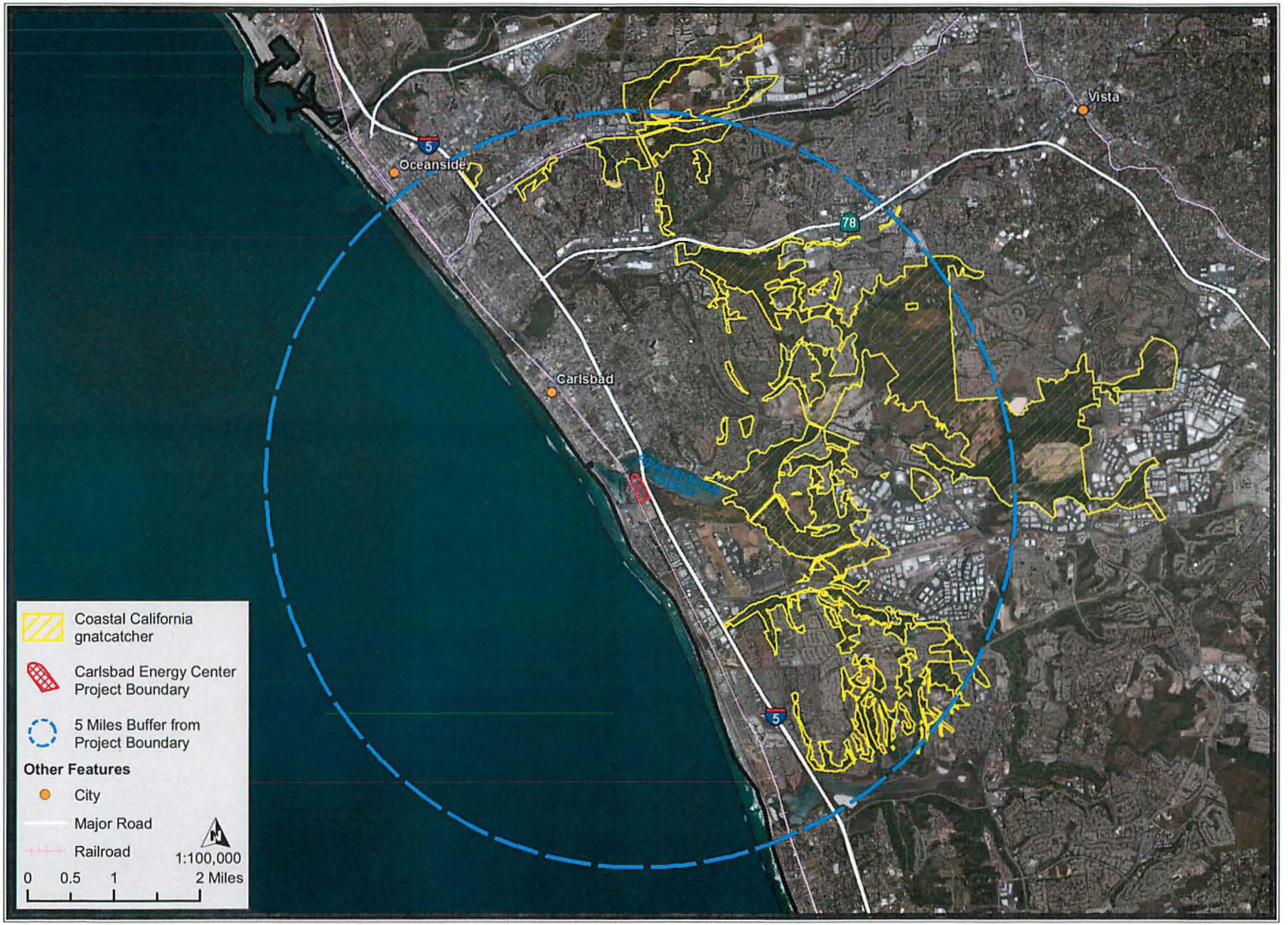
BIOLOGICAL RESOURCES - FIGURE 1

Carlsbad Energy Center Project Amendment - United State Fish and Wildlife Service (USFW) Coastal California Gnatcatcher



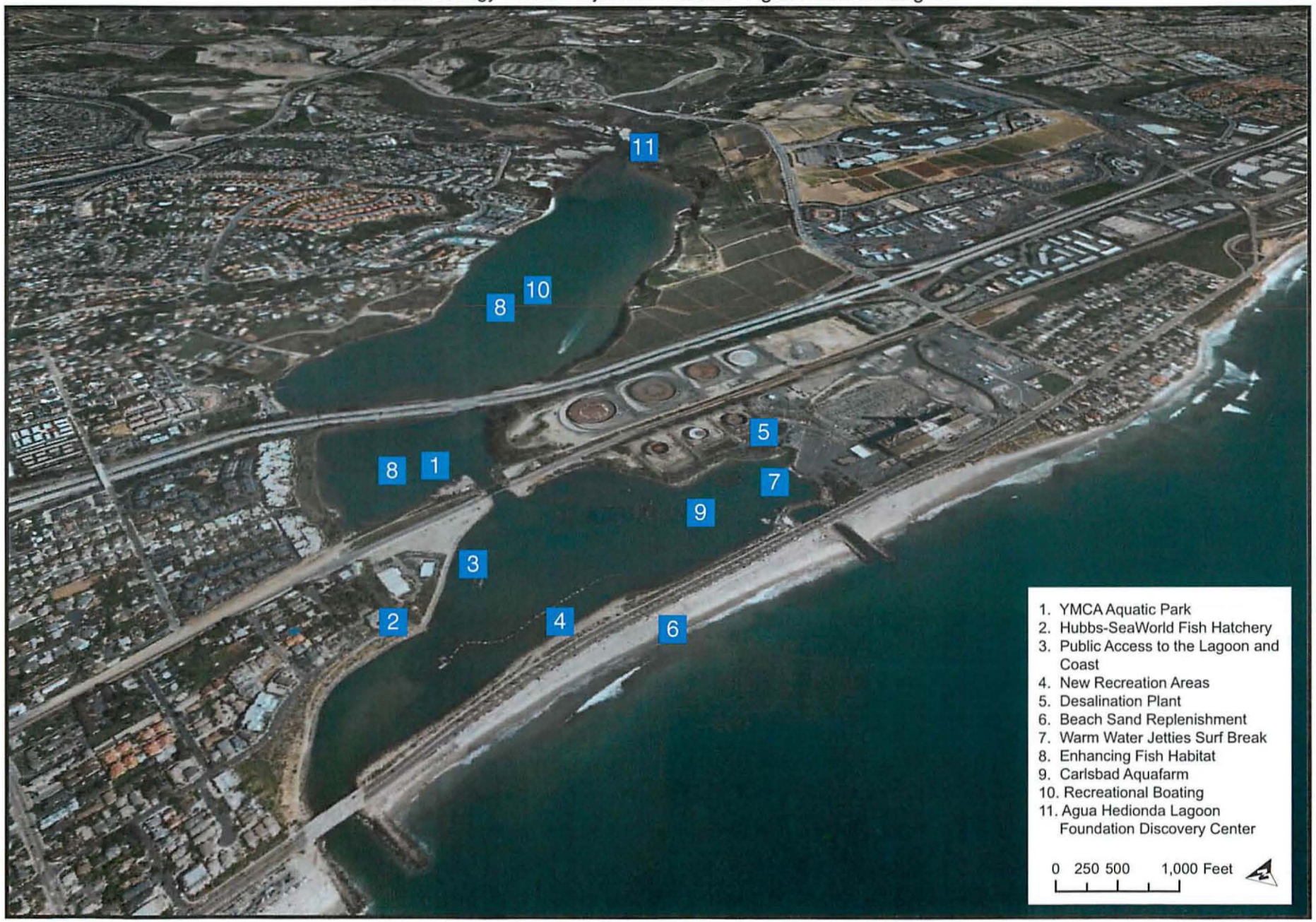
BIOLOGICAL RESOURCES

CALIFORNIA ENERGY COMMISSION, SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: USFW Service Critical Habitats - October 2014, ESRI, Bing Aerial Image

BIOLOGICAL RESOURCES - FIGURE 2

Carlsbad Energy Center Project Amendment - Agua Hedionda Lagoon



BIOLOGICAL RESOURCES

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Agua Hedionda Lagoon Foundation, ESRI

CULTURAL RESOURCES

Melissa Mourkas and Matthew Braun[1]

SUMMARY OF CONCLUSIONS

Staff finds that the amended CECP would not result in significant impacts to any historical built environment or ethnographic resources. However, staff is unable to make any conclusions or recommendations at this time with regard to direct, indirect, or cumulative impacts to potentially historical archaeological resources. Staff anticipates having sufficient information to conduct this analysis to include in the Final Staff Assessment (FSA).

The conditions of certification included below are those from the May 31, 2012 licensed CECP, and are the ones proposed by the petitioner in their May 2, 2014 Petition to Amend (PTA). Staff has not made any changes to these conditions of certification at this point; however, it is possible that the FSA will include modified conditions of certification based on the results of archaeological testing.

INTRODUCTION

This cultural resources assessment identifies the potential impacts of the amended CECP on cultural resources. Cultural resources are defined under state law as buildings, sites, structures, objects, areas, places, records, manuscripts, and historic districts (Cal. Code Regs., tit. 14, §§4852a, 5064.5(a)(3); Pub. Resources Code, §§5020.1(h, j), 5024.1[e][2, 4]). Three broad classes of cultural resources are considered in this assessment: prehistoric, ethnographic, and historic.

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 12,000 years ago and extended through the eighteenth century until A.D. 1769, when the first Europeans settled in California.

Ethnographic resources are those materials important to the heritage of a particular ethnic or cultural group, such as Native Americans or African, European, or Asian immigrants. They may include traditional resource collecting areas, ceremonial sites, topographic features, value-imbued landscapes, cemeteries, shrines, or ethnic neighborhoods and structures. Ethnographic resources are variations of natural resources and standard cultural resource types. They are subsistence and ceremonial locales and sites, structures, objects, and rural and urban landscapes assigned cultural significance by traditional users. The decision to call resources "ethnographic" depends on whether associated peoples perceive them as traditionally meaningful to their identity as a group and the survival of their lifeways.[2]

[1] Mourkas – Built environment resources; Braun – Archaeological and ethnographic resources.
[2] A “lifeway,” as used herein, refers to any unique body of behavioral norms, customs, and traditions that structure the way a particular people carry out their daily lives.

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, structures, traveled ways, artifacts, or other evidence of human activity. Under federal and state requirements, historical cultural resources must be greater than fifty years old to be considered of potential historic importance. A resource less than fifty years of age may be historically important if the resource is of exceptional importance.

For the amended CECP, staff provides an overview of the environmental setting and history of the project area, an inventory of the cultural resources identified in the project vicinity, and an analysis of the potential impacts from the proposed project using criteria from the California Environmental Quality Act (CEQA). The primary concern is to ensure that all potential impacts are identified and that conditions are set forth that ensure that impacts are mitigated below the level of significance.

If cultural resources are identified, staff determines whether there may be a project-related impact to them. If the cultural resources cannot be avoided, staff determines whether any of the impacted resources are eligible for the California Register of Historical Resources (CRHR). If impacted resources are eligible for the CRHR, staff recommends mitigation measures that ensure that impacts to the identified cultural resources are reduced to a less-than-significant level.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

Projects proposed before the Energy Commission are reviewed to ensure that the proposed facilities would comply with all applicable laws, ordinances, regulations, and standards (Pub. Resources Code, §25525; Cal. Code Regs., tit. 20, §§1702[n], 1744[b]).

See **Cultural Resources Table 1** for a summary of cultural resources LORS applicable to the project.

Cultural Resources Table 1
Laws, Ordinances, Regulations, and Standards

Applicable LOR	Description
State	
Public Resources Code, §§5097.98(b) and (e)	Requires a landowner on whose property Native American human remains are found to limit further development activity in the vicinity until s/he confers with the Native American Heritage Commission (NAHC)-identified Most Likely Descendents (MLDs) to consider treatment options. In the absence of MLDs or of a treatment acceptable to all parties, the landowner is required to reinter the remains elsewhere on the property in a location not subject to further disturbance.
Public Resources Code, §5097.99	§5097.99 prohibits the acquisition, possession, sale, or dissection with malice or wantonness of Native American remains or artifacts taken from a Native American grave or cairn.
Health and Safety Code, §7050.5	This code prohibits the disturbance or removal of human remains found outside a cemetery. It also requires a project owner to halt construction if human remains are discovered and to contact the county coroner.
Civil Code, §1798.24	Provides for non-disclosure of confidential information that may otherwise lead to harm of the human subject divulging confidential information
Government Code, §6250.10—California Public Records Act	Provides for non-disclosure of records that relate to archaeological site information and reports maintained by, or in the possession of, the Department of Parks and Recreation (DPR), the State Historical Resources Commission, the State Lands Commission, the NAHC, another state agency, or a local agency, including the records that the agency obtains through a consultation process between a California Native American tribe and a state or local agency.
Local	
County of San Diego Guidelines for Determining Significance, Cultural Resources: Archaeological and Historic Resources 2007	These guidelines are used by county staff for the review of discretionary projects and environmental documents pursuant to CEQA and assist in providing a consistent, objective, and predictable evaluation of significant effects (San Diego County 2007).
City of Carlsbad General Plan – Open Space and Conservation Element 2006	Encourages property owners to use all available incentives to preserve historic resources, including tax incentives and regional, state, and federal programs that promote cultural preservation to upgrade and redevelop property vitality; encourages the rehabilitation of historic structures through adoption of the Historic Building Code; and incorporates the cultural resource guidelines in the environmental review of development applications (City of Carlsbad 2006:34-36).

SETTING

Information provided regarding the setting of the amended CECP places it within geographical and geological contexts and specifies the technical description of the project. Additionally, the prehistoric, ethnographic, and historical settings provide the contexts for the CRHR evaluation of the historical significance of any identified cultural resources within the PAA.

REGIONAL SETTING

Like the licensed CECP, the amended CECP would be located in northwestern San Diego County (CH2M Hill 2014: Figure 1.3-1). The proposed project site is located on the coastal plain at the western edge of the Peninsular Ranges physiographic province

of Southern California. The region is within the geomorphic province of the Peninsular Ranges, which extend south into Baja California and west into the Pacific Ocean and make up the Southern Channel Islands, and are bounded on the east by the Colorado Desert. This portion of northwestern San Diego County has undergone a geological process for the past 54 million years known as marine regression, wherein the previously submerged seafloor becomes exposed. Thus, this marine regression has resulted in a thick sequence of marine and non-marine sedimentary rocks on the seaside terrain.

PROJECT, SITE, AND VICINITY DESCRIPTION

The amended project site is located in the urban, beachside city of Carlsbad. Like the licensed CECP, the project site is bordered on the north by the Agua Hedionda Lagoon; on the east by Interstate 5 (I-5) freeway and agricultural fields; on the south/southeast by residential and commercial properties; and, on the west by Carlsbad Boulevard and the Pacific Ocean.

Environmental Setting

Identifying the kinds and distribution of resources necessary to sustain human life in an environment, and the changes in that environment over time is central to understanding whether and how an area was used during prehistory and history. During the time that humans have lived in California, the region in which the project site is located has undergone several climatic shifts. These shifts have resulted in variable availability of vital resources, and that variability has influenced the scope and scale of human use of the project vicinity. Consequently, it is important to consider the historical character of local climate change, or the paleoclimate, and the effects of the paleoclimate on the physical development of the area and its ecology. An overview is provided here for the reader, with a more detailed environmental setting provided in **Cultural Resources Appendix A.**

Overview

The amended CECP project site is situated at an elevation of approximately 50 feet above mean sea level (amsl) on southwestern shore of the Agua Hedionda Lagoon, and proximate to the Pacific Ocean. The modern climate of the project vicinity is Mediterranean, influenced by the adjacent open coastline.

The paleoclimate and ecology of the project vicinity is complex, but well-represented by the following general framework: a moderately cool and moist period known as the Anathermal (ca. 10,000–7500 B.P.); a warmer and drier period referred to as the Altithermal (ca.7500–4000 B.P.); the moisture and temperature conditions that resemble those of today known as the Medithermal (ca. 4000 B.P.–present (Moratto et al. 1978:147-148).

Geologically, the amended project site is situated on two types of artificial fill (a silty to slightly clayey sand, and a sandy conglomerate fill), as well as marine and non-marine terrace deposits of Late Pleistocene age (80,000 to 120,000 years old), which overlay an Eocene-aged (about 50 million years old) marine bedrock strata. The geomorphology considers how and when the underlying soils and sediments at the

amended project area developed, and is discussed in more detail in **Cultural Resources Appendix A**.

The ecological community most closely associated with the amended CECP project area, and that which would have been available to prehistoric Native Americans, is that associated with the Agua Hedionda estuary. There are three primary vegetation communities that would have been present during prehistoric times, the Diegan coastal sage scrub habitat, marsh, estuarine, freshwater and saltwater marsh, and other wetland habitats, and riparian woodland. A host of plants and animals that are useable for food and other resources live in these habitats and are detailed more fully in **Cultural Resources Appendix A**.

Prehistoric Setting

The regional archaeological history for the San Diego region presented by Gallegos (2002: Figure 3.3) is most applicable to the amended project area. This sequence identifies two periods, the Early/Archaic Period (ca. 10,000 years before present (B.P.) to ca. 1,300 B.P.), and the Late Period (ca. 1,300 B.P. to historic contact), with various traditions/complexes identified within these periods which are discussed in more detail in **Cultural Resources Appendix A**. The periods are primarily separated on the basis of differences in material culture through time, e.g., projectile point technologies, use or non-use of various food-processing materials, burial practices, or ceramics.

Ethnographic Setting

Agua Hedionda and the land that surrounds the lagoon and creek was aboriginal territory between the Luiseño to the north and the Kumeyaay (also referred to as the Ipai and Tipai or Diegueño) to the south (Bean and Shipek 1978: Figure 1; Luomala 1978: Figure1). Thus, both groups have ties to the project area and will be discussed throughout this cultural resources analysis.

The amended CECP is located in the coastal portion of the Luiseño and Kumeyaay mainland territory and adjacent to the, now dredged, Agua Hedionda Estuary. Alfred Kroeber (1976: Plate 57) provides a map of ethnographic village and camp locations. Palamai is identified on this map as being located on the Pacific coast in the Carlsbad region, and Kroeber (1907:147) suggests that Palamai was the Luiseño name of Agua Hedionda. This ethnographic village later provided the name ‘Palomar’ to several of the surrounding features of Carlsbad (e.g., Palomar Airport Road, Palomar Mountain). More detailed ethnographic information is included in **Cultural Resources Appendix A**.

Contemporary Tribal Entities with Ethnographic Affiliations

There are numerous Luiseño and Kumeyaay tribes, nations and other organizations. Some of these groups are federally recognized and others have not yet received federal recognition; however, the Energy Commission consults will all tribes on the list provided by the Native American Heritage Commission (NAHC), regardless of recognition status. The NAHC letter to staff (Singleton 2014) identified the tribal entities listed in **Cultural Resources Appendix A**.

Historic Setting

The historic period in the vicinity of the project site can be separated into three major periods, the Spanish Period (1769-1822), the Mexican Period (1822-1848), and the American Period (1848-Present). The first significant Euro-American settlement in the area began with the Rancho Agua Hedionda. Another notable event in the history of the area included the owner of the Rancho, Robert Kelly, granting a coastal right-of-way to the Southern California Railway for a railroad in 1880. Construction of the railroad initiated development on the coast, including railroad depot stops and a stage coach operation. At the northern depot in Carlsbad, Frazier's Station, two wells provided water for railroad passengers, and the water became infamous for its high quality. With the influx of publicity and tourism regarding the touted health aspects of the water, a resort hotel was built and the land was subdivided for other commercial and residential interests, initiating a population boom in the region until the late 1880s. Development in Carlsbad was stagnant until about 1914 when the South Coast Land Company acquired much of the land owned by the Carlsbad Land and Mineral Water Company, and promoted real estate development along the coast. The Encina Power Station came online in 1954 to accommodate the energy needs of the burgeoning population growth in coastal Southern California (Harmon 1961). More detailed historic period information is included in **Cultural Resources Appendix A**.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

Regulatory Context

The regulatory context with regard to cultural resources for the amended CECP has not changed since the licensed CECP was approved; however, for the convenience of the reader the context is included here.

California Environmental Quality Act

Various laws apply to the evaluation and treatment of cultural resources. CEQA requires the Energy Commission to evaluate cultural 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.

CEQA and the CEQA Guidelines define significant cultural resources under two regulatory definitions: historical resources and unique archaeological resources. A historical resource is defined as a "resource listed in, or determined to be eligible by the State Historical Resources Commission, for listing in the CRHR", or "a resource listed in a local register of historical resources or identified as significant in a historical resource survey meeting the requirements of Section 5024.1(g) of the Public Resources Code," or "any object , building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California, provided the agency's determination is supported by substantial evidence in light of the whole record." (Cal. Code Regs., tit. 14,

§15064.5[a].) Historical resources that are automatically listed in the CRHR include California historical resources listed in or formally determined eligible for the National Register of Historic Places (NRHP) and California Registered Historical Landmarks from No. 770 onward (Pub. Resources Code, §5024.1[d]).

Under CEQA, 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 (and may meet more than one) of the following four criteria (Pub. Resources Code, §5024.1):

- Criterion 1, is associated with events that have made a significant contribution to the broad patterns of our history;
- Criterion 2, is associated with the lives of persons significant in our past;
- Criterion 3, embodies the distinctive characteristics of a type, period, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or
- Criterion 4, has yielded, or may be likely to yield, information important to history or prehistory.

In addition, historical resources must also possess integrity of location, design, setting, materials, workmanship, feeling, and association (Cal. Code Regs., tit. 14, §4852[c]).

Even if a resource is not listed or determined to be eligible for listing in the CRHR, CEQA allows the lead agency to make a determination as to whether the resource is a historical resource as defined in Public Resources Code, sections, 5020.1(j) or 5024.1.

In addition to historical resources, archaeological artifacts, objects, or sites can meet CEQA's definition of a unique archaeological resource, even if it does not qualify as a historical resource (Cal. Code Regs., tit. 14, §15064.5[c][3]). Archaeological artifacts, objects, or sites are considered unique archaeological resources if "it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

1. Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information.

2. Has a special and particular quality such as being the oldest of its type or the best available example of its type.

3. Is directly associated with a scientifically recognized important prehistoric or historic event or person." (Pub. Resources Code, §21083.2[g].)

To determine whether a proposed project may have a significant effect on the [cultural resources] environment, staff analyzes the project's potential to cause a substantial

[3] The Office of Historic Preservation (OHP 1995:2) endorses recording and evaluating resources over 45 years of age to accommodate a five-year lag in the planning process.

adverse change in the significance of historical or unique archaeological resources. The significance of an impact depends on:

- The cultural resource affected;
- The nature of the resource's historical significance;
- How the resource's historical significance is manifested physically and perceptually;
- Appraisals of those aspects of the resource's integrity that figure importantly in the manifestation of the resource's historical significance; and
- How much the impact will change those integrity appraisals.

At Title 14, California Code of Regulations, section 15064.5(b), the State CEQA Guidelines define a substantial adverse change as "physical demolition, destruction, relocation or alteration of the resource or its immediate surroundings such that the significance of an historical resource would be materially impaired."

HISTORICAL RESOURCES INVENTORY

The development of an inventory of historical resources in and near the proposed project area is the requisite first step in the assessment of whether the project might, under Public Resources Code, section 21084.1, cause a substantial adverse change in the significance of a historical resource, and could, therefore, have a significant effect on the environment. The effort to develop the inventory has involved conducting a sequence of investigatory phases that includes doing background research, consulting with local Native American communities, conducting primary field research, interpreting the results of the inventory effort, as a whole, and evaluating whether found cultural resources are historically significant. This section discusses the methods and the results of each inventory phase, develops the historical resources inventory for the analysis of the proposed project, and interprets the inventory to assess how well it represents the archaeology of the PAA.

Project Area of Analysis

The PAA is a concept that staff uses to define the geographic area in which the proposed project has the potential to affect cultural resources. The effects that a project may have on cultural resources may be immediate, further removed in time, or cumulative. They may be physical, visual, auditory, or olfactory in character. The geographic area that would encompass consideration of all such effects may or may not be one uninterrupted expanse. It may include the project area, which would be the site of the proposed plant (project site), the routes of requisite transmission lines and water and natural gas pipelines, and other offsite ancillary facilities, in addition to one or several discontiguous areas where the project could be argued to potentially affect cultural resources.

Staff defines the archaeological PAA as comprising (a) the proposed project site and a 1-mile radius (**Cultural Resources Figure 1)**. The architectural study is defined as the area set one parcel beyond the proposed project site (**Cultural Resources Figure 2)**.

For ethnographic resources, the area of analysis is expanded to take into account sacred sites, traditional cultural properties (places), and larger areas such as

ethnographic landscapes that can be vast and encompassing, including viewsheds that contribute to the historical significance of such historical resources. The NAHC assists project-specific cultural resources consultants and agency staff in identifying these resources, and consultation with Native Americans and other ethnic or community groups may contribute to defining the area of analysis. For the amended CECP, staff identified one potential ethnographic resource in the area, the village of Palamai at Agua Hedionda, and so defined an area of analysis that includes the estuary in its entirety and the surrounding landforms. The ethnographic PAA directly corresponds to the proposed Agua Hedionda Prehistoric Archaeological District (**Cultural Resources Figure 1**).

Background Research

The background research for the present analysis employs information that the project owner/petitioner and Energy Commission staff gathered from literature and record searches, and information that staff obtained as a result of consultation with affiliated Native American entities and the city of Carlsbad. The purpose of the background information is to help formulate the initial cultural resources inventory for the present analysis, to identify information gaps, and to inform the design and the interpretation of the field research that will serve to complete the inventory.

Literature Review and Records Search

The literature review and records search portion of the background research attempts to gather and interpret documentary evidence of the known cultural resources in the project area of analysis. The source for the present search was the South Coastal Information Center (SCIC) of the California Historical Resources Information System (CHRIS) located at San Diego State University.

Methods and Results

CH2M Hill, the cultural resources consultant to the petitioner, requested a records search from the SCIC for the licensed CECP proceeding on June 25, 2007. The records search covered the proposed project site and a 1-mile radius surrounding it (CECP 2007: Appendix 5.3C). The records search, conducted by SCIC staff on July 5, 2007, included examinations of the SCIC's GIS database of previous cultural resource studies and known cultural resources as well as:

- The NRHP listings and determinations of eligibility.
- The CRHR listings and determinations of eligibility.
- Historic Property Data Records.
- Known/recorded archaeological sites and associated Primary Forms.
- Bibliography of all reports, surveys, excavations, inventories, and studies.
- Historic maps.
- Historic addresses

In partial response to staff's Data Request 31, the petitioner conducted an updated cultural resources record search at the SCIC on October 3, 2014. In addition, staff

conducted an online search for proposed projects and environmental impact analyses using the websites of the cities of Carlsbad, Encinitas and Oceanside. The purpose of this search was to identify cultural resource analyses that might not have been submitted to the SCCIC or were submitted after October 3, 2014.

The literature review and records search indicate that 85 previous cultural resource studies have been conducted in the records search area; of these, 13 cultural resource studies have been conducted within or adjacent to the PAA. Additionally, a total of 35 cultural resources have been previously recorded in the records search area. Of these, three are located in the amended CECP project area (see **Cultural Resources Table 2**). Tables detailing the literature review results are included in **Cultural Resources Appendix A.**

Cultural Resources Table 2
Literature Review Results: Previously Recorded Cultural Resources in the amended CECP Project Area

Resource Designation	Type	Description	Location	Significance	Source
Archaeological Resources					
(unknown prefix) 210/W-127A	Prehistoric	Cobble hearths, shell, lithics	PAA		Rogers N.D.
CA-SDI-16885	Prehistoric	Shell and lithic scatter, FAR, scrapers, hammerstones	PAA		CH2M Hill 2007
CA-SDI-6751	Prehistoric	Shell scatter	PAA		CH2M Hill 2007

Additional Literature Review

Staff conducted additional research at the Energy Commission in-house library through inter-library loans services, California History Room of the California State Library in Sacramento, and online sources, as well as consulted the reports contained in the applicant's records searches (CH2M Hill 2007: Appendix 5.3C; Helton 2014). The purpose of this research was to obtain an understanding of the natural and cultural development of the land in and around the PAA, identify locations of potential historic built environment and archaeological resources, and have a partial, chronological record of disturbances in the PAA. All consulted historic maps are presented in **Cultural Resources Appendix A**.

Native American Consultation

Methods

The Governor's Executive Order B-10-11, executed on September 19, 2011, directs state agencies to engage in meaningful consultation with California Indian Tribes on matters that may affect tribal communities. The California Resources Agency adopted a Final Tribal Consultation Policy on November 20, 2012 that extols informed decision

making by collaboratively working with tribes to seek positive, achievable, and durable outcomes. The Energy Commission Siting Regulations require applicants to contact the NAHC for information on Native American sacred sites and a list of Native Americans interested in the project vicinity. The applicant is then required to notify those Native Americans on the NAHC's list about the project and include a copy of all correspondence with the NAHC and Native Americans, including any written responses received, as well as a written summary of any oral responses in the AFC (Cal. Code Regs., tit. 20, §1704[b][2], Appendix B[g][2][D]).

The NAHC is the primary California government agency responsible for identifying and cataloging Native American cultural resources, providing protection to Native American human burials and skeletal remains from vandalism and inadvertent destruction, and preventing irreparable damage to designated sacred sites and interference with the expression of Native American religion in California. It also provides a legal means by which Native American descendents can make known their concerns regarding the need for sensitive treatment and disposition of Native American burials, skeletal remains, and items associated with Native American burials.

The NAHC maintains two databases to assist cultural resources specialists in identifying cultural resources of concern to California Native Americans, referred to by staff as Native American ethnographic resources. The NAHC's Sacred Lands database has records for areas, places, sites and objects that Native Americans consider sacred or otherwise important, such as cemeteries and gathering places for traditional foods and materials. The NAHC Contacts database has the names and contact information for individuals, representing a group or themselves, who have expressed an interest in being contacted about development projects in specific areas.

Results

In an effort to conduct an independent analysis of ethnographic resources, staff also requested information from the NAHC on the presence of sacred lands in the vicinity of the proposed project, as well as a list of Native Americans to whom inquiries should be sent to identify both additional cultural resources and any concerns the Native Americans may have about the proposed project.

Staff contacted the NAHC on July 16, 2014 and requested a search of the Sacred Lands File and a Native American contacts list. The NAHC responded on July 17, 2014 with a list of Native Americans interested in consulting on development projects in the project area. A check of the NAHC Sacred Lands File resulted in the presence of multiple Native American traditional sites/places within the project site. Staff sent letters to all of the NAHC-listed tribes on August 19, 2014 inviting them to comment on the proposed project and offered to hold face-to-face consultation meetings if any tribal entities so requested. Follow-up phone calls were made by staff to those groups from whom staff had not received a response on September 17, 2014. Additional phone calls and emails occurred on September 2, 3, 16, and 22, 2014. Staff received several comments from multiple tribal entities that the project area is very sensitive for cultural resources and human remains and that there are significant concerns regarding impacts to these resources, and that it is very important to have Native American monitors, both Luiseño and Kumeyaay, during all project activities that have potential to impact cultural resources.

A face-to-face meeting was held with two representatives of the San Luis Rey tribe on September 26, 2014. The conversation concerned the known sites in the project area, the need to test these sites for CRHR significance, the need for Native American monitors, and the high potential for buried sites in the project area.

In accordance with federal and state law, regulations, policies, and guidance, staff considered the proposed project's potential to cause significant adverse impacts on environmental justice populations (E.O. 12898; 40 C.F.R., §§1508.8, 1508.14; Cal. Code Regs., tit. 14, §§15064(e), 15131, 15382; Cal. Code Regs., tit. 20, §1704(b)(2), App. B(g)(7); CEQ 1997). **Socioeconomics Figure 1** indicates that an environmental justice population does not exist within a six-mile buffer of the proposed project area (see the **SOCIOECONOMICS** section of this PSA for a discussion of methods and composition of the environmental justice population). Staff also reviewed the ethnographic and historical literature, and corresponded with Native American tribes, to determine whether any environmental justice populations use or reside in the project area. Staff concluded that because Indian tribes maintain long-standing ancestral and traditional use practices and concepts connected to the environment and to their identities as Indian people, they do constitute an environmental justice population.

These efforts are documented in the "Ethnographic Setting" and "Native American Consultation" subsections, which can be found in **Cultural Resources Appendix A**.

Cultural Resources Distribution Models

One critical use of the information drawn together during the background research for a cultural resources analysis is to inform the design and the interpretation of the field research that will complete the cultural resources inventory for the analysis. The background research for the present analysis of the amended CECP within the PAA was recorded for the May 31, 2012 licensed CECP and the May 2, 2014 PTA (Carlsbad Energy Center LLC. 2007, CH2M Hill 2014). A further role of background research is to help develop predictive or anticipatory models of the distribution of cultural resources across the PAA. Such models of the types of archaeological, ethnographic, and built-environment resources, and the patterns of their distribution across and beneath the surface of the landforms of the PAA, provide the means to tailor more appropriate research designs for the field investigations that will complete a cultural resources inventory, and help gauge the degree to which the results of those investigations may reflect the actual population of archaeological, ethnographic, and built-environment resources in the PAA. Such models also provide important contexts for the ultimate interpretation of the results of those investigations.

Models of the distribution of prehistoric archaeological sites, of ethnographic resources, and of historical archaeological sites and built-environment resources are developed here and draw on information in the "Environmental Setting," "Prehistoric Setting," "Ethnographic Setting," and "Historic Setting" subsections of **Cultural Resources Appendix A**, in addition to the information in the "Background Research" subsection of **Cultural Resources Appendix A**. Staff formulated data requests during the discovery phase of the present certification process on the basis of these models to ensure the collection of enough information to factually support the conclusions of this analysis. The discussions in the "Interpretation of Results" subsection below also employ the models.

Model of Prehistoric Archaeological Resources

The analysis of the information in the "Environmental Setting," "Prehistoric Setting," and "Background Research" subsections of the **Cultural Resources Appendix A** leads to the conclusion that the likelihood of prehistoric archaeological deposits across the surface of the PAA is low and subsurface prehistoric archaeological deposits could be present in the PAA.

According to the *Geomorphology* subsection in **Cultural Resources Appendix A**, the sandy ocean shoreline present today began to form between 6000 and 5000 B.P., and was in place by about 4000 B.P. Particularly in the last 4,000 years, sand spits and droughts periodically closed larger estuaries and open bays, producing shallow lagoons and wetlands attractive to waterfowl (Masters and Aiello 2007:40). The project area is unique in that the Agua Hedionda estuary provided vast resources for prehistoric peoples living close to it. Long-term human habitation with respect to the estuary would have been restricted to the higher elevations around the margins of the estuary, with resource processing (e.g., shellfish or lithics) locations located closer to the water. It should be noted that the location of estuaries, lagoons, and bolsas changed over the past 4,000–5,000 years (Engstrom 2006:852, 854). The entirety of the area around the estuary, therefore, cannot be assumed to have been uninhabitable for the entirety of the last 5,000 years. The resource base provided by the estuary is known to have been a draw to human use and habitation of the project vicinity (e.g., Gallegos 1991; Koerper et al. 1991; Moriarty 1967).

The petitioner suggests that the geomorphology and previous ground disturbance at the proposed project site has reduced the likelihood of encountering buried archaeological resources to a low level (Carlsbad Energy Center LLC. 2014:5.3-2; Helton 2014: 4-1 – 4-2). The PTA points out that construction of the existing EPS and subsequent infrastructure development resulted in a large amount of ground disturbance and placement of fill throughout most of the project area. Staff agrees that prior disturbance and placement of fill reduces the probability of encountering intact buried archaeological resources, but does not preclude their existence or their presumed integrity.

Whether the petitioner would encounter buried prehistoric archaeological deposits during construction depends on several factors, including the location and depth of construction, the depositional character and the ages of the sedimentary deposits that construction would disturb, the presence of buried land surfaces or buried surfaces of ancient soils (paleosols), the duration or stability of any paleosols, the post-depositional character of geomorphic processes in the PAA, and the nature of past human activities in the area. The information provided in the PTA, Helton (2014) and staff's analysis indicate that the proposed project site is on an uplifted marine terrace, suggesting that the most likely form of deposition during the Holocene (the time period in which humans occupied the area) would be the result of aeolian action. Much or all of any such deposition would have occurred within the last 10,000 years. The *Environmental* and *Prehistoric* settings in **Cultural Resources Appendix A** show that the Agua Hedionda estuary contains abundant natural resources, and as evidenced by the recordation of three cultural resources in the PAA, this area was a draw to human use of the project vicinity. Given these qualities of the PAA, staff suggests that the PAA is likely to contain buried archaeological resources.

Model of Ethnographic Resources

Ethnography fulfills a supporting role for other anthropological disciplines as well as providing contributions on its own merits. For example, ethnography provides a supporting role to the discipline of archaeology by providing a cultural and historic context for understanding the people associated with the material remains of the past. By understanding the cultural milieu in which archaeological sites and artifacts were manufactured, utilized, or cherished, this ethnographic information can provide greater understanding for identification efforts, making significance determinations per the National Historic Preservation Act (NHPA) or CEQA, as applicable; eligibility determinations for the NRHP or the CRHR, as applicable; and for assessing if and how artifacts are subject to other cultural resources laws, such as the Native American Graves Protection and Repatriation Act.

In addition, ethnography has merits of its own by providing information concerning ethnographic resources that tend to encompass physical places, areas, or elements or attributes of a place or area. Ethnographic resources have overlap and affinity to historic preservation property types referred to as cultural landscapes, traditional cultural properties (TCPs), sacred sites, heritage resources, historic properties, or historical resources that are areas or places, and specific historic property or historical resource types of sites, objects, buildings, structures, districts, areas or places. There is notable overlap in terminology when referring to ethnographic resources. Studies that focus on specific ethnographic resource types may also take on names such as ethnogeography, ethnobotany, ethnozoology, ethnosemantics, ethnomusicology, etc. In general, the ethnographic endeavor attempts to minimize human conflict by facilitating an iterative cross-cultural understanding and, by extension, self-awareness.

While several definitions of ethnographic resources can be found in historic preservation literature, the National Park Service (NPS) provides the most succinct and commonly used definition (NPS 2007: Chapter10):

> Ethnographic resources are variations of natural resources and standard cultural resource types. They are subsistence and ceremonial locales and sites, structures, objects, and rural and urban landscapes assigned cultural significance by traditional users. The decision to call resources "ethnographic" depends on whether associated peoples perceive them as traditionally meaningful to their identity as a group and the survival of their life ways.

Ethnographic Methods

Ethnographic methods, when applied to projects of limited size and scope involve four steps.[4]

Step 1 involves reviewing the project description and mapped project location and, based upon the geographic and environmental setting, formulate preliminary guiding questions that may be asked of people with cultural affiliation to the project area.

[4] See Pelto 2013, Chapter 16 for an overview of applied ethnographic methods for conducting focused inquiry conducted in limited timeframes.

Step 2 involves contacting, informally discussing with, (or formally interviewing) people who might have a cultural relationship or affiliation to a given area.

As Step 2 is being conducted, a parallel Step 3 involves archival "search, retrieve, and assess" process that should be undertaken to provide supporting or conflicting information to what is being discovered through the discussion process. In addition to archives, book stores, and other informational repositories (e.g., the internet), the people themselves or other ethnographers with previous experiences with the same people, may provide source materials. Findings in Step 3 may require a repetition of Step 2.

Step 4 involves field visit(s) that are intended to help the ethnographer triangulate between what people currently say, what people have written in the past, and what is actually or perceived to be in the project vicinity as a potential ethnographic resource.

Preliminary Guiding Research Domains

Based upon the project description and project location maps three preliminary Guiding Questions were developed.

- The Luiseño village of Palamai is located on a map (Kroeber 1976: Plate 57) in the vicinity of Carlsbad. Research the location and any information regarding this village site.
- Research contemporary Luiseño and Kumeyaay connections to archaeological sites at the project site and around Agua Hedionda.
- Research Palamai and contemporary Luiseño and Kumeyaay connections with the Palamai settlement.

As documented in the "Native American Consultation" subsection, staff made efforts to make preliminary contact with Native Americans affiliated with the project area.

Meetings were held around the proposed project area in September of 2014. One meeting was held with representatives of the San Luis Rey Tribe's cultural resources group. Discussions focused on the known sites in the project area, sites around Agua Hedionda Lagoon, the need for Native American monitors, and the high potential for sites in the project area.

Interviews

Staff did not complete any interviews for inclusion in the PSA.

Archival Research

Staff made efforts to seek, obtain, and assess culturally relevant information from various archival sources. Information specifically sought related to Palamai, the relationship between Palamai and the Luiseño and Kumeyaay, as well as other archaeological sites in the vicinity of Agua Hedionda. The California History Room of the California State Library, located in Sacramento, was also used for retrieving ethnographic information.

Field Visit

Ethnographic staff visited the project area and its surroundings on September 24, 2014. Staff's visual observation of the project site and vicinity did not result in the field identification of ethnographic resources because of the paved character and industrial nature of the area.

Ethnographic Method Constraints

Constraints on the ethnographic methods described above are twofold:

1. There has been a significant amount of loss of traditional cultural knowledge on the part of the Luiseño and Kumeyaay, and

2. Little information is available concerning Palamai, other than Kroeber's map of the village and the interpretation of the word Palamai as meaning "Agua Hedionda" (Kroeber 1907:147).

Model of Historical Archaeological Resources

The analysis of the information in the "Environmental Setting," "Historic Setting," and "Background Research" of **Cultural Resources Appendix A**, leads to the conclusion that historic archaeological deposits are likely present in low frequency across the surface of the PAA and subsurface historic archaeological deposits could be present as well.

The primary historic land uses in the vicinity of the amended CECP include agricultural and industrial uses. Thus, buried historic archaeological resources in the PAA are expected to consist of refuse deposits associated with domestic, railroad, and industrial disposal.

Cultural Resources Inventory Fieldwork

The field efforts to identify cultural resources in the PAA consist of the project owner's/petitioner's pedestrian archaeological and historic built-environment surveys, archaeological, built-environment, and monitoring reports for other projects in the PAA, and staff's field visits to the proposed project site and vicinity (see **Cultural Resources Tables A1** and **A2** in **Cultural Resources Appendix A**). On the basis of the applicant's/petitioner's background research for the present analysis, staff investigations and the results of the field efforts that are presently available, the total cultural resources inventory for the PAA includes 3 archaeological, 1 ethnographic, and 12 built-environment resources, in addition to 1 archaeological district.

This section discusses the methods and the results of each field inventory phase and interprets the resultant inventory relative to the cultural resources distribution models above to assess how well the inventory represents the archaeology of the project area. Descriptions of each cultural resource in the inventory, consideration of and potential impacts on archaeological resources that may lie buried on the project site, and proposed mitigation measures for significant impacts may be found in the "California Register of Historical Resources Eligibility" and "Identification and Assessment of Direct Impacts on Built-Environment Resources and Proposed Mitigation" subsections below.

Pedestrian Archaeological Surveys

Methods

As stated in the PTA, an archaeologist meeting the Secretary of the Interior's professional qualifications surveyed the amended project site on February 4, 2014. The amended project site consisted primarily of buildings, structures, and pavement, rendering ground surface visibility to zero except in areas of unpaved dirt and grass (Carlsbad Energy Center LLC. 2007: Appendix 5.3E; Helton 2014:Figure DR31-1).

Results

No evidence of the three previously recorded archaeological resources was identified on the surface in the PAA as a result of the petitioner's survey (Carlsbad Energy Center LLC. 2007: Appendix 5.3F:3; Helton 2014: 4-3). However, staff's research and site visit has led to the conclusion that an archaeological district, the Agua Hedionda Archaeological District, is present in the PAA. Additionally, staff's research and site visit suggests that there is a potential for two of the previously recorded sites, CA-SDI-16885 and (unknown prefix) 210/W-127A to be extant subsurface in the PAA. Staff requested the petitioner to determine the subsurface extent and CRHR eligibility of these sites in areas where there could be impacts (Data Requests 34 and 35), but the petitioner objected to conducting this testing. Thus, staff has proposed to test these sites itself and anticipates having the information to include in the cultural resources analysis for the FSA.

Results of Ethnographic Resources Investigations

Staff research and site visit leads staff to suggest that an ethnographic resource consisting of the Luiseño village of Palamai may be present in the PAA.

Historic Built Environment Survey

Methods: 2007 Field Survey

For the original AFC, JRP Historical Consulting, LLC (petitioner's consultant) conducted an architectural field survey to assess the potential for historic architectural resources at the licensed CECP location. JRP established a PAA that included above-ground fuel oil storage tanks (ASTs) 5, 6 and 7, the Cannon Substation and a segment of the North County Transit District (NCTD) railroad tracks, which bisect the EPS property (JRP 2007:18). The architectural study area was limited to these resources.

In 2007, JRP identified three historic structures within the project area from the records search and the field survey. The only structure of historic age at the time was the Atchison, Topeka and Santa Fe Railway's "Surfline", recorded via the field survey. It is a 4000-foot long rail line that runs through the EPS property west of the CECP site, now owned by NCTD and used by freight and commuter trains, including Amtrak. The track was originally built in 1881-1882, and underwent a realignment in 1906. JRP evaluated this segment of the rail line on behalf of the petitioner. According to that evaluation, this resource did 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, the report found that continued development along the route had

impacted the integrity of the line; as such, little remains of the 1882 track except the location (CECP 2007a, Appendix 5.3B:19).

Also identified during this 2007 survey effort was the historical Carlsbad Santa Fe Depot located at 400 Carlsbad Village Drive (Previously 400 Elm Drive). This resource 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 amended project. Another address that exceeded 50 years of age in 2007 appears to be a private residence located at 519 Chinquapin Avenue, several blocks north of the lagoon. 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. It was classified as 6Y- determined ineligible for NRHP by consensus through the NHPA Section 106 process-not evaluated for CRHR or local listing in 1995. 519 Chinquapin is not locally listed as of 2014 - see **Cultural Resources Tables A7 and A8** in **Cultural Resources Appendix A** reflecting the 2014 update to the city's historic properties listings). There is considerable modern development located between the building and the licensed CECP (CECP 2007, Confidential Filing, Appendix 5.3C, Part 1). Staff concluded there would be no direct or indirect impacts to historic structures in the 2009 FSA.

Methods: 2014 Field Survey

Built environment staff reviewed the May 2, 2014 PTA and the April 29, 2014 Petition to Remove Obsolete Facilities (PTR), as well as the original September 2007 AFC, associated cultural resources documents, the September 2008 Project Enhancement and Refinement (PEAR) document, the November, 2009 FSA, the August 2011 Supplemental Staff Testimony, and the May 31, 2012 Commission Final Decision for the licensed CECP. Given the proposed modifications contained in the PTA and PTR (which were combined on September 24, 2014 by the Committee reviewing this project), including the proposed expansion of the areas slated for demolition west of the railroad tracks, expansion of the CECP footprint by 7 acres for new power plant construction purposes, and the complexity of the proposed project changes outlined in the **Project Description** section of this Preliminary Staff Assessment, staff concludes that there is insufficient information to analyze the proposed amendment's potential impacts on built-environment resources. Summarized below are the areas where the project data was insufficient for staff to complete an analysis of the potential impacts to the environment.

As noted in the discussion above, the licensed CECP included a very narrow built environment survey area, confined to the immediate construction area and two adjacent properties. In September of 2007, JRP (JRP 2007) conducted an architectural field survey to assess the potential for historic architectural resources at the licensed project location. The architectural study area considered the location of above ground fuel oil storage tanks (ASTs) 5, 6 and 7 -- the footprint where the 23-acre licensed CECP project was permitted for construction and operation after AST removal), the Cannon Substation, and a segment of the former AT&SF tracks, now owned by NCTD (Carlsbad Energy Center et al. 2008:5.3-15; CEC 2009:4.3-13). ASTs 5, 6 and 7 and the Cannon Substation were not evaluated for their significance as historical resources because

they were not 50[5] years of age at the time of the survey in 2007. The segment of the AT&SF railroad tracks within the EPS boundaries was the only built environment resource evaluated for its potential as a historical resource under CEQA. JRP concluded that the AT&SF railroad segment was not eligible for listing on either the NRHP or the CRHR. Energy Commission staff concurred with that conclusion in the FSA (CEC 2009). ASTs 5, 6 and 7 date either to the late 1960s to early 1970s (JRP 2007:18) or to 1972-1975-1977 (JRP 2014; 15). Depending on which date applies, anything constructed through 1969, would be 45 years or older in 2014. The Cannon Substation is attributed to 1976-1984 (JRP 2007:19), making it not of historic age and therefore there continues to be no need to study it.

The proposed amendment would be implemented within the bounds of the EPS, which was constructed in the 1950s and is of historic age. The EPS and affiliated structures have been evaluated for significance under CEQA (Carlsbad Energy Center 2014a:5.3-2; White 2013; JRP 2014). The proposed amendment would affect the EPS by demolishing most of its structures and associated facilities. Several known structures associated with the EPS were not included in the survey and evaluation. These are the Substation Expansion Area and the Railroad Spur leading into the EPS building from the AT&SF line. Additional structures of the EPS slated for demolition are two large fire-suppression water tanks located on the adjacent SDG&E North Coast Service Center.

Considering the narrow study results of the licensed CECP, and the substantial modifications and changes proposed by the amended CECP, staff identified a PAA for which includes the active 95-acre EPS parcels, the 16-acre SDG&E service center parcel, and a one-parcel boundary typically used in urban projects. Consistent with Title 20, California Code of Regulations, sections 1704(b), 2012, Appendix B(g)(2)(C)(iii) and *Instructions for Recording Historical Resources* (OHP 1995:9), the PAA survey and evaluation needs to include not only the EPS but other resources 45 years or older within the PAA established by staff (**Cultural Resources Figure 2**), applying the CEQA historical significance criteria contained in Public Resources Code, section 21084.1, and Title 14, California Code of Regulations, section 15064.5(a).

Additional information based upon this PAA was requested in Data Requests nos. 36-38. Specifically, no. 36 and no. 37 requested the additional survey areas be evaluated and project impacts to historic resources, if any, identified. Initially the petitioner objected to these requests. The objections and staff's rationale for requesting the information was discussed at a public workshop held in Carlsbad on September 25, 2014. A subsequent response to the data requests docketed on October 17, 2014 (Carlsbad Energy Center Project 2014d) reiterated the petitioner's objection to expanding the study area and methodology beyond that required for the licensed CECP and the evaluation of the EPS, submitted as part of the May 2, 2014 PTA. Staff proceeded to investigate the historic-age properties within the PAA without the benefit of a survey or evaluation by the petitioner.

Built Environment staff Melissa Mourkas conducted a reconnaissance survey of the PAA and toured the project site on September 24, 2014. In addition to the EPS, three

[5] JRP limited their investigation to resources 50 years or older. The Energy Commission uses 45 years or older in conformance with state standards for evaluating historic properties.

Terramar neighborhood streets were investigated: Tierra del Oro on the western boundary across Carlsbad Boulevard, and El Arbol and Los Robles on the southern boundary across Cannon Road. These streets are in what is known as the Terramar Association. This windshield survey also included the SDG&E North Coast Service Center on Cannon Road (immediately south of the EPS), and Olive Avenue on the northern boundary at the north end of Agua Hedionda Lagoon. Staff identified twelve properties of historic age, 45 years or older, within the PAA, including the EPS. These are listed in **Cultural Resources Table A5** in **Cultural Resources Appendix A**.

The SDG&E North Coast Service Center dates to sometime between 1953 and 1963. Based upon aerial images provided in Appendix 5.14A, Phase 1 ESA, to the original AFC (CECP 2007a), the SDG&E facility and the two EPS water tanks are visible by 1963. That makes this resource of historic age and therefore potential impacts need to be analyzed. Staff requested an evaluation of the property as part of Data Requests 36-37.

One-Mile Literature and Records Search Area

The 2007 records search for the licensed CECP included only two studies involving built environment features. One is a wood and steel remnant of an unknown structure on the shore of Agua Hedionda Lagoon (8795H). The other is a minor discussion of the AT&SF railroad that bisects the EPS property (Guerrero et al 2004).

Cultural Resources Table A7 in **Cultural Resources Appendix A** lists all the historic built environment resources that have been identified by the city of Carlsbad. As of the 2007 literature search, only one listed resource was within the one-mile PAA: the Santa Fe Railroad Depot. Another address that exceeded 50 years of age in 2007 appears to be a private residence located at 519 Chinquapin Avenue, several blocks north of the lagoon. It was classified as 6Y- determined ineligible for NRHP by consensus through the NHPA Section 106 process-and not evaluated for CRHR or local listing in 1995. 519 Chinquapin is not locally listed as of 2014.

A number of other resources with the potential to be listed as historical resources are listed in the 2014 Envision Carlsbad working papers (Carlsbad 2014c). Within the one-mile PAA, those resources are: the Gage House, Cohn House, Twin Inns, the Barrio Museum, Ramirez House, Mission Santiago and Gaus House. These resources, as well as the Santa Fe Railroad Depot are shown on **Cultural Resources Figure 3**.

Cultural Resource Descriptions and Eligibility Evaluations

Staff has identified a total of 16 cultural resources in the PAA. Of these, three are prehistoric archaeological sites (CA-SDI-16885, CA-SDI-6751, and (unknown prefix) 210/W-127A), one is an archaeological district (the Agua Hedionda Archaeological District), 1 is an ethnographic resource, and 12 are built-environment resources.

Archaeological and Ethnographic Resources

Agua Hedionda Prehistoric Archaeological District

Staff proposes the designation of a prehistoric Native American archaeological district that incorporates a zone of similar, discontiguous archaeological deposits buried along

the margins of the Agua Hedionda Estuary. The designation of the district is the Agua Hedionda Prehistoric Archaeological District, and preliminarily includes those cultural resources listed in **Cultural Resources Table A9**, located in **Cultural Resources Appendix A**. This is a newly identified archaeological district since the licensed CECP. The district was not identified or evaluated in the documentation for the licensed CECP because there were no identified impacts to any potential contributing elements to the district.

The known prehistoric archaeological sites that make up the district appear to represent long-term exploitation of the terrestrial and wetland resources in the vicinity of the Agua Hedionda Estuary. The pattern of resource use was likely a significant component of the economy of Native Americans groups from the Early Archaic period (9020 B.P.) to the Late Prehistoric period (ca. 800 B.P.). Additional study of the district may provide new and important information regarding the chronology, use, and settlement of Native American lifeways along the Southern California Coast, and more particularly, Luiseño or Kumeyaay chronology, use, and settlement around the Agua Hedionda Estuary.

The boundary and thematic associations of the Agua Hedionda Prehistoric Archaeological District are necessarily provisional. The fact that our present knowledge of the district only includes information from the PAA and the 1-mile boundary surrounding the PAA constrains the accuracy of the present boundary for the district. The landforms that ultimately bound the district are the Buena Vista estuary to the north, Canyon de las Encinas to the south, the Pacific Ocean to the west, and the area in the vicinity of Agua Hedionda Creek near Mount Marron to the east. The present relatively small sample of archeological deposits that make up the district similarly constrain the scope of the historic themes that the district may represent.

Staff recommends that the Agua Hedionda Prehistoric Archaeological District is eligible for listing on the CRHR under Criterion 1, because the district is associated with events that have made significant contributions to California's history and culture, in particular the events associated with coastal Southern California Native American lifeways, and more specifically, those related to Agua Hedionda, from the Early Holocene Paleo-Coastal traditions, through the Late Prehistoric period. The associative values that contemporary Native Americans hold regarding the events indicated by the archaeological deposits further indicates the district's significant contributions to the regional and local events associated with these archaeological sites. The district is also recommended eligible under Criterion 4, because the district has yielded and has the potential to yield further information important to the prehistory of Native American lifeways in coastal Southern California, and more particularly, in the Agua Hedionda region, and because the district retains particularly high degrees of integrity of location, design, materials, and association and is therefore well-able to convey its significance. The presently known contributing elements for the district are those sites listed in **Cultural Resources Table A9**, one of which is also recommended in the table as being individually eligible for inclusion in the CRHR.

The following site descriptions are those cultural resources that have been documented in the amended CECP project area, and could potentially be directly affected by proposed activities associated with the amended CECP. As noted above, information

concerning the presence of sites CA-SDI-16885 and (unknown prefix) 210/W-127A is currently the subject of an ongoing archaeological investigative effort.

CA-SDI-16885

This artifact and shell scatter site was initially recorded in November of 2003 during construction monitoring of the Encina Power Plant. The site was recorded to west of ASTs 2 and 3, in the northwestern portion of the amended CECP project site. The site was subsequently tested in the proposed impact area for that project (an area that does not overlap in its entirety with the proposed ground-disturbance for the amended CECP) and found to represent a disturbed remnant of the site; however, the archaeologists indicated that the site extends east into the amended CECP project area. Artifacts recovered during monitoring and testing of the site include 18 pieces of lithic debitage, 28,839.2 grams of shell, and 2.05 grams of bone. This testing also included radiocarbon dating of two pieces of shell, which returned dates of about 800 years B.P., one from 0-10 centimeters below the ground surface, and the other from 30-40 centimeters below the ground surface. These archaeologists noted fill in the excavated units was only 4 centimeters to about 10 centimeters deep (Guerrero, Stropes, and Gallegos 2004), despite the interpretations drawn by the archaeologists for the petitioner regarding the geotechnical investigations by Magorien (2006) that suggest fill extends 2.5 to 10 feet deep. Staff suggests that the geotechnical borings in the vicinity of CA-SDI-16885 are not conclusive regarding the depth of fill in the vicinity of this site, and that the archaeologists who conducted intensive archaeological investigations of the site are a more reliable reference regarding where the deposits are located rather than a geological technician.

The site was monitored again in 2005 during geotechnical borings (Magorien 2006) and the site boundaries increased to the west, south, and north. Additional artifacts were identified including fire-affected rock, cooked marine shell, a lithic core, a graver/scraper tool, a hammerstone, and lithic debitage. The monitoring archaeologist suggested that the surface artifacts identified were mechanically re-deposited during previous grading, but that “additional artifacts or archaeological deposits may exist subsurface near ASTs #2 and #3” (Smallwood 2005: 4). Staff disagrees with the assessment that the artifacts were re-deposited because there is no evidence to support this conclusion, only the conjecture of the cultural resources monitor; however, staff does agree that portions of the site have been disturbed by previous grading as suggested by Guerrero et al. (2004). Moreover, monitoring geotechnical borings, like that conducted by Smallwood (2005) does not provide the same degree of interpretive capability that an archaeological excavation, like that conducted by Guerrero et al. (2004) can afford.

CA-SDI-6751/W-1874

This shell scatter was initially recorded in March of 1978 as being located about 40 meters east of ASTs 4-7, on both the western and eastern sides of the railroad tracks that bisects the amended CECP project area. The site was recorded as being 75 by 30 meters with a depth of about 30 centimeters (Franklin 1978). The site was revisited in March of 1993 and 3 additional shell scatter loci were identified, expanding the boundaries of the site to about 500 by 30 meters, to the north and south along the railroad tracks. Additionally, a possible metavolcanic tool was noted during this update to the site, as well as two unassociated purple glass bottles (Pigniolo and Mealey 1993).

The site was revisited again in 2004 during a survey conducted for the Carlsbad Seawater Desalination Project and archaeologists relocated two of the shell scatter loci changing the site boundaries accordingly, and noted that both loci were sparse and highly fragmented. Based on the sparse and fragmented nature of the shell scatters and lack of associated artifactual material, in addition to the geotechnical borings taken by Magorien (2006) in the vicinity of the site which indicate that artificial fill directly overlays the terrace deposits, staff finds that this suggests that there is likely no buried component to this site.

Unknown Prefix 210/W-127A

This site was initially recorded by Malcolm Rogers sometime during the early 20th century as an intermittent slough terrace campsite from the Early Archaic period with cobble hearths, and a thickness of about 3 feet. Little definitive information is available concerning this site, partially due to the antiquity of the site record as well as the fact that the Museum of Man, which houses Rogers' notes, is not currently available for research. The site was tested in 1981 to determine if expanding Carlsbad Boulevard would impact the site. The limited trenching that was conducted as part of this testing procedure did not find any extant portions of the site in the proposed road expansion area (Polan 1981). The initial recordation of the site is drawn in such a way as to provide a somewhat ambiguous site boundary, and some of the researchers who have conducted archaeological investigations at the EPS have suggested that CA-SDI-16885 and CA-SDI-6751/W-1874 may be extensions of the 210/W-127A deposit. Rogers' suggestion that the site dates to the Early Archaic and that there is a buried component to the site indicates to staff that there is a high potential for encountering this site during ground-disturbing activities associated with the amended CECP.

California Register of Historical Resources Eligibility

Staff recommends that the Agua Hedionda Prehistoric Archaeological District is eligible for listing on the CRHR under Criterion 1 and 4. Staff does not currently have sufficient information to make an eligibility determination regarding sites CA-SDI-16885 and (unknown prefix) 210/W-127A. Site CA-SDI-16885 was the subject of Data Requests 34 and 35, to which the petitioner objected. Staff proposes to conduct the testing of the site itself and would include the results of this testing and staff's eligibility determinations in the FSA.

Built Environment Resources

Staff reviewed the built environment resources within the PAA and did not discover any historic age resources that had the potential to be impacted in a significant way. These resources are captured in **Cultural Resources Tables A5, A6, A7,** and **A8** in **Cultural Resources Appendix A** and **Cultural Resources Figures 2** and **3**. Staff did not identify any built environment resources within the one-mile record search area, including the PAA, which would be impacted by the amended CECP.

Staff identified eleven historic-period built environment resources located within the PAA, excluding EPS. These are listed in **Cultural Resources Table A5**. Ten of the resources are residential and one, the SDG&E maintenance facility is an industrial property. Staff concludes that they are ineligible for listing on the CRHR under Criteria 1–4. A brief discussion of those found ineligible for listing on the CRHR follows.

Staff conducted a reconnaissance-level windshield survey on September 24, 2014. Ten of the properties are residential, ranging in age from 1930 to 1966. Of those only one, located on Tierra de Oro, had been substantially altered to the point where the original form was not discernible. Seven were relatively unchanged from their original design and construction, a scenario staff found to be surprising given their desirable location near the ocean and beaches. One of the residences on Olive Avenue north of the lagoon was not visible from the street due to vegetation, gates and fencing and the other appeared to have undergone some alterations to its original form.

Also investigated by cultural resources staff was the broader area known as the Terramar Association, which includes 8 of the historic age resources in the PAA. Terramar is comprised of a group of residents that live in the small neighborhood bordered by Cannon Rd, Palomar Airport Rd, Cannon Lake (west of the railroad tracks), and the Pacific Ocean. It also includes Tierra Del Oro. There are about 250 homes in this neighborhood. The primary function of the Terramar Association is to care for and maintain the beach access for resident members. Members can voluntarily belong to this association and enjoy the beach access (Terramar 2014). The Association was also an official party to the licensed CECP proceeding as an Intervenor, represented by member Kerry Seikemann; the Association is likewise an Intervenor in the amended CECP proceeding as well (status granted June 26, 2014 tn: 202620), The developer, William D. Cannon, named the subdivision Terramar, (Jones 1982:142-144). Parts of the one-parcel PAA are located in Terramar.

Within Terramar, the Tierra del Oro neighborhood has undergone substantial changes over time and no longer reflects its 1950s-1960s roots. The El Arbol and Los Robles neighborhoods remain largely intact, with few modern intrusions or remodels, reading very much like a 1950s-1960s era-tract development. None of these residences nor their respective neighborhoods seem to have the qualities that would make them eligible as historic resources under CEQA, individually or as part of a district. Other than the association with William D. Cannon as a developer, and the era of the EPS plant, there does not appear to be any additional significance to the development that would make it a candidate for listing on the CRHR. Staff recommends that they are not eligible as historic resources and will not be impacted by the project in that sense.

Located within the PAA and considered part of the project, the SDG&E North Coast Maintenance Facility was originally part of the SDG&E-owned EPS. SDG&E sold EPS to Cabrillo Power 1 LLC (Cabrillo) in 1999 (CECP 2007a: p 5.6-1). An aerial photograph from 1963 clearly shows the maintenance facility and associated structures, including the two waste water tanks proposed to be demolished as part of the PTA. One of those tanks may be visible in the 1953 aerial. Lacking better data, staff considers it contemporary with the EPS's construction and a component of the EPS. The primary maintenance building exterior walls are an unknown material. The south-facing elevation is capped by a clerestory of ribbon windows typical of the International Style and other mid-20th Century architecture. A concrete block wall separates the facility from Cannon Road.

Encina Power Station

Based upon the Historical Resource Evaluation and Update Report filed for this petition (JRP 2014), The Encina Offshore Marine Terminal evaluation (White 2013) and staff's

own independent research and analysis, staff concludes that the EPS is not an historical resource for the purposes of CEQA. EPS does not meet the criteria for listing in the NRHP or the CRHR.

Considering EPS under Criterion 1, it has not been found to have a significant contribution in the areas of power generation, steam power plants or the history of the regional power development. While it was an important post-war component of SDG&E's ability to provide reliable electric generation for a growing population, it did not make a significant contribution in its own right to that development.

Considering EPS under Criterion 2, it is not associated with an historically significant person or entity. While the property was acquired from William D. Cannon, a prominent land developer in Carlsbad during the period when the plant was constructed, it does not seem to have a significant attachment to Mr. Cannon or the Terramar subdivision near the EPS. SDG&E was one of several power companies in California undergoing rapid expansion in the post-war period and EPS was one of many plants built by SDG&E to meet that need.

Considering EPS under Criterion 3, it is not historically significant for its design, architecture or construction. EPS is a utilitarian facility with no architectural distinction. While the dredging of the lagoon and creation of the intake channel are creative solutions to providing a consistent water supply for the once-through cooling process, it does not rise to the level of historical significance under Criterion 3.

Considering EPS under Criterion 4, it does not appear that it would yield important information relative to history. Criterion 4 is rarely applied to the built environment and it is highly unlikely EPS as a built environment feature would yield information especially pertinent to United States or California history.

Therefore, the EPS as an entity with its appurtenant facilities, does not rise to the level of significance as an historical resource under CEQA. Additionally, when considering the period of significance to be the 1950s to 1970s post-war development of steam power at the coast and throughout Southern California, the EPS lacks integrity to that period. There have been many alterations over time which intrude upon the underlying facility from its construction period. Even though one could argue that the 400-foot tall stack added in 1978 has attained significance as a potential contributing feature in its own right, it still remains that the layers of change over time on the property obscure its original form in terms of design, setting, materials, workmanship and feeling. Therefore, the resource is lacking integrity.

Historic Age Structures within the PAA and One Mile Literature Search Area

Staff investigated historic age built environment resources in the PAA and have not found any properties that would be eligible as historical resources under CEQA. While the adjacent Terramar neighborhood has interesting associations with the development of Carlsbad in the mid-20th Century, it does not rise to the level of significance for consideration of eligibility under Criterion 1, 2, 3 or 4. There are several listed or eligible historic landmarks within one mile of the project, mostly clustered in Carlsbad Village center (see **Cultural Resources Figure 3**). While the AT&SF Railroad and its predecessor, the California Southern, were instrumental in bringing Carlsbad to the

attention of tourists and others, the tracks are now part of a passenger and freight rail line that bears little resemblance to the original railroad. Track realignment in 1906 and the addition of a second track and rebuilding of the bridge over the lagoon in 2012 have altered the physical railroad substantially. The change in use of the Santa Fe Depot to a Visitor's Center further affects the integrity of the railroad by lack of association with structures from the historic period of significance. Staff is unable to draw the conclusion that the railroad meets the test of significance and eligibility for CRHR or as an historical resource under CEQA. And therefore, even though the railroad was important to Carlsbad's beginnings, it no longer resembles the original California Southern line in terms of location, design, materials, setting or association, and therefore suffers a lack of integrity.

California Register of Historical Resources Eligibility

Staff recommends that none of the built environment resources identified during the course of the amended CECP process are eligible for listing in the CRHR. The EPS is not eligible because it does not rise to the level of significance such that it would be considered a historical resource under CEQA. The additional resources identified by staff in the built environment PAA also do not meet the CRHR criteria, and thus are not considered historical resources.

Interpretation of Results

Model of Prehistoric and Historic Archaeological Resources

The PTA and associated cultural resources documentation suggest that the PAA has a low-moderate potential to contain archaeological resources on the ground surface because of the degree of surface disturbances and development. These expectations were borne out by the cultural resources inventory described in this PSA; however, it should be noted that the lack of surface manifestations of an archaeological site does not preclude subsurface deposits.

The PTA and associated cultural resource documentation states that buried archaeological resource potential is low based on previous disturbance of 100 percent of the horizontal extent of the project site (the disturbance of the vertical extent is unknown) as indicated by historic aerial photographs and geotechnical boring logs. Staff conducted additional analysis to estimate the depth of fill across the proposed project site; whether and where proposed excavation would penetrate native sediments; and the age, characteristics, and preservation potential of any underlying native sediments.

Aerial photographs and geotechnical boring tests indicate that essentially the entire project area has been subject to some degree of grading. The geotechnical borings and evaluation suggests that the sediments underlying the artificial fill are marine and non-marine sands and Late Pleistocene age (80,000 to 125,000 years old) deposits overlying Eocene age (about 40 million years old) marine and non-marine terraces, (Magorien 2006:5-6).

The PTA and supporting documentation state that the project site rests atop 2.5-10 ft of fill dirt, based on mapped geotechnical borings. However, archaeological investigations suggest that fill, at least in the vicinity of CA-SDI-16885, is less than 10 cm below the

existing ground surface. This investigation found cultural materials in the marine and non-marine sands that overly the Eocene terrace deposits (Guerrero, Stropes, and Gallegos 2004: 3-4, Appendix D).

The fill deposits in the PAA would not contain archaeological deposits with stratigraphic integrity. Depending on where the existing fill material was obtained, such deposits could contain archaeological materials with compromised integrity and/or human remains. However, it is possible, as indicated by the (unknown prefix) 210/W-127A site record for Aeolian deposition to bury artifacts in the PAA, and thus the potential for buried archaeological resources is high.

DIRECT/INDIRECT IMPACTS AND MITIGATION

In the abstract, direct impacts to cultural resources are those associated with project development, construction, and operation. 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, oily sand remediation, or demolition of overlying structures. Construction can have direct impacts on historic standing structures when those structures must be demolished or 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, feeling and association. New structures might also produce something harmful to the materials or structural integrity of the historic structures, such as emissions or vibrations.

Generally speaking, indirect impacts to archaeological resources are those which may result from 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 to resources by non-project-affiliated personnel and the potential for vandalism or greater weather exposure becomes possible.

Ground disturbance accompanying construction at a proposed plant site has the potential to directly affect archaeological resources, the significance of which is unknown 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 power 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

Since this project is an amendment to the previously analyzed and licensed CECP, the conclusions, recommendations, and conditions of certification from the licensed CECP are applicable to the amended CECP, unless the petitioner or staff has justification for

changing the conditions of certification. For the licensed CECP (CEC 2009: 4.3-20 – 4.3-21) staff concluded,

> 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 any recovered artifacts and associated notes, records, and reports; and
> - Cultural resources surveys, if the petitioner chooses to use 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.

In the PTA, the petitioner recommended that the licensed CECP conditions of certification be applied to the amended CECP (Carlsbad Energy Center 2014: 5). Since staff has not come to a conclusion regarding archaeological resources for the amended CECP, and there would not be any impacts to ethnographic or built environment resources, staff does not propose any changes to the conditions of certification at this time. Thus, the conditions of certification from the licensed CECP are included below.

Assessment of Direct Impacts on Archaeological Resources and Proposed Mitigation

Archaeological Resources on the Surface of the PAA

Over the past approximately 80 years, 3 archaeological resources have been identified on the surface of the PAA; CA-SDI-6751, CA-SDI-16885, and (unknown prefix) 210/W-127A. However, the most recent survey of the PAA by the archaeologist for the petitioner did not identify these sites on the surface. At this time staff does not have sufficient information to determine if there will be impacts, or if those impacts would be significant, to CA-SDI-16885 and (unknown prefix) 210/W-127A. Proposed amended project activities in the vicinity of site CA-SDI-16885 include the demolition and removal ASTs 1 and 2, oily sand remediation, and preparation and grading of the area after tank removal and remediation for parking and laydown activities. It is unlikely that tank removal would impact any extant archaeological deposits because this activity would not entail any subsurface disturbance as the fuel oil tanks are set on concrete pads, and the pads would stay in place. However, oily sand remediation, and preparing and grading the area could impact subsurface archaeological deposits, if present. Remediation of oily sands would be required if there were any contaminated soils found during project activities, or were known from previous spills. Generally, this type of industrial level remediation extends to a depth of 2 to 3 feet, but can go deeper depending on the degree of contamination. Preparing and grading the area would entail laying gravel, of an unknown thickness, and grading it to make a level area for parking and laydown. This could impact subsurface archaeological deposits during the grading process if the grader goes deeper than the gravel, and also via compaction and thus crushing any archaeological deposits from the weight of the grader or any other heavy machinery that is placed on top of deposits.

In the vicinity of (unknown prefix) 210/W-127A the petitioner proposes to expand the 230 kV switchyard, and to lay an underground electrical conduit line from the northeastern portion of the switchyard expansion area to the north, parallel to the SDG&E switchyard, where it would intersect the existing transmission line about 450 feet away. According to the petitioner, expansion of the switchyard would not entail any subsurface disturbance; however, the installation of the electrical conduit line would be underground and the trench in which it would be placed would be excavated to a depth of 5 feet, in addition to being 2 feet wide.

It is possible that these cultural resources could be impacted by the construction, demolition, and remediation activities described above. However, a determination of whether there would be impacts and if these impacts would be significant depends on the results of pending subsurface archaeological investigations. If a resource is found eligible for listing in the CRHR, ground-disturbing activities would likely significantly impact the integrity of these resources. Examples of possible mitigation measures if these resources are recommended eligible could include avoidance of the resource, or data recovery to collect artifacts and information from any impacted sites As contributors to the Agua Hedionda Prehistoric Archaeological District, staff could assume that the information the sites would contribute to the archaeological record would be similar in extent and valuableness as other stratified sites in the District, such as CA-SDI-210/UCLJ-M-10, W-131/Windsong Shores, and W-132A. Possible mitigation

under this scenario would reflect proportional mitigation for the assumed impact to these resources.

Staff recommends that CA-SDI-6751 is not a historical resource for the purposes of CEQA, and thus impacts to this resource would not be significant.

Buried Archaeological Resources in the PAA

Two sites in the PAA, CA-SDI-16885 and (unknown prefix) 210/W-127A are known to have subsurface components (Guerrero, Stropes, and Gallegos 2004; Rogers N.D.). However, as discussed above, staff does not have sufficient information at this time to definitively analyze impacts to any subsurface components of these sites. A complete impact assessment to the buried components of these sites would be included in the FSA, if staff is able the necessary information.

Assessment of Direct Impacts on Ethnographic Resources

One ethnographic resource, the village of Palamai, has been identified in the PAA. However, staff finds that this resource lacks integrity and therefore is not considered a historical resource for purposes of analyzing impacts from the amended CECP, and staff is not recommending any mitigation measures for this resource.

Federal Environmental Justice (EJ) guidance directs agencies to consider to the extent practicable whether there is or will be an impact on the natural or physical environment that significantly (as employed by the National Environmental Policy Act) and adversely affects Indian tribes. Such effects may include ecological, cultural or social impacts on Indian tribes when those impacts are interrelated to impacts to the natural or physical environment. Agencies must also consider whether environmental effects are significant (as employed by the National Environmental Policy Act) and are or may be having an adverse impact on Indian tribes that appreciably exceeds or is likely to appreciably exceed those on the general population or other appropriate comparison group.

Staff considers the Indian tribes affiliated to the Carlsbad area (through ancestral or traditional use claims) to constitute environmental justice populations. Staff makes this consideration because Indian tribes maintain long-standing ancestral and traditional use practices and concepts connected to the environment and to their identities as Indian people, unlike other populations that do not have territories linked to their collective identities.

Staff does not expect that the proposed project would result in impacts on ethnographic resources, and therefore would have no impacts on an environmental justice population.

Assessment of Direct Impacts on Built-Environment Resources and Proposed Mitigation

Built environment technical staff has reviewed the literature search materials, other available studies as noted herein and performed on-site and off-site reconnaissance surveys. Based on the information available, staff concludes that the amended CECP would have no direct impacts on known built environment historic resources. Therefore, staff is not recommending any mitigation measures for built environment resources.

Indirect Impacts

Neither the petitioner nor staff has identified any indirect impacts on any cultural resources that qualify as historical resources or unique archaeological resources under CEQA. However, until such time that staff has sufficient information regarding sites CA-SDI-16885 and unknown prefix 210/W-127A with which to conduct a cultural resources analysis, indirect impacts to archaeological resources cannot be assessed. Staff anticipates that the information will be available for inclusion in the FSA.

Staff has reviewed the literature search materials, other available studies as noted herein and performed on-site and off-site reconnaissance surveys. Based on the information available, staff concludes that the amended CECP would have no indirect impacts on known built environment cultural resources. Therefore, staff does not recommend any mitigation measures for indirect impacts to built environment resources.

Operation Impacts and Mitigation

Because staff does not currently have sufficient information regarding the location and eligibility of two sites in the PAA, impacts to these sites from the operation of the amended CECP power plant cannot be determined or analyzed at this time. However, the measures proposed above and below for the mitigation of impacts to previously unknown archaeological resources found during construction would mitigate impacts that occur during operation-phase repairs to unknown sites. Operation of the amended CECP would have no impacts upon built environment historic resources as none have been identified.

CUMULATIVE IMPACTS AND MITIGATION

The cumulative impact analyses contained in the licensed CECP AFC, Final Staff Assessment, Supplemental Staff Testimony and ,the Energy Commission Final Decision for the licensed CECP, as well as information present in the PTA/PTR documents relied on a cumulative impact list of eight projects situated within approximately 0.5 mile of the proposed amended CECP project site. No cumulatively considerable impacts on archaeological resources were identified in any of these analyses. (Carlsbad Energy Center 2014a[6]; CEC 2009:4.3-19, 4.3-20; CEC 2012:7.3-6; CH2M Hill 2014:5.3-3, 5.3-4, 5.6-3, Table 5.6-1.) Staff excludes seven of these projects from the present cumulative impacts analysis, but includes Poseidon's Carlsbad Seawater Desalination Project since it has both on-site and offsite components. In addition, staff has determined that the cumulative area of analysis for archaeological resources comprises a 6-mile-radius circle from the proposed project (**Executive Summary Figure 1**). The cumulative projects area of analysis encompasses the project site and geographic qualities that were likely of concern to the prehistoric inhabitants of the project vicinity. The ethnographic record indicates that the semisedentary Luiseño occupied villages and base camps, from which they gathered the majority of their foodstuffs within a day's walk of home (Bean and Shipek 1978:551). Doubtlessly, California Indians forayed much farther in all directions for resource procurement, socializing, and trading, but day-to-day activities of a settlement would have occurred

[6] Analyses of potential cumulative impacts are not contained in the PTR.

nearby, over more limited distances. A 6-mile-radius circle from the project site therefore appears to form a geographic unit that was probably meaningful to the prehistoric and historic-period human inhabitants of the project vicinity, and a useful basis for assessing cumulative impacts on archaeological resources.

In selecting projects that could contribute to cumulative impacts, staff identified those projects in the 6-mile radius that would result in ground disturbance because excavation is the primary vehicle for archaeological resource impacts for the proposed project. Staff presents its list of cumulative projects for archaeological resources in **Cultural Resources Table B1** in **Cultural Resources Appendix B**. Cumulative projects were identified by consulting planning websites for the municipalities in the 6-mile radius: the cities of Carlsbad, Encinitas, Oceanside, and Vista; California Department of Transportation; and San Diego Association of Governments. In many instances, copies of environmental review documents were not available online for staff's perusal; such projects are listed as yielding "No information" in the Resources Affected/Level of Significance column of **Cultural Resources Table B1**.

Staff identified a total of 42 cumulative projects in the 6-mile buffer. Staff was unable to locate environmental impact reviews for 21 of the projects summarized in **Cultural Resources Table B1**. Three cumulative projects reportedly would result in no impacts on archaeological resources. Nine out of 42 cumulative projects report less-than-significant impacts on archaeological resources because none were identified in their respective impact areas, identified archaeological resources were not found to qualify as historical or unique archaeological resources under CEQA, or had been mitigated prior to the project's environmental review. Six cumulative projects would result in less-than-significant impacts on archaeological resources with the implementation of mitigation measures; all of these project areas contain known archaeological resources (total of approximately 300) and one contains an Indian sacred site. (**Cultural Resources Table B1**.) Staff is unable to come to conclusions regarding cumulative impacts at this point in time, however, because staff is still analyzing potential impacts on archaeological resources in the PAA itself. Staff will complete its cumulative impacts analysis in the FSA.

For cumulative impacts to the built environment, staff has used both the one-mile PAA used for the literature search and an overlay including Los Angeles County, Orange County and San Diego County, taking into account the numerous former or existing generating stations built with once-through cooling technology in the post-war boom of the 1950s to 1970s and located at the southern California coast. The literature search results for the PAA yielded several environmental reports within the cumulative impacts area, mostly pertaining to the I-5 expansion plans and the Poseidon desalination project. Built environment technical staff has reviewed the literature search materials and other available studies and performed on-site and off-site reconnaissance surveys. In order to be as conservative and inclusive as possible, the projects included in this cumulative analysis include project sites with historic-age buildings, regardless of whether or not an eligibility determination was made.

Considered in conjunction with the potential removal and reconstruction of other Southern California steam-generating plants from the 1950s to 1970s, such as Huntington Beach Generating Station (HBGS), Alamitos Generating Station (AGS),

Redondo Beach Generating Station (RBGS), and El Segundo Steam Station (ESSS), the loss of the EPS facility has the potential to add to the loss of information relative to the development of electric steam power generation post-WWII and into the mid-twentieth century in California. Another once-through cooling plant in the SDG&E service area, the South Bay plant in Chula Vista, built in the1960s, was demolished and remediated in 2013.[7] However, most of these post-war power plants have been recorded, their operations and expansion activities documented and evaluated at a basic level (at the very least), and through the licensing process, that historical information has been made available to the public. Due to the existence of this recorded historical information, the likelihood of there being a cumulative impact from the amended CECP is negligible.

Demolition of the EPS, which staff concludes is not an historical resource under CEQA, does not add to the cumulative effects of other built environment projects in the PAA or the built environment cumulative overlay. Therefore, staff is not recommending any mitigation measures for the amended CECP beyond what already exists for the licensed CECP.

COMPLIANCE WITH LORS

The applicable state laws, ordinances, regulations, and standards are listed above in **Cultural Resources Table 1**. For this Preliminary Staff Assessment, staff has not yet identified any cultural resources in the PAA that would qualify as historic or unique archaeological resources for the purposes of CEQA, and thus cannot definitively state that the amended project would comply with all identified LORS. Although impacts to as-yet-unidentified archaeological resources that qualify as historical or unique under CEQA could occur during construction and operation of the proposed project, staff-proposed Conditions of Certification **CUL-1** through **CUL-8** are expected to mitigate such impacts to less-than-significant levels. These conditions establish the necessary protocols to constructively handle the issues identified in **Cultural Resources Table 1**: the treatment of human remains discoveries during project-related ground disturbance (**CUL1 – CUL-8**), prevention of unauthorized removal of Native American remains or artifacts from a Native American grave or cairn (**CUL-1 – CUL-8**), and non-disclosure of records pertaining to ethnographic consultants or archaeological site information (**CUL-3**).

The city of Carlsbad General Plan and other supporting policies and documents have language promoting the general perseveration of cultural resources. The conditions of certification require specific actions not just to promote but to effect historic preservation and mitigate impacts to all cultural resources in order to ensure CEQA compliance. It is unknown at this time if the project would comply with this preservation directive until the presence or absence of archaeological sites is determined, and a recommendation concerning their eligibility is provided.

[7] Accounts vary as to construction dates for the South Bay plant. The Chula Vista Bayfront Master Plan, revised DEIR dates the power plant to 1969 (Chula Vista 2008: p. 2-11). The South Bay Power Plant Timeline, published by the Port of San Diego, dates it from construction beginning in 1958 to Plant 4 coming online in 1964 (Port of San Diego).The DEIR did not evaluate the plant in the Cultural Resources analysis, presumably because it was not considered of historic age at the time of the DEIR.

CONCLUSIONS AND RECOMMENDATIONS

At this time staff does not have sufficient information to make conclusions whether known prehistoric archaeological resources on the amended Carlsbad Energy Center Project (amended CECP) site are historical resources under CEQA, or whether the amended CECP's potential direct impacts to these resources would be considered significant. Staff requested the petitioner (Carlsbad Energy Center, LLC, also the project owner) to determine the subsurface extent and historical register eligibility of two known prehistoric archaeological sites in areas of the amended CECP where there could be ground-disturbance (Data Requests nos. 34 and 35). However, the petitioner objected to conducting this testing. Staff has proposed testing the sites itself, and if granted access to the property by the petitioner, anticipates having the information from the fieldwork to complete the cultural resources analysis and include staff's conclusions regarding archaeological resources in the FSA. If the sites are determined to be eligible as historical resources under CEQA, staff would propose mitigation, and new or modified conditions of certification, to reduce impacts to less than significant. If staff is unable to obtain additional information regarding these sites, staff may assume that both sites are individually eligible for the CRHR, and that both sites are eligible as contributing elements to the Agua Hedionda Prehistoric Archaeological District under criteria 1 and 4, and proposed mitigation to reduce impacts to less than significant.

Based upon staff's investigation of a number of built environment resources of historic age within the Project Area of Analysis (PAA) and the results of a one-mile literature search area for the project, staff concludes that there would be no significant impacts from the project on built environment resources.

As a result of ethnographic research, staff concludes that there are no ethnographic resources that will be impacted by the proposed project. The ethnographic background information included in **Cultural Resources Appendix A** provides a brief context for the prehistoric resources discussed below, and one ethnographic resource that was found by staff to lack integrity.

Staff has considered environmental justice populations in its analysis of the amended project. At this time, staff has not identified significant adverse direct, indirect, or cumulative cultural resources impacts that would affect Native American environmental justice populations.

PROPOSED CONDITIONS OF CERTIFICATION

Staff recommends retaining all of the conditions of certification for the licensed CECP. It should be noted that staff may propose to change, add, or delete these mitigation measures based on new information to be included in the FSA. Any modifications proposed by staff will be shown in ~~strikethrough~~ for deletions and **bold underline** for additions.

CUL-1 Prior to the start of ground disturbance,[8] 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

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. After all ground disturbance is completed and the CRS has fulfilled all responsibilities specified in these cultural resources conditions, the project owner may discharge the CRS, if the CPM approves. With the discharge of the CRS, these cultural resources conditions no longer apply to the activities of this power plant.

[8] "Ground disturbance" includes "preconstruction site mobilization"; "construction ground disturbance"; and "construction grading, boring and trenching," as defined in the General Conditions for this project.

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.

The CRS and CRM shall coordinate their oversight of ground disturbance with the Geotechnical Investigation required by the **Facility Design** Conditions of Certification.

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 should 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 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, their roles and responsibilities, and provisions to comply with NAHC Guidelines.
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:

3. 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.

4. 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 monitor full time all ground disturbance of native soils at the project site, along linear facilities and roads, and at parking and other ancillary areas, including wetlands mitigation areas, to ensure there are no impacts to undiscovered resources and to ensure that known resources are not impacted in an unanticipated manner.

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 where machines are actively disturbing native soils. If an excavation area or areas are too large for one monitor to effectively observe the soil removal, one or more additional monitors shall be retained to observe the area.

In the event that the CRS believes that the current level of monitoring is not appropriate in certain locations, a letter or e-mail detailing the justification for changing the level of monitoring shall be provided to the CPM for review and approval prior to any change in the level of monitoring.

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.

The project owner shall obtain a Native American monitor to monitor ground disturbance in any areas where Native American artifacts are discovered in native soils. 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: 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.

5. 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 likelihood 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.

6. 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.

7. 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.

CULTURAL RESOURCES ABBREVIATION AND ACRONYM GLOSSARY

ACC	air-cooled condenser
ACHP	Advisory Council on Historic Preservation
AFC	Application for Certification
ARMR	Archaeological Resource Management Report
asl	above sea level
bgs	below ground surface
Cal. Code Regs.	California Code of Regulations
CCC	California Coastal Commission
CCGT	combined cycle gas turbine
CEC	California Energy Commission
CECP	Carlsbad Energy Center Project
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
C.F.R.	Code of Federal Regulations
CHRIS	California Historical Resources Information System
COE	Corps of Engineers, U.S. Army
Conditions	Conditions of Certification
CRHR	California Register of Historical Resources
CPM	Compliance Project Manager
CRM	Cultural Resources Monitor
CRMMP	Cultural Resources Monitoring and Mitigation Plan
CRR	Cultural Resource Report
CRS	Cultural Resources Specialist
DPR	Department of Parks and Recreation (State of California)

DPR 523	Department of Parks and Recreation cultural resources recordation form
E.O.	Executive Order (presidential)
EPS	Encina Power Station
° F	degrees Fahrenheit
FSA	Final Staff Assessment
gal	gallon(s)
GLO	General Land Office
HABS	Historic American Building Survey
HAER	Historic American Engineering Record
HALS	Historic American Landscape Survey
HDP	Heritage Documentation Programs
HRSG	heat recovery steam generator
LORS	laws, ordinances, regulations, and standards
MCR	Monthly Compliance Report
MLD	Most Likely Descendent
MRS	Marine Research Specialists
NAHC	Native American Heritage Commission
NAM	Native American Monitor
NHPA	National Historic Preservation Act
NPS	National Park Service
NRHP	National Register of Historic Places
OHP	Office of Historic Preservation
PAA	Project Area of Analysis
PCH	Pacific Coast Highway (State Route 1)
PSA	Preliminary Staff Assessment
SCIC	South Coastal Information Center

SHL	State Historical Landmark
SHPO	State Historic Preservation Officer
SOI	Secretary of the Interior
SST	sea surface temperature
Staff	Energy Commission cultural resources technical staff
STG	steam turbine generator
TCP	traditional cultural property
USGS	U.S. Geological Survey
WEAP	Worker Environmental Awareness Program

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CULTURAL RESOURCES APPENDIX A

BACKGROUND INFORMATION NOT INCLUDED IN THE PSA

The following information in this **Cultural Resources Appendix A** is included to provide the reader more context to gain a better understanding of those relevant aspects briefly mentioned in the PSA cultural resources section.

ENVIRONMENTAL SETTING

Overview

The amended project site is situated at an elevation of approximately 50 feet above mean sea level (amsl) on southwestern shore of the Agua Hedionda Lagoon, and proximate to the Pacific Ocean. Current land uses in the project vicinity include planned industrial, open space, travel/recreation, commercial, agricultural, and residential (CH2M Hill 2014: 5-6.2).

The modern climate of the project vicinity is Mediterranean, influenced by the adjacent open coastline. Consequently, the local weather conditions are typically mild, with average daily highs of 63–71 degrees Fahrenheit (° F) and average daily lows of 45–64 ° F. Summers are relatively warm and dry, and winters are typically mild and semi-arid, with the majority of the region's precipitation falling during the winter season (TWC 2014).

Paleoclimate and Ecology

The paleoclimate and ecology of the project vicinity is complex, belied by the fact that former climatic and ecological conditions in the area generally conform to the long-standing, three-part paleoclimatic framework for arid western United States. In this framework, the Holocene began with a moderately cool and moist period known as the Anathermal (ca. 10,000–7500 B.P.). During the Altithermal (ca.7500–4000 B.P.), the California climate warmed and dried, and in the following Medithermal period (ca. 4000 B.P.–present), moisture and temperature conditions resembled those of today (Moratto et al. 1978:147-148). The wet winter/dry summer climate of southern California is thought to have persisted through much of these three climatic periods and may be about 160,000 years old (Masters and Aiello 2007:40). Locally, however, climate and ecology changed considerably over the last 12,000–10,000 years.

Paleobotanical studies suggest that a warming trend commenced during the terminal Pleistocene Epoch (15,000–11,750 B.P.) and continued into the Early Holocene (11,750–7000 B.P.). The amount of conifer pollen decreased and was accompanied by a simultaneous increase in the quantity of oak, chaparral, and herb pollen around 14,000–10,000 B.P. The rate of increase appears to have been rapid. (West et al. 2007:25).

The warming trend—called the Altithermal or Holocene Climatic Optimum—continued throughout the Early Holocene, though cooling events are noticeable as well. For instance, between 8000 and 7000 B.P., the project vicinity is inferred to have been warmer and wetter than today (Altschul et al. 2007:35), but is followed by a cooler

period about 7500–6800 B.P. During this latter interval, red abalone (*Haliotis rufescens*) became more abundant than black abalone in the intertidal zone (*H. carcherodii*), illustrating that climate change affects animal as well as plant life—changes which might be represented in the archaeological record. Overall, mean summer temperatures were higher and precipitation lower than present conditions. (Vellanoweth and Grenda 2002:75–77, 80).

During the Middle Holocene (7000–4000 B.P.), the southern California climate remained predominantly warm and dry (Altschul et al. 2007:35; Vellanoweth and Grenda 2002:78). Dated pollen profiles illustrate this trend, with species favoring cooler and wetter settings (pine and fern) giving way to drought- and heat-tolerant plants (oaks, grasses, chenopods, and the sunflower family [Compositae][1]) throughout this interval (Vellanoweth and Grenda 2002:77–78). Despite the warm and dry conditions of the Middle Holocene, locally sufficient stream flows were available to freshwater marshes (Altschul et al. 2007:35). In such instances, indicator species of wetter conditions were abundant, despite an overall arid trend (Vellanoweth and Grenda 2002:77–78).

By 5000–4500 B.P., at the end of the Middle Holocene, sea level reached approximately present-day level, changing the character of near-ocean habitats going into the Late Holocene (4000 B.P.–present). Sea level rise increased tidal influence and direct reach into near-shore wetlands, changing water bodies from freshwater to largely saltwater features. Wetland salinity was moderated during pulses of freshwater inputs (Altschul et al. 2005:286).

Surface sea temperature (SST) oscillated between warm and cold temperatures on a millennial timescale during the last 11,000 years. Cooling episodes occurred about every 1,500 years. Over the last 3,000 years, SST followed a tri-phase development:

1. 3000–1500 B.P.: SST was warm and relatively stable. Marine productivity was low.

2. 1500–650 B.P.: SST was very cold and unstable. Precipitation was low. Marked dry periods occurred at 1450–1150 and 970–700 B.P., corresponding with Stine's (1998) Medieval Climatic Anomaly or medieval drought periods. Between 1000 and 650 B.P., marine productivity was very high.

3. 650 B.P.–present: SST became warmer and more stable. The period of highest marine productivity in the Late Holocene occurred about 650–400 B.P., followed by low marine productivity. A severe dry interval occurred about 300–200 B.P., coincident with much of the Little Ice Age. (Kennett and Kennett 2000:383–385; Vellanoweth and Grenda 2002:79–80; West et al. 2007:25–26).

The nineteenth-century climate on the southern California coast was a little different than today's climate. Northwesterly winds dominated then as today, although southeasterly winds were more frequent and intense, likened to hurricanes. The turn of the twentieth century heralded reduced influence of southeasterly winds and the Little Ice Age (450–50 B.P.) ended with five El Niño events in a 20-year period. (Engstrom 2006:850–851).

[1] Grass and chenopod pollen, however, was relative sparse throughout sample taken (Vellanoweth and Grenda 2002:78).

GEOLOGY

The geology of the project vicinity is described in multiple sections of the 2007 Application for Certification (AFC) for the licensed CECP and a geotechnical study conducted in support of the Poseidon desalination project (Carlsbad Energy Center LLC 2007, Magorien 2006). These discussions are not reproduced in full here, but are summarized for the reader's convenience, followed by a discussion of geological characteristics relevant to this cultural resources analysis.

The amended project site is situated on two types of artificial fill (a silty to slightly clayey sand, and a sandy conglomerate fill), as well as marine and non-marine terrace deposits of Late Pleistocene age (80,000 to 120,000 years old), which overlay an Eocene-aged (about 50 million years old) marine bedrock strata. The literature presents evidence that fill deposits are present to about 10 centimeters in the northwestern portion of the project area (Guerrero, Stropes, and Gallegos 2004: 3-4), and from three to nine feet in other portions of the project site (Magorien 2006:8). The Pleistocene terrace deposits are exposed in the project area near the railroad tracks and extend to a depth of 22 feet in other areas of the project (Magorien 2006:9).

Geomorphology

The discussion of the geomorphology of the amended project area considers how and when the underlying soils and sediments developed, and provides a baseline physical context to assess whether surface and buried archaeological materials are likely to occur in the proposed project area.

The project vicinity is located on the coastal plain of the Peninsular Ranges geomorphic province of Southern California. Granitic type rocks make up most of the composition of the Peninsular Ranges province, but along the Southern California coast late Cretaceous (65 to 90 million years old) and Cenozoic age (1.5 to 65 million years old) sedimentary and volcanic rocks are widely exposed. The past 54 million years has seen the deposition of both marine and non-marine sediments that resulted in thick accumulations of marine and non-marine sedimentary rock overlying the older granitic and volcanic deposits (Magorien 2006:3-4).

20,000–11,000 B.P.

During this time, sea level was markedly lower than today, presenting a wider shoreline than is currently extant in southern California. As a result, many bays and estuaries were far less pronounced than today. (Porcasi et al. 1999:2, Figure 1) The coast was narrow and rocky, backed by 100–150-feet-tall sea cliffs. Stream action cut valleys onto the coastal plain, with sediment discharge lost to the ocean. The shoreline was energetic at this time owing to the action of large waves. Sea level rise increased wave energy across the continental shelf and flooded the incised valleys that formed from 20,000 to 14,000 B.P. Kelp forests developed near the break of the continental shelf. Estuaries expanded during the melt water pulses of 13,500 and 11,000 B.P., when stream flows increased considerably. Stream sediments, however, were deposited into the head of estuaries and did not reach the shore, which remained rocky. Kelp forests grew in extent and sea level sat approximately 180 feet below the present level. (Masters and Aiello 2007:40).

10,000–8200 B.P.

This interval witnessed the development of quiet-water estuaries that fostered fish nurseries, shellfish beds, shorebird foraging, and marine mammal visitation. Deposition of sediment onto the shoreline was limited at this time. Hence, the coast remained rocky with cobble beaches and supported shallow reefs and large fish communities. At this juncture the ocean had transgressed to a point about 115 feet below modern sea level. (Masters and Aiello 2007:40).

6000–5000 B.P.

Between 6000 and 5000 B.P., the southern California coast began its transition from a rocky shore coastline to a sandy beach condition, aided by shore platform-cutting waves. Shoaling estuaries became less productive and were replaced by sand and mudflats. (Masters and Aiello 2007:40).

4000 B.P.–Present

During the Late Holocene (the last 4,000 years), large estuaries were replaced by shallow wetlands and lagoons, which were periodically closed by the formation of sand spits. During the last 2,000 years, “megadroughts” (see Stine 1998:51) lasting up to 200 years probably closed lagoons to direct ocean influence. “Megafloods” with a return period of 200–400 years reopened lagoons to the ocean. Kelp forests were limited to wave-cut platforms off rocky headlands. Shallow rocky reefs were smothered by sand on the inner shelf. Sand beaches accreted within the littoral cells, certainly during summers’ low-wave energy. (Masters and Aiello 2007:40).

NATIVE PLANTS AND ANIMALS IN THE PROJECT VICINITY

The licensed CECP AFC describes the current suite of plants and animals of the project vicinity, with an emphasis on special-status species and sensitive ecological communities (Carlsbad Energy Center LLC. 2007: Section 5.2). The ecological community most closely associated with the amended CECP project area, and that which would have been available to prehistoric Native Americans, is that associated with Agua Hedionda Lagoon. The lagoon is a valuable natural resource because this “estuarine habitat provides abundant foraging and nesting opportunities, the structural diversity provides cover resources and micohabitats, and the coastal lagoon is an important source of water” (Carlsbad Energy Center LLC. 2007:5.2-7). The vegetation communities that would have been present during prehistoric times are listed here with some native species that typically occur in these areas.

- Diegan coastal sage scrub – Some of the shrubs in this community include California Sagebrush (*Artemisia californica)*, California buckwheat (Eriogonum fasciculatum var. *fasciculatum*), buckwheat sp. (*Eriogonum* sp.), lemonade berry (*Rhus integrifolia*, coastal cholla (*Opuntia prolifera*), and coast prickly pear (*Opuntia littoralis*). Animals that make their homes in coastal scrub habitats include desert cottontail (*Sylilagus audubonii*), California quail (*Callipepla californica*), coyote (*Canis latrans*), raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), pocket gophers (*Thomomys bottae*), and mule deer (*Odocoileus hemionus*)
- Marsh, estuarine, freshwater and saltwater marsh, and other wetlands – Some of the species associated with these habitats include broad-leaved cattail (*Typha latifolia*),

bulrush sp. (*Scirpus* sp.), rush sp. (*Juncus* sp.), saltgrass (*Distichlis spicata*), willows (*Salix* sp.), mule fat (*Baccharis salicifolia*), pacific treefrog (*Pseudacris regilla*), and California toad (*Bufo boreas*)

- Riparian woodland – Some of the plant species in this habitat include willow (*Salix* sp.), western sycamore (*Platanus racemosa*), Fremont's cottonwood (*Populus fremontii* ssp*. fremonti*), mule fat (*Baccharis salicifolia*), palm (*Washingtonia* sp.). Many of the same animals that make their home in this habitat are also listed in the Diegan coastal sage scrub habitat (Bean and Saubel 1972; Carlsbad Energy Center LLC. 2007: 5.2-7 – 5.2-8; Hedges and Beresford 1986).

Other Local Fauna

Several animals frequent the coastal strand: western and California gulls (*Larus occidentalis* and *L. californicus*), sand crabs (*Emerita analoga*), razor clams (*Siliqua lucida*), surf and coquina clams, Pismo clams (*Tivela stultorum*), kelp flies (*Fucellia* and *Coelopa* spp.), wrack flies, rove and dune beetles, tiger beetles (Cicindelidae), pill bugs (Isopoda), and beach hoppers (*Orchestoidea californiana*) (CCC 1987:21; Johnson and Snook 1967:282, 441, 458, 460; Schoenherr 1992:635).

Coastal sand dunes and foredunes provided habitat for numerous insects and animals: San Francisco tree lupine moth (*Grapholita edwardsiana*), Morro blue butterfly (*Icaricia icarioides moroensis*), Pheres blue butterfly (*Aricia icarioides pheres*), deer mouse (*Peromyscus maniculatis*), California vole (*Microtus californicus*), black legless lizard (*Anniella pulchra nigra*), northern harrier (*Circus cyaneus*), gray fox (*Urocyon cinereoargenteus*), and striped skunk (*Mephitis mephitis*) (CCC 1987:19).

Fish, shellfish, and other aquatic animals of marshes and mudflats include California killifish (*Fundulus parvipinnis*), bay goby (*Lepidogobius lepidus*), striped bass (*Morone saxatilis*), topsmelt (*Atherinops affinis*), starry flounder (*Platichthys stellatus*), moon snails (Polinices spp.), horn snail or horn shell (*Cerithidea californica*), fiddler crabs (*Uca crenulata*), ghost shrimp (Callianassidae Family), fat innkeeper (*Urechis caupo*), pea crabs (*Pinnotheres pisum*), scale worms (*Lepidonotus melanogrammus*), gobies (Gobiidae Family) and various other crabs, shrimp, clams, and worms (CCC 1987:24).

Locally available shellfish species include abalone (*Haliotis* spp.), bean clam (*Donax gouldii*), black turban snail (*Chlorostoma funebralis*), California mussel (*Mytilus californianus*), littleneck clam or rock cockle (*Leukoma staminea*), olive snail (*Callianax biplicata*, formerly *Olivella* spp.), Pismo clam (*Tivela stultorum*), thick scallop (*Argopecten ventricosus*), and Venus clams or hardshell cockles (*Chione* spp.) (Lightfoot and Parrish 2009:271–272).

Pelagic or open-ocean fish in the project vicinity include anchovies (Engraulididae Family), chub mackerel (*Scomber japonicas*), Pacific bonito (*Sarda chiliensis*), leopard shark (*Triakis semifasciata*), Pacific angel shark (*Squatina californica*), Pacific barracuda (*Sphyraena argentea*), Pacific sardine (*Sardinops sagax*), shovelnose guitarfish (*Rhinobatos productus*), soupfin shark (*Galeorhinus galeus*), and yellowtail (*Seriola lalandi*). Near-shore fish in the area comprise cabezon (*Scorpaenichthys marmoratus*), California sheephead (*Semicossyphus pulcher*), surfperches (Embiotocidae Family), rockfishes (*Sebastes* spp.), kelp bass (*Paralabrax clathratus*),

señorita (*Oxyjulis californica*), blacksmith (*Chromis punctipinnis*), bat ray (*Myliobatis californica*), and soupfin shark (*G. galeus*). (Lightfoot and Parrish 2009:273.)
Prior to development of the project vicinity, the area supported various mammals. Among marine mammals there were sea lions (Otariidae Family), sea otter (*Enhydra lutris*), and northern elephant seal (*Mirounga angustirostris*). In addition to the terrestrial mammals listed previously in this section, likely inhabitants of the project vicinity included ground squirrels (*Spermophilus* spp.), hares and rabbits (Leporidae Family), mule deer (*Odocoileus hemionus*), and woodrats (*Neotoma* spp.)(Lightfoot and Parrish 2009:275–277.)

PREHISTORIC SETTING

The Petition to Amend (PTA) submitted by the petitioner does not provide an historic context for prehistoric resources. However, the FSA for the licensed CECP (CEC 2009) includes a useful background regarding prehistoric human occupation in San Diego County, and it is used as the basis for this section.

For the purposes of this project, the regional history for the San Diego region presented by Gallegos (2002: Figure 3.3) is applicable. This chronological sequence identifies two periods, the Early/Archaic Period (ca. 10,000 years before present (B.P.) to ca. 1,300 B.P.), and the Late Period (ca. 1,300 B.P. to historic contact), with various traditions/complexes identified within these periods.

Archaeologists traditionally viewed the Early Holocene archaeology of coastal southern California as the product of people who focused on extracting resources from the terrestrial environment. These Paleoindians originally dwelt in the southern California deserts, using lake and lakeside resources—an economic orientation referred to as the Western Pluvial Lakes Tradition (WPLT)—until the Pleistocene lakes in the deserts and Great Basin dried at the beginning of the Early Holocene, at which time some WPLT people migrated west to the coast and adjusted their food gathering strategies (Byrd and Raab 2007:217-218). The presence of archaeological sites on the Channel Islands[2] at the beginning of the Holocene Epoch, however, suggests that the southern California coast was not simply colonized by WPLT peoples, but another group was already established or possibly colonized by two distinct groups. The Early Holocene marine economy (fish and shellfish) has long been equated with the San Dieguito Complex because of assumed links with the WPLT and similarities in flaked stone tools (Moratto 1984: Figure 4; Wallace 1955:218). The marine focus, however, clearly represents a distinct lifeway and early coastal sites—situated on bays and estuaries, such as Agua Hedionda in the project area—is now commonly classified as part of the Paleo-Coastal Tradition (ca. 12,000–8000 B.P.) (Byrd and Raab 2007:218).

WPLT archaeological sites are typically characterized by leaf-shaped, Lake Mojave, and Silver Lake projectile points; stone crescents; formal and expediently made flake tools; atlatl (spear-thrower) hooks; and micro-cores[3]. Tools for plant processing are generaly absent. Presumably, these assemblages represent an economy focused on hunting.

[2] The most reliable earliest dates on Early Holocene archaeological sites in the southern Bight come from San Miguel Island and San Clemente Island (Byrd and Raab 2007:219) and from CA-ORA-64 on the mainland (Erlandson et al. 2007:Table 4.1).
[3] Cores are masses of stone from which pieces are flaked off to make tools.

Paleo-Coastal Tradition sites exhibit a similar flaked stone tool assemblage, but differ from WPLT sites in the presence of pitted stones, asphaltum, pointed-bone objects, and shell spoons and ornaments (Moratto 1984: 104, 190). Marine shellfish, fish, and mammals are dominant at mainland coastal sites (approximately 73 percent of animal remains) compared to pericoastal and other inland sites (25 percent) (Erlandson et al. 2007:61).

The La Jolla archaeological complex is representative of the post-San Dieguito complex (ca. 7,500 B.P. to 1,300 B.P.) during the Middle Holocene in the vicinity of the amended CECP. This complex is characterized by spear, crescent, lanceolate, and leaf-shaped points, leaf-shaped knives, and obsidian sourced from Casa Diablo and the Coso Mountains. Coastal lagoons in northern San Diego County, like Agua Hedionda, supported large populations, with at least two excavated sites around Agua Hedionda and in the close vicinity to the project area dating to this time period (CA-SDI-10965 and CA-SDI-9649). However, there is a gap in the archaeological record around coastal lagoons from about 6,000 years ago until about 3,000 years ago, a gap attributed to the siltation of coastal lagoons and depletion of shellfish and other lagoon resources (Warren and Pavesic 1963 cited in Guerrero and Gallegos 2004: 1-7). Although, some researchers argue that the La Jolla complex may just represent seasonal or geographical variations of the older and more general San Dieguito complex (Guerrero and Gallegos 2004:1-7). Inland sites from this time period are referred to as Pauma complex sites, and are typically characterized by a predominance of grinding implements, a lack of shellfish remains, a variety of tool types, and an emphasis on sedentism, as well as hunting and gathering. From about 10,000 to 1,300 years ago there is a pattern of cultural continuity, and the material culture remains are similar in many aspects, possibly representing slow cultural change (Gallegos 2002: 35; Guerrero and Gallegos 2004:1-7 - 1-8).

The Late Period in the San Diego region (ca. 1,300 B.P. to historic contact) reflects many of the same attributes with regard to the material culture that are known to have been possessed by Native Americans at historic contact. Groups during this time period focused on exploiting locally available resources and settlement was denser than in preceding periods. Archaeological assemblages dating to the Late Period tend to include small projectile points (for use in bow and arrows) such as Cottonwood and Desert side-notched points, ceramics, acorn milling sites in the uplands, mortars and pestles, obsidian sourced from Obsidian Butte, cremation, and reflect a pattern of permanent or semi-permanent seasonal villages (Byrd and Reddy 2002:44; Guerrero and Gallegos 2004: 1-8).

Many major settlements dating to the Late Period on the San Diego coast moved eastward due to extensive siltation of lagoons which caused a decline in the shellfish populations. This is not to say that coastal settlements were abandoned, but settlement patterns were locally innovative as groups experienced and dealt with population pressure, increased territoriality, and greater settlement permanence (Byrd and Reddy 2002: 41-42). Sites also tended to be located close to permanent water sources rather than ephemeral streams as during earlier periods. There were usually two or more permanent base camps, one used during the summer months and one during the winter months, with secondary camps located within the groups' territory. Secondary camps were special-purpose sites used for activities such as acorn processing, quarrying lithic

material, or hunting or fishing camps. Ceremonies usually occurred at the winter base camp (Gallegos 2002:31). The archaeological evidence from the coastal sites from Los Angeles, Orange, and San Diego counties during the Late Holocene demonstrate a diffusion of elements, e.g., ceramics and cremations, and movement of linguistic groups. This could be due to the influence of migrating Shoshonean groups after ca. 1500 B.P. (Erlandson 1994:43).

The Native American groups living in the San Diego region during the Late Period interacted closely and for an extended period of time, sharing and exchanging cultural ideas. This has caused an amalgamation of cultural traits that makes identifying ethnographically known groups with specific archaeological deposits difficult.

ETHNOGRAPHIC SETTING

Luiseño

The Luiseño people and representative tribes are one of two Native American groups related to the project vicinity. Anthropologists in the early 20th century initially distinguished the Luiseño and their immediate northern neighbors, the Juaneño, as distinct ethnic nationalities (e.g., Kroeber 1976:636). However, later studies indicate that they are ethnologically and linguistically related, and are referred to here as the Luiseño (Bean and Shipek 1978:550).

The names 'Luiseño' and 'Juaneño' are derived from the Spanish missionaries who established Catholic missions on the San Diego coast in the late 1700s. Two missions were established in the, soon to be renamed, tribes' territory: the Mission San Luis Rey, founded in 1798 in Oceanside (about 6 miles northeast of the project area), and the Mission San Juan Capistrano, founded in 1776 in San Juan Capistrano (over 30 miles northwest of the project area). Those indigenous Californians closest to Mission San Luis Rey became known as 'Luiseños' and those closest to Mission San Juan Capistrano became known as 'Juaneños'.

The Luiseño speak a language that belongs to the Cupan group of the Takic sub-family. This language branch is part of what formerly was known as the Southern California Shoshonean group because it is part of the Uto-Aztecan language family. It is not known what the Luiseño called themselves, however it is likely that they, like most other tribes in California, did not have a name for their own nationality (Bean and Shipek 1978:550).

The traditional territory of the Luiseño consisted of an estimated 1,500 square miles of both coastal and inland environments. The Agua Hedionda estuary served as the southern boundary which extended east-northeast to about Palomar Mountain. The boundary from Palomar Mountain extended along the eastern side of the Elsinore Fault Valley to Santiago Peak (Bean and Shipek 1978:550-551:Figure1).

Kumeyaay

The Kumeyaay people and representative tribes are the other Native American group related to the project vicinity. This group is also referred to as the Diegueño because the Spanish associated this group of people with the presidio and mission San Diego de Alcalá. There are two subgroups within the Kumeyaay, the Ipai, which denotes the

northernmost group, and the Tipai, which denotes the southern group (Luomala 1978: 592).

The Kumeyaay speak Diegueño, which is a part of the Yuman family of the Hokan stock. The Ipai and Tipai designations are in part linguistic categorizations, i.e, Ipai was spoken primarily north of the U.S./Mexico border, and Tipai was spoken in Baja California.

Agua Hedionda Creek served as the approximate northern boundary of the Kumeyaay's traditional territory, extending south into Baja California to about Todos Santos Bay. Their territory extended east past Lake Cahuilla (Salton Sea) to the Sand Hills, to the southeast where their territory met those of their Quechan and Cocopah (fellow Yuman-speakers) neighbors, and they ranged into the valley between Sierras de Júarez and San Pedro de Mártir (Luomala 1978: 593, Figure 1).

Sources of Ethnographic Data

The earliest ethnographic sources of information can be found in the records of the Spanish explorers and later missionary records. Of the various documents related to Spanish exploration and subsequent colonization, Father Boscana's manuscript on the religious beliefs of the Luiseño and neighboring tribes, has provided invaluable information, especially with regard to the *Chingichngish* religion. The earliest attempt at Luiseño ethnography can be attributed to Henshaw (1972). Early twentieth-century publications include publications by Sparkman (1905, 1908a, 1908b), Du Bois (1904, 1908), and Kroeber (1906, 1908, 1909, 1917, 1976). Later studies built on this information, including works by Gifford (1918, 1922) and Strong (1929). Raymond White's (1963) work significantly added to the body of literature through his interpretation of settlement patterns, social organization and worldview, and Bean and Shipek (1978) provide a valuable synopsis of Luiseño culture.

As with the Luiseño, the earliest accounts of Kumeyaay lifeways are attributed to Spanish explorers and missionaries, but Spier (1923) conducted a survey of Southern Diegueno in the early twentieth-century. Constance Du Bois (1901, 1904, 1905, 1908) did valuable work in explaining both Kumeyaay and Luiseño myths and rituals.

Luiseño and Kumeyaay Trade, Settlement Patterns, Economy, Resources and Material Culture

The Luiseño tended to be somewhat isolationist and conservative in their relationships with neighboring ethnic groups (Bean and Shipek 1978:550), and the ethnographic and ethnohistoric information suggests that trade was not particularly important for the Luiseño (Davis 1961:27). However, it is known that they obtained steatite bowls from Santa Catalina Island, and obsidian from the north and east. The Luiseño settlement pattern was one of sedentary and autonomous villages, with surrounding resource locations for hunting, collecting, and fishing that were owned by individuals, families, the chief, or collectively by the village. Other private property interests included a family's house, ritual and ceremonial paraphernalia, eagle nests, songs, and various other non-material possessions. Inland village groups usually had coastal areas they visited annually, usually during low tides or when inland resources were less plentiful. But, in

general, most subsistence needs were available within a day's travel (Bean and Shipek 1978:551).

Trade played a more prominent role for the Kumeyaay, but they traded more frequently with each other than they did with other ethnic groups. Coastal groups were known to have traded salt, dried seafood, dried greens, and abalone shells, for inland acorns, agave, mesquite beans, and gourds (Luomala 1978:601). Davis (1961:20) summarizes Kumeyaay trade in general, indicating that they supplied acorns to the Mohave, tobacco, acorns, baked mescal roots, yucca fiber, sandals, baskets, carrying nets, and eagle feathers to the Kamia, eagle feathers to the Cocopah, and acorns to the Quechan. They received salt from the Cocopah, gourd seeds from the Mohave, vegetal foods and salt from the Kamia, tule roots, bulbs, cattail sprouts, yucca leaves, mescal, pine nuts, Manzanita berries, chokecherries, and mesquite beans from "The Desert", and gourd seeds from the Quechan.

Like many other Native American groups in California, acorns were the primary subsistence source for the inland Luiseño and Kumeyaay. Acorns were also important for coastal groups, though to a somewhat lesser degree. Because of the importance of acorns, easy access to water was important for village locations to help with the acorn leaching process. Seeds also provided an important component to the Luiseño and Kumeyaay diet, including grass, Manzanita, sunflower, sage, chia, lemonade berry, wild rose, holy-leaf cherry, prickly pear, lamb's-quarters, and pine nuts for the Luiseño (Bean and Shipek 1978:552), and various sage species, pigweed, peppergrass, flax, buckwheat, cacti, and fruits for the Kumeyaay (Luomala 1978:600). Various greens, fruits, and cacti were also eaten by the Luiseño (Bean and Shipek 1978:552). The Kumeyaay ate fresh foods as well, including watercress, miner's lettuce, clover, yucca roots and stalks, grasses, shrubs, and the buds and blossoms of various flowers and cacti (Luomala 1978:600). Inland groups ate more game, such as deer, rabbit, woodrat, mice and ground squirrels, antelope, quail, doves, and ducks, than coastal groups who ate more fish and marine mammals, including crustaceans, and mollusks (Bean and Shipek 1978:552).

The Kumeyaay in the Imperial Valley adopted horticultural methods learned from their eastern Quechan neighbors, and grew maize, beans, teparies, and melons after seasonal floods. Both the Kumeyaay and Luiseño used fire to burn and rejuvenate grasslands, as well as to draw out rabbits or deer (Bean and Shipek 1978:552; Luomala 1978:601).

Hunting was conducted both collectively and individually, with rabbit and deer drives the most common animals taken as a community. For the Kumeyaay, most meat came from rodents, but lizards, some snakes, insects, and insect larvae were also eaten (Luomala 1978:601). Bows were used for hunting and war, in addition to curved throwing sticks, war clubs, thrusting sticks, lances, and slings. Balsa rafts or dugout canoes were used for ocean fishing near the shores, and seines, fish traps made of basketry materials, dip nets, bone or haliotis shell hooks, and harpoons captured seafood (Bean and Shipek 1978:552; Luomala 1978:601).

Basketry was an important component of Luiseño and Kumeyaay lifeways and various types were constructed for different purposes. Coiled and twined baskets were used for

gathering, preparing, storing, and serving food. The Kumeyaay also constructed a variety of soft textiles in basket-shapes made of string materials such as milkweed. Winnowing grain chaff or separating coarse from finely ground meal was done by a long shallow basket tray. Acorn leaching was done with openwork twined baskets, but basins in fine sand were also used. Ceramic vessels in addition to baskets were also used for storage. Acorn granaries were constructed from willow boughs and were set on a flat rock base (Bean and Shipek 1978:552-553; Kroeber 1976:722).

Luiseño ceramics were made by the typical paddle-and-anvil technique, and were sparsely decorated with simple lines using a fingernail or stick, or were painted on. Ceramic shapes included shallow dishes, bowls, hemispherical bowls, wide- and narrow-mouthed jars, ladles and dippers, and miniatures. Food was also prepared using wooden paddles, brushes, tongs, tweezers, steatite bowls and cups, and wooden digging sticks, in addition to various groundstone and flaked-stone tools for cutting, scraping, prying, drilling, and pounding. Bedrock mortars were common in inland locations (Bean and Shipek 1978:553; Kroeber 1976:722).

Luiseño house construction entailed conical, partially subterranean structures thatched with reeds, brush, or bark. Other structures included a brush-covered rectangular shade structures referred to as *ramadas* by the Spanish, sweathouses which were round, semi-subterranean, and covered with earth, and a centrally located circular fenced-off area used as a ceremonial location called a *wamkis* (Bean and Shipek 1978:553). Houses of the Kumeyaay were elliptical in shape and similar to those of the Luiseño except that Kumeyaay houses were covered with earth. Kumeyaay also built sweathouses which were smaller but higher than domiciles. The Kumeyaay also dug wells, particularly along the eastern slopes where springs are less plentiful. Communally owned ceremonial structures were located in villages, and a brush dance circle was also used (Kroeber 1976:721-722; Luomala 1978:597).

Luiseño and Kumeyaay Burial Knowledge and Practice

The Kumeyaay burial practices were similar to their eastern Yuman-speaking neighbors and the Luiseño's were more similar to their northern Gabrielino Tongva neighbors. The Luiseño cremated their deceased, and conducted at least six different mourning ceremonies after cremation. One ceremony entailed ritualistically washing the clothes of the deceased, whilst singing, declaiming, and dancing in the ceremonial enclosure. Another ceremony included burning the clothing of the dead and instructing them to depart to the sky, while another ceremony was an annual or semi-annual public ceremony observing the dead by burning images of them. An additional ceremony involved a tall painted pole, which represented the spirit of the deceased, and climbing contests of the pole, were held among tribal members during the ritual. The eagle killing ceremony was held for chiefs, and the eagle's body was ritualistically burned or buried. Another ceremony was the burial of the feather headdress and other ritual paraphernalia belonging to the deceased in a central hole of a ground painting (Kroeber 1976:672-677).

The Kumeyaay also practiced cremation, and the ashes were placed in a ceramic jar which was buried or hidden with a broken metate. They also practiced an image burning ceremony like the Luiseño, but the ceremony was affiliated with the Yuman *keruk* ceremony. The *keruk* was a mourning ceremony held a year after death, and entailed

the construction of a specific ceremonial structure in addition to the burning of the images of the dead (Kroeber 1976:716; Luomala 1978:603).

Contemporary Tribes Entities with Ethnographic Affiliations

La Posta Band of Mission Indians

This federally recognized tribe has a reservation located near Boulevard, California. Members are of Kumeyaay descent, and the tribe maintains a 5-member tribal council[4].

Manzanita Band of Kumeyaay Nation

The Kumeyaay of the Manzanita Band are a federally recognized tribe located on a 3,580 acre reservation near Boulevard, California. Their tribal council consists of 1 tribal chairman[5].

San Pasqual Band of Mission Indians

No information could be accessed regarding this tribe.

Sycuan Band of the Kumeyaay Nation

This federally recognized Kumeyaay tribe maintains a 640 acre reservation in the Dehesa Valley, near El Cajon, California. The tribe's casino is located in El Cajon as well, and the tribe holds an annual pow-wow. The 6-member tribal council determines and administers laws, conditions, and regulations for the benefit of the Sycuan people[6].

Viejas Band of Kumeyaay Indians

The Viejas Band is a federally recognized tribe with a 15,000 acre reservation near Alpine, California. The tribe maintains two councils, a general council which includes all tribal members and votes on issues relating to budget and land use, and a tribal council which serves as the legislative and executive branch, with quasi-judicial authority as well. The tribe operates a casino in Alpine, in addition to an outlet center, and campgrounds[7].

Kumeyaay Cultural Historic Committee

This is not a tribe but a group that protects Kumeyaay cultural sites, and also maintains the Kumeyaay Cultural Repatriation Committee.

Campo Band of Mission Indians

The Campo Band are of Kumeyaay descent, and have a federally recognized reservation in Campo, California and maintain a 7-member tribal council. They have a casino in Campo, and also a materials (ready-mix concrete, washed concrete sand, and plaster sand) distribution business, and wind farm located on tribal lands[8].

[4] http://www.lptribe.net/
[5] http://www.sctca.net/manzanita.html
[6] http://sycuantribe.org/tribal-government/tribal-council/
[7] http://www.viejasbandofkumeyaay.org/index.html
[8] http://www.campo-nsn.gov/

Mesa Grande Band of Mission Indians

The federally recognized Mesa Grande Band maintains a 1,820-acre reservation near Santa Ysabel, California and is governed by a general council consisting of all members over 18 years old. A 5-member, elected business committee governs the day-to-day affairs of the tribe. This is a non-gaming tribe and they are committed to sustainable business endeavors[9].

Pala Band of Mission Indians

The Pala Band are a federally recognized group of Luiseño and Cupeño members with a 12,273-acre reservation in Pala, California. They maintain a general council which includes all eligible votes over 18 years old, and a 6-member, elected Executive Committee. The tribe's casino resort and spa is located in Pala, California, and they also maintain a skatepark, fire station, preschool, and fitness center[10].

Pauma and Yuima Reservation

The Luiseño who live on the 5,777-acre reservation in Pala, California are governed by a 4-member tribal council. The tribe maintains a casino in Pauma Valley, California, in addition to business in agriculture[11].

Pechanga Band of Mission Indians

The 5,500-acre federally recognized Pechanga reservation is located near Temecula, California. The Luiseño who are eligible, voting members of this tribe consist of the general council and elect a 7-member tribal council which is in charge of setting policy and administering government programs. The income generated from the tribe's casino in Temecula has assisted in the establishment of a community park, youth center, senior center, and tribal government center[12].

Rincon Band of Mission Indians

The Rincon Band maintains an approximately 5,000-acre reservation near Valley Center, California for their Luiseño members. This federally recognized tribe has a 5-member tribal council which, in addition to its executive, legislative, and executive authority, also serves as the board of directors for tribal enterprises.

Kwaaymii Laguna Band of Mission Indians

The Kwaaymii are a sub-group of the Kumeyaay who live in the Laguna Mountains. They are not a federally recognized group, and only 1 member of the group is still alive.

Kumeyaay Cultural Repatriation Committee

This committee is a part of the Kumeyaay Cultural Historic Committee, and "was created in 1997 to aid the San Diego area Kumeyaay bands in the repatriation of their ancestors' human remains, tribal artifacts, and cultural objects of a patrimony heritage"[13]

[9] http://mesagrandeband-nsn.gov/
[10] http://www.palatribe.com/
[11] http://www.paumatribe.com/index.php
[12] http://www.pechanga-nsn.gov/
[13] http://www.kumeyaay.info/repatriation/

Ewiiaapaayp Tribal Office

The Ewiiaapaayp are a federally recognized group, and are also known as the Cuyapaipe. They have an approximately 500-acre reservation near Alpine, California. The tribe maintains a general council in addition to a 3-member tribal council[14].

San Luis Rey Band of Mission Indians

The San Luis Rey Band are not federally recognized and do not have a reservation in southern California. However, they do have a tribal council and work together with some of the federally recognized tribes as part of a larger Tribal Coalition to protect cultural resources. They also hold an annual pow-wow in the summer in Oceanside, California.[15]

La Jolla Band of Mission Indians

The federally recognized La Jolla Band has a nearly 10,000-acre reservation near Palomar Mountain. They are Luiseño and are governed by a 5-member tribal council, and have a campground on the reservation that is open to the public.[16]

Ipay Nation of Santa Ysabel

The Ipay Nation maintain an approximately 15,000-acre federally recognized reservation near Santa Ysabel, California. The tribe recently adopted a constitution in which they established four branches of government: the general council of all voting-eligible members, the chairman and vice-chairman entailing the executive branch, a 7-member legislative committee, and a judicial branch. The tribe also hosts internet-gaming at the reservation[17].

Kumeyaay Diegueno Land Conservancy

This group is a non-profit organization dedicated to preserving and protecting environmentally and culturally-sensitive lands in traditional Kumeyaay territory. There are currently three properties under protection by the Land Conservancy, the Sacred Mountain Ranch at Kuuchamaa Mountain, the Mosler Property in Julian, California, and Sloan Canyon in the Dehesa Valley[18]

Inter-Tribal Cultural Resource Protection Council

Staff cannot find any current information regarding this group at this time.

HISTORIC SETTING

Spanish Period (1769 to 1822)

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. It was founded by Father Junipero Serra,

[14] http://www.sctca.net/ewiiaapaayp.html
[15] http://www.slrmissionindians.org/about/
[16] http://lajollaindians.com/lajollatribe/
[17] http://www.iipaynation-nsn.com/index.html
[18] http://www.kdlc.org/index.html

who, along with Gaspar de Portola, led the initial Spanish expedition into Alta California. In 1798, Mission San Luis Rey was established approximately six miles north of Agua Hedionda Lagoon (located in modern-day Carlsbad). This mission became the largest of the 21 missions in California, extending over 20 square miles and with the largest number of Indian residents. 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. Ultimately, however, the entry of Spanish missionaries into the coastal region resulted in large-scale destruction of native populations (Cook and Marino 1988). A number of family ranchos were established during this period, although there are few remnants of these early settlements.

Mexican Period (1822 to 1848)

The Mexican period followed the Spanish period as Mexico gained its independence from Spain. 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. 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 (CEC 2009).

American Period 1848 to present

During the American period, which began in 1848, a growing number of farms appeared along with the cattle and sheep ranches. 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 (CEC 2009).

Agua Hedionda Lagoon

Originally named “San Simeon Lipmaca” by Gaspar de Portola and Father Juan Crespi in 1769, the soldiers travelling in the expedition referred to it as Agua Hedionda, which is “stinking water” in Spanish (Harmon:1). The name has persisted to current times. From Harmon’s account in A History of Carlsbad, it appears the lagoon would dry up in the summer months, such that automobiles could cross the lagoon, bypassing the circuitous county road which followed the northern edge of the lagoon (Harmon : 30-31). The lagoon’s channel was cut out by several large storms in 1922 and 1927. After the storm and flood of 1927, the channel remained open for five years and the beaches and sand bars became popular picnic and swimming locations. Boating and fishing also gained in popularity. However, when the state blew up the existing bridge crossing the lagoon and dumped it into Agua Hedionda, it once again was blocked off from tidal flows (Harmon:31).

Agua Hedionda Ranch

Rancho Agua Hedionda was granted to Don Juan María Marrón by Mexican Governor Juan Bautista Alvarado in 1842. The grant extended south along the coast from the present day city of Carlsbad to Encina Creek, then eastward about five miles, then north to Buena Vista Creek (Harmon:1). Don Juan María Marrón died in 1853 at the age of forty-five; his widow and four children inherited Rancho Agua Hedionda, with the exception of 360 acres bequeathed to Silvestre Marrón. The latter also was given grazing rights on the huge rancho. Francis Hinton purchased Rancho Agua Hedionda in 1860. The transaction took several years to complete and three deeds were recorded between 1865-1869. (Harmon:2-3).

Robert Kelly became half-owner and head man at Francis Hinton's Rancho Agua Hedionda, during the time of Hinton's acquisition. When Hinton died in 1870, Robert Kelly inherited Hinton's half of the property, receiving "all rights, title and interest" of the Hinton rancho. Kelly put 25 miles of fence around the Hedionda property to avoid being drawn into clashes with squatter farmers. At one time prior to the fencing, the cattle roamed unhampered over the land from Los Angeles to Lower California. Harmon writes in A History of Carlsbad that "even today" (ca. 1961), "it is possible to discover remains of some of the old split redwood posts and original barbed wire fence at Aqua Hedionda" (Harmon:4-5).

Robert Kelly died in 1890, leaving Rancho Agua Hedionda to his nine nephews and nieces, the children of his brother, Matthew Kelly. The last of these heirs, William Sherman Kelly, died on May 10, 1950, at the age of eighty-five. Holdings of his son, Allan, 820 acres of the Marrón grant, included the upper part of Agua Hedionda Lagoon. "From Allan Kelly's home can be seen the lagoon into which empties the creek of the same name, the Encina power plant and the ocean. In the distance to the south is Palomar Airport which had been carved out of the original land grant. Within the same boundaries are two high hills, or mountains, which on county maps bear the historic names of Mount Kelly and Mount Hinton" (Moyer 1969:38-40). Allan Kelly's remaining ranch has been since subdivided into a number of housing developments, including Heron Bay, Spyglass Hills and Evan's Point. Part of the mitigation for the Kelly Ranch Master Plan (1984) was to create habitat conservation land. The Kelly Ranch Habitat Conservation Area is located adjacent to the Heron Bay and Spyglass Hills communities. Mention is made that the 6.5 acre parcel containing the historic Allan Kelly ranch was not part of the sale of land[19]. Construction of Heron Bay and Spyglass Hills did not commence until 2002. (Heron Bay 2014). There is a large parcel nearby at 2770 Sunny Creek Road, off El Camino Real, currently owned by Robert P. Kelly[20] and considered for eligibility for the National Register of Historic Places (NRHP) in Carlsbad's 1990 Cultural Resources Survey (Carlsbad 2014c:3.7-7). The survey information noted "Adobe rehab, 1842; outbuildings, c. 1900s". Viewed from Google Earth in historical aerial imagery, it appears the existing structure has been extant since

[19] Allan Kelly's remaining property is located on Hemingway Drive. He built the adobe home in the 1960's (Gutierrez 2014).

[20] The Robert P. Kelly residence at 2770 Sunny Creek Road is listed in a City of Carlsbad Building Permits Pending report dated Monday, September 16, 2013, for installation of solar panels, permit # CB132175.

at least 1994. It is unclear what portion, if any, contains the original adobe referenced in the survey notes.

The old Marrón[21]-Kelly adobe was off of El Camino Real (Hatley 1978). Its location is best described today as between El Camino Real to the west and College Boulevard to the east, just south of Highway 78, on Haymar Drive. It is listed as a potential historical resource in the Draft Environmental Impact Report (EIR) for the General Plan Update. (Carlsbad 2014a:3.7-11). The list describes the property as including the "Buena Vista Creek and El Salto Falls archaeological sites as well as natural open space, part of which is sensitive habitat".

Rancho Los Kiotes/Leo Carrillo Ranch

Robert Kelly's older brother Matthew arrived with his family in 1868 to homestead 10,000 acres immediately adjacent to Rancho Agua Hedionda's southern border. They named it Rancho Los Kiotes (Quiotes). Leo Carrillo, an early to mid- 20th Century actor, purchased 1,700 acres from Charles and Lavinia Kelly in 1937 and an additional 838 acres from Edward and Nettie Kelly in 1939 (Carlsbad 2014b: 6). Construction of the bulk of the ranch buildings and facilities occurred between 1937 and 1940, even incorporating a portion of the Kelly rancho adobe house into the main wing of his adobe (Carlsbad 2014b:7). The Leo Carrillo Ranch has been found to be significant under Criterion A, B and C of the National Register of Historic Places (Carlsbad 2014b: 1). Leo Carrillo died in 1961. The ranch fell into decline during Carrillo's later years and was sold by his daughter in 1961 to developer Byron White's Carrillo Ranch Partnership. The city of Carlsbad took possession of the 10.5 acres at the heart of the ranch in 1978. The city increased the landholding to a total of 27 acres. In 1991, the city commissioned a Historic Structures Report and began the process of stabilization and rehabilitation of the site. The property opened to the public as Leo Carrillo Ranch Historic Park in 2003 (Carlsbad 2014b:8-9).

Las Encinitas Rancho

Las Encinitas Rancho, ("little live oaks"), was a 4,431-acre tract given to Don Andres Ybarra by Mexican Governor of Alta California Juan Bautista Alvarado in 1842. The Ybarra family built an adobe home near a creek on the rancho. The rancho was sold in 1860 and the adobe house later became a stage stop. Located within modern-day Carlsbad, what remains of the stage stop adobe has been preserved in situ and is now incorporated into Stagecoach Community Park (Moyer 1969:41-43).

Frazier's Well

John Frazier and his family arrived in Carlsbad by railroad in 1883. Frazier obtained a property north and west of Rancho Agua Hedionda and drilled his well in what is now the village center of modern-day Carlsbad. Frazier's well water was soon known for its high quality and as a way station for thirsty travelers. A water analysis revealed that Frazier's water was nearly identical in taste and chemical content to the famed water of Well Number 9 in Karlsbad, Bohemia (Harmon:12-13). Hence, the name of the town

[21] This adobe is also noted by some sources as the Silvestre Marrón adobe, brother of Don Juan Maria Marrón. (Moyer 1969; p37).

emerged as Carlsbad. In 1886, Frazier sold his 127 acres, including his well, to Gerhard Schutte and Samuel Church, who also obtained 275 nearby acres (Carlsbad 2014a). Frazier's Well was made a California historical monument by Assembly Resolution 125 on April 20, 1955. The well had been abandoned. A monument to the well was created by the then owner, B.M. Christiansen. He duplicated the pump house of the Karlsbad well in Bohemia (Harmon:79-80). In 1993 Ludvik Grigoras, a Karlovy Vary (Karlsbad, Czech Republic) native started to completely restore the old well and re-drilled another of Frazier's wells which is naturally carbonated. Ludvik encouraged a hometown friend, renowned sculptor Vaclav Lokvenc from Karlsbad, Czech Republic, to create a 13 ft. bronze statue of Capt. John Frazier which was shipped from Europe in 1994 and is now erected at the Alt Karlsbad Historic Site. Today the famous therapeutic water is being bottled again as Carlsbad Alkaline Water and customers line up at the dispensing machines to fill their gallon jugs. An elegant spa has opened in the beautiful European-style building on the site of the original hotel (Carlsbad Mineral Water Spa 2014). The site of John Frazier's original well can still be found at Alt Karlsbad, located at 2802 Carlsbad Boulevard.

Carlsbad

As noted above, the community of Carlsbad was named for the popular 19th century Karlsbad Spa in Europe. The original Carlsbad railroad depot, an open-air shed, was built to serve the California Southern Railway in 1887. In 1905 or 1906 (accounts vary), the railroad was purchased by the Atchison, Topeka and Santa Fe (ATSF) Railroad, as it had become a shipping point for locally grown fruits, vegetables, and flowers. In 1907, a new enclosed Queen Anne-styled station was built and the name on the station was shortened to "Carl" to avoid confusion with Carlsbad, New Mexico (Gutierrez 2002:119). The depot also served as a telegraph office, post office, Wells Fargo Express office, and general store. 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:5.3-9). The 1907 station is listed on the NRHP. A new train station is located at Carlsbad Village Station north of the old depot and serves the Amtrak Surfliner and the Coaster commuter train.

A railroad poster featured in A History of Carlsbad advertised an excursion train on April 11, 1888, to Carlsbad, the "Greatest Seaside Sanitarium on the Pacific Coast". The railroad was instrumental in opening access to Carlsbad's now famous waters and ultimately led to the development of Carlsbad as a resort and later as a city. Carlsbad was incorporated as a city in 1952 and several subsequent annexations led to the City's boundary as it exists today (Gutierrez 2002:48-57).

Railroads: California Southern-ATSF Railroad-Amtrak Surfliner-The Coaster-North San Diego County Transit District

To help bring the railroad through, Robert Kelly donated 40 acres of his Rancho Agua Hedionda property for the railroad[22] and "a money consideration" in addition to the right-of-way through his ranch (Harmon:5). The California Southern Railroad, a group of investors closely affiliated with the ATSF (JRP 2007:15), completed the Fallbrook-

[22] Various accounts describe this action but it is unclear as to what entity the land was given. Ultimately, it became part of the line that the California Southern Railway built from National City to Fallbrook.

National City line through Carlsbad on January 2, 1881. After completing a rebuild of the line in the wake of an 1885 flood, in 1888 the California Southern railroad became the main line between San Diego and Los Angeles. In 1889, the California Southern and several other branch lines were reorganized into the Southern California Railroad (JRP 2007:16, USGS 1893). The original track was realigned to the east and straightened out in 1906 (JRP 2007:16). Encina Power Station (EPS) oil tanks occupy the original location of the tracks (Guerrero et al 2004:1-9). A review of maps on file at the California State Railroad Museum dating to 1881 show the original alignment (California Southern 1881a, 1881b). Another adjustment to the ATSF rail line as it passed through what is now EPS can be seen in historical topographic maps and aerial photographs from 1939 to 1953. There was a siding on the peninsula where the original fuel tanks were located. The 1953 aerial shows a portion of the siding remaining, but it appears to have been partially destroyed by the EPS construction process at the time.

The Carlsbad Santa Fe Depot was originally built in 1907 and underwent an award-winning rehabilitation in 1987. The depot is listed on the NRHP. The depot is located at 400 Elm Avenue (now 400 Carlsbad Village Drive) and is described in the NRHP nomination as Folk Victorian/Carpenter Gothic (Cratty 1993). It also has Queen Anne style elements of wood, weatherboard, decorative shingles and metal roof cresting. The depot now serves as a visitor's center for the city of Carlsbad.

The depot replaced an open air shed. The station was sometimes referred to as Frazier's Station, named after the famous waters discovered by John A. Frazier. After all, it was the railroad that brought Frazier and his family to Carlsbad, where he discovered the superb mineral and artesian waters in his well and brought the area to national recognition. The railroad experienced a significant decline in passenger use after a new section of I-5 was opened in 1953 from Oceanside to Carlsbad (Gutierrez 2002:62-63) and automobile travel became preeminent. This decline was especially noticeable from 1960 to 1990. The North County Transportation District (NCTD) introduced commuter rail service known as the Coaster in 1995 (Coaster 2013). The Coaster commuter train travels past coastal scenery as it runs north and south through San Diego County, serving eight stations between Oceanside and downtown San Diego. More than twenty trains run on weekdays, with additional service on the weekends. In addition, Amtrak's Surfliner trains currently run six trains per day, serving the same eight stations (NCTD 2014).

The North San Diego County Transit Development Board (NSDCTDB) was created by California Senate Bill 802 on September 20, 1975. The board was created to plan, construct and operate public transit systems in its area of jurisdiction. On January 1, 2003, a new state law was enacted (SB 1703) that transferred future transit planning, programming, development and construction to SANDAG, San Diego's regional planning agency. NSDCTDB continued to operate the Breeze (Passenger Bus Service), Coaster (Commuter Rail) and Sprinter (Light Rail Line). On August 30, 2005, California Governor Arnold Schwarzenegger signed AB 1238, which renamed the Board the North County Transit District (NCTD), with the name change becoming effective January 1, 2006 (NCTD 2014).

As of February, 2012, the rail line has been upgraded to a double track for a 1.9-mile section from Carlsbad Village southward past Cannon Road. This upgrade included the replacement of the railroad bridge over Agua Hedionda Lagoon (NCC Carlsbad 2014).

ROADS AND BRIDGES

El Camino Real

The first mission was established in 1769 at San Diego, when they established a fortress and a Franciscan mission. A footpath, called The El Camino Real, or Kings Highway, was created to connect the outposts. Ultimately, El Camino Real linked 21 missions, pueblos and four presidios from San Diego to Sonoma (CAHighway 2014). An article by Nathan Masters (Masters 2013) disputes the notion that the path was a well-traveled road and suggests the path changed over time based upon weather, modes of travel and even tides.

Led by groups like the Auto Club, the California Federation of Woman's Clubs, and the Native Daughters of the Golden West, efforts to develop El Camino Real into a tourist destination highway gained traction in the first decade of the twentieth century. The El Camino Real Association succeeded in placing more than 400 roadside markers comprised of bells hung on poles along an approximation of the original footpath between 1906 and 1914 (Masters 2013).

The 1910 State Highways Act authorized construction of a paved road along the route of El Camino Real. However, construction lagged and for many years much of the historic road was only a primitive trail. Between cities there were streams to ford and steep grades to scale. Sometimes, teams of horses would rescue automobiles trapped in mud. Finally, by the mid-1920s, the highway construction was complete, and in 1925 the route was signed as US 101 (CAHighway 2014).

El Camino Real currently traverses Carlsbad as County Route S11. El Camino Real runs from near the old Mission San Luis Rey just north of the Carlsbad city boundary to the intersection with Manchester Avenue in Encinitas. It is not a continuous route in San Diego County.

Pacific Coast Highway/Carlsbad Boulevard

The old dirt road along the coast was paved in 1915-1916 (Harmon:31). This coincides with the implementation of the 1910 State Highways Act (above) but it is not known if it is connected. Carlsbad Boulevard is a segment of Pacific Coast Highway.
Pacific Coast Highway opened in the late 1920s as part of the Roosevelt Highway, a 1,400-mile road that traversed the westernmost United States. Pacific Coast Highway is a road which connects coastal towns from Ventura to San Juan Capistrano, however there are other sections which have adopted the moniker, the most obvious being the segment along the Big Sur coastlines. Passing directly through coastal towns, the Roosevelt Highway -- renamed Pacific Coast Highway in much of Southern California in 1941 -- adequately met the region's transportation needs in 1929 (Masters 2012). The route was replaced by I-5 in the 1950s in the Carlsbad area. It is also identified as Highway 101 or CA 1 in various sections.

The significance of this road to Carlsbad is that it was the first road that directly connected Carlsbad to San Diego and Oceanside (Gutierrez 2002:111). The road in Carlsbad was originally called Lincoln Street. The 1927 state realignment was when the street name changed to Carlsbad Boulevard. The road was first paved in 1915 and a concrete bridge over Buena Vista lagoon was built to replace a wooden bridge. Carlsbad Boulevard became a catalyst for new businesses to spring up along its route (Gutierrez 2002:111-112).

Cannon Road

A road following a portion of the route of Cannon Road is seen in historic aerials as far back as 1947. The 1947 aerial shows it at the southern boundary of the agricultural fields to the east of the ATSF railroad tracks, leading to the west presumably to the coast road (now Carlsbad Boulevard), albeit diverted around some intervening development. By 1953 it appears to go straight through to Carlsbad Boulevard, achieving its modern alignment. Historical imagery from Google Earth reveals that by May 31, 1994, Cannon Road dead ended at what is now Car Country Road. By May 21, 2002, the road extended to Faraday in the foothills and was paved from Frost Avenue to El Camino, leaving an unpaved gap between Faraday and Frost. The gap was closed by March 10, 2003. Cannon Road finally extended to its current completed alignment at College Avenue by October 10, 2005.

William D. Cannon purchased 150 acres extending along the coast from Agua Hedionda Lagoon southward in 1926. Water problems had made the property difficult for agriculture. Cannon arranged for water to be delivered from wells located several miles to the east along Agua Hedionda Creek by forming his own water company and building a six-inch pipe across Allan Kelly's rancho land (Gutierrez 2014;Kubota 2014; Sippel 2014). The route of the water pipeline appears to be along the modern alignment of much of Cannon Road (Sippel 2014). This account is borne out by a 1955 diagram of the proposed Carlsbad Municipal Water District, which shows a pipeline route from the San Diego Aqueduct (Gutierrez 2002:62). These coastal properties were included in Carlsbad when incorporation took place in 1952. Cannon named the residential subdivision south of Cannon Road Terramar and the name persists to today for the beachside neighborhood which dates to the 1940s-1950s (Jones 1982:142-144). Presumably, Cannon Road was named for William D. Cannon, although it is unclear when it acquired the name.

Interstate 5

The 11.7 mile section of I-5 from Oceanside to Carlsbad was opened in 1953 (Gutierrez 2002: pp 62-63: 114). This includes the section that abuts the Encina Power Station. I-5 bisected the city and reduced vehicle trips on Carlsbad Boulevard. It eventually had the positive effect of bringing even more tourists to Carlsbad and new businesses (Gutierrez 2002:114).

Bridges

Three bridges are on or about the project site. The bridge on I-5 that crosses Agua Hedionda Lagoon is a continuous concrete bridge, first built in 1953 and updated in 1970. The I-5 bridge that spans Cannon Road is made of pre-stressed concrete and dates to 1971 (CALTRANS 2014). All highway bridges within the Area of Potential

Effect (APE) for the I-5 widening project were previously determined not significant in accordance with Caltrans Statewide 1987 historic bridge inventory, which was reconfirmed with the 2006 update (CALTRANS 2013:3.8-8). That would include the two bridges noted above.

The bridge on County Route S21 (Carlsbad Boulevard) crossing the Agua Hedionda Lagoon is not logged by Caltrans. The City of Carlsbad's Land Development Engineering Department developed plans for the reconstruction of the bridge in 1985 and has on file a Notice of Completion in 1987 for the bridge (Carlsbad 2014d).

San Diego Gas & Electric Company (SDG&E)

San Diego Gas Company was founded in 1881 and incorporated as San Diego Consolidated Gas & Electric Company in 1905. The utility built its first principal electric-generating plant in 1905. It was the only provider of gas and electricity for San Diego and its suburbs. The company's system included two steam electric-generating stations by 1927.

In 1932 the company replaced manufactured gas with natural gas in its service area. Two years later, San Diego Consolidated began purchasing power produced by the Boulder Dam. In 1939, San Diego Consolidated was authorized to export 3.6 million kilowatt hours per year to its wholesale customers in Tecate, Mexico.

The Public Utility Holding Company Act of 1935 resulted in the Securities and Exchange Commission ordering Standard Gas & Electric to sell all of its utility holdings in 1940. This sale included San Diego Consolidated, which changed its name to San Diego Gas & Electric Company and became publicly owned.

During the 1950s SDG&E began research into nuclear power, and in 1961 it agreed to participate in development of what is known as the San Onofre Nuclear Generating Station (SONGS) in partnership with Southern California Edison, where SDG&E owned 20 percent of the plant. SONGS Plant 1 came online in 1968, followed by Plants 2 and 3 in 1983 and 1984. Plant 1 was decommissioned in 1992 and Plants 2 and 3 were taken permanently offline in 2013.

By the late 1960s air pollution control regulations were hindering the company's efforts to build plants to supply the booming population of the San Diego area. By 1970, it was one of the fastest-growing utilities in the United States. Fuel oil costs increased in 1970 due to local regulations that required the utility to burn higher-priced low-sulfur crude, and the company began to look elsewhere for its power needs (HBS 2012).
SDG&E is now owned by Sempra Energy. Sempra Energy's California utilities, San Diego Gas & Electric Co. and Southern California Gas Co., serve more than 20 million consumers.

Steam Generation Electric Plants in California

In 1879, the Brush Plant in San Francisco was the first central generating station on the west coast to produce and distribute electricity on demand to customers. Prior to Thomas Edison's invention of the incandescent electric light bulb in 1879, only the electric arc system was available, which turned out to be unsafe for indoor use. (Myers 1983:11.) Edison is also known for improving the generation and distribution systems

for electricity, which truly opened up the consumer market. This “central station” concept was to become the cornerstone of the electric utility industry (Myers 1983:11).

Hydroelectric power was the dominant form of electric generation in California in 1920. By 1940, it grew to 89 percent of the market in California. However, by 1960, steam generating plants became the primary source of electricity in California as hydroelectric generation had fallen to 27 percent (JRP 2014:5).

Power generating plants constructed before World War II were typically housed in an architectural shell with a recognizable style of design. In the early part of the twentieth century, this was partly an outgrowth of the City Beautiful Movement. San Diego Consolidated Gas & Electric Company’s Station B (1911) and Sacramento’s PG&E Station A are examples of this early beaux arts-based Classical Revival presentation of an edifice housing the turbines, generators and various facilities of a steam generating electric plant. The original Pacific Light and Power Company steam plant at Redondo Beach, constructed in 1906, was also emblematic of the Classical Revival style. All of these featured arched fenestration, distinct cornice details, rhythmic patterns of windows, columns or piers and spacious interior volumes housing the equipment.

Later examples adopted the architectural style of their times. The City of Vernon’s Station A, built in 1932, is an excellent example of the Art Deco style of architecture popular at the time, especially in Southern California. A later addition to San Diego’s Classical Revival style Station B (1928-1939) was constructed in the Spanish Revival and Art Deco styles.

Post World War II, power plant design in Southern California transitioned to largely outdoor turbines and generating equipment, with few plants being constructed within a shell. EPS is an exception to that, as are portions of Redondo Beach Generating Station (Plant 1).

Encina Power Station (EPS)

The Encina Power Station was built by SDG&E and Plant 1 came online in October, 1954. (JRP 2014: p.11). The original site was comprised of 110 acres adjacent to the Agua Hedionda Lagoon and was purchased by SDG&E in 1948 from Paul Ecke, who had been granted the land by William D. Cannon in 1947 (Gutierrez 2002:47;SGI 2014: 57). (Ecke was a partner with Cannon in the development of Terramar). A 1947 aerial seen in Appendix 5.14A, Phase 1 ESA, to the original AFC (CECP 2007a), shows the entire site east of the railroad tracks to be in agricultural production. The area west of the railroad tracks appears marshy and there are some structures shown in the southwest corner of the site off what is now Cannon Road and Carlsbad Boulevard. A 1948 USGS Topographic Map labels the area where the structures are visible as “Military Res” (JRP 2014:12). EPS was designed to use once-through ocean water for cooling. The natural lagoon was variable in its shape and how much water it contained, so the EPS project also involved dredging the lagoon to create a large water body with consistent water levels for intake purposes. Then an intake facility was located on the south end of the outer lagoon and a discharge tunnel constructed to empty into a cooling pond which ultimately is drawn into the ocean. A large intake at the northwest end of the lagoon is flanked by rip-rap jetties and passes under PCH/Carlsbad Boulevard into the lagoon.

EPS is a series of five generating plants coming online in phases from 1954 to 1978. The first three are housed in a poured concrete structure with an internal steel support system. The final two plants are housed in a composite material known as transite panels. The original plants each had their own external exhaust stack. Those stacks were replaced by a singular, 400-foot tall stack in 1978, allegedly so that emissions and plumes would travel farther from the power plant site.

The 1953 aerial image also clearly shows the existence of a railroad spur leading from the ATSF tracks into the south end of the power station. Presumably it carried the heavy equipment onto the site during construction. The railroad spur exists today, although portions of it have been abandoned to automobile parking and outdoor storage. The spur enters the southernmost portion of the plant on the same level as the turbines.

A 1963 aerial shows the existence of the two water tanks associated with the EPS that are now located on SDG&E property just south of the power plant site (CECP 2007a), While the EPS may very well be one of the last electric generating plants in California to be housed in an architectural shell, it is not a shell that is embellished with any architectural style or merit. Unlike the architecturally significant Art Moderne Plant 1 and Pump House at the Redondo Beach Generating Station (RBGS), it is a strictly utilitarian housing for a power plant, with no decorative features. The interior is typical of these types of plants: the turbines are located on a mezzanine floor along with the control rooms. Although, in the case of EPS, much of the infrastructure is below grade while the mezzanine is at grade.
The EPS expanded and added support facilities over time. Some of the original buildings have been replaced, such as the administration building. Additional fuel tanks were constructed in the 1970s (Tanks 4, 5, 6 and 7). The 1980s saw the addition of waste water tanks, a hazardous waste building, a paint storage building and maintenance shop. Most recently, the property has the addition of the Poseidon Desalination Plant (Poseidon), currently under construction in an area west of the railroad tracks and east of the waste water tanks where Tank 3 originally was located. Tank 3 was removed as part of the locally-permitted Poseidon Plant.

BACKGROUND RESEARCH

Cultural Resources Table A1
Literature Review Results within or adjacent to the PAA

Author and Date of Study	NADB[23] Number	Resources Identified
Crafts 1995	1123329	None
Guerrero, Stropes, and Gallegos 2004	1129569	1
Helton 2007	N/A	0
Helton and Lawson 2008	N/A	0
Helton 2013	N/A	0
Laylander and Pallette 2005	1129382	5
Polan 1981	1121752	0
Rosen 1999	1126629	6
Rosen 2003	1128484	1
Seeman 1982	1124111	0
Smallwood 2005	1130467	1
Tang, Hogan, Smallwood, Jacquemain, and Hensley Shaker 2004	1129146	1
Wade 1987	1121665	8

[23] NADB is an acronym for the National Archaeological Database,

Cultural Resources Table A2
Literature Review Results: Studies outside PAA, in Records Search Area

Author(s) and Date of Study	NADB Number
Bonner and Aislin-Kay 2007	1131419
Bonner and Keasling 2007	1131423
Brandman 1983	1122045
Brown 2001	1125343
Byrd and O'Neill 2002	1129361
CALTRANS 2012	1133916
CALTRANS 2013a	1134495
CALTRANS 2013b	1134615
Carrico and Phillips 1981	1120424
Caterino 2005	1129516
Cheever and Gallegos 1987	1120786
Cupples 1976	1120535
Dolan and Allen 1996	1123378
Dolan, Moomjian, Raen-Jenning, and Smith 1996	1123170
Dominici, Rosen, and White 2006	1129996
Dominici 2007	1131761
Dominici 2010	1132762
Duke 2002	1127960
Eigmey and Wade 1990	1121394
Elfend 1984	1122016
Environmental Impact Profile 1973	1122296
Environmental Impact Profile/Unknown Author 1974	1122088
Flandreau 2013	1134757
Gallegos and Kyle 1992	1122474
Gallegos 1986	1121028
Gallegos and Carrico 1984	1121055
Gallegos, Carrico, and Thesken 1983	11121054
Gallegos, Doose, and Guerrero 2008	1132043
Gallegos, Mitchell, Schroth, and Harris 1998	1124093
Gallegos, Schroth, and Perry 1995	1123943
Greene and Smith 2006	1130655
Greene 2007	1131177
Gross 1987	1129215
Gross and Bull 1973	1120980
Gross and Robbins-Wade 1987	1129215
Guerrero and Gallegos 2003a	1129571
Guerrero and Gallegos 2003b	1129575
Guerrero and Gallegos 2003c	1129586
Guerrero and Gallegos 2004a	1132016
Guerrero and Gallegos 2004b	1132019
Guerrero and Gallegos 2007	1132035
Guerrero, Stropes, and Gallegos 2004	1129569
Hector 1981	1121122
Hector 1985	1128738
Hogan and Encarnacion 2009	1132738
Kaldenberg 1976	1120716
Keith 1981	1121752

Author(s) and Date of Study	NADB Number
Kyle 2002	1129082
Kyle and Gallegos 1998	1127250
Laylander and Becker 2004	1129362
Laylander and Akyuz 2008	1131783
Loftus 2013	1134888
McCorkle-Apple 1987	1121745
McGinnis 2009	1132444
Mooney 1993	1124440
Mooney and Cook 1993	1122694
Morgan 2011	1133626
Page 2012	1134574
Pierson, Schiller, and Slater 1987	1122200
Robbins-Wade 1999	1125045
Robbins-Wade 2007	1131224
Robbins-Wade 2009	1132153
Schroth and Gallegos 1996	1123273
Schroth, Harris, and Gallegos 1996	1123272
Schroth, Schilz, and Cooley 1990	1124367
Smallwood 2005	1130467
Smith 1998	1123586
Smith and Rosenberg 2007	1130651
Strudwick 1993	1122691
Strudwick 1994	1124806
Tang 2009	1132693
Tennesen 2011	1133707
Ultra Systems, Inc. 1983	1128750
Unknown Author Unknown Date (Santa Fe Depot)	1130847
Unknown Author Unknown Date (Santa Fe Depot)	1131269
Vanwormer 1987	1124483
Wade and Hector 1986	1121579
WESTEC 1980	1121984
WESTEC1987	1121618
Woodward and Stammerjohan 1985	1121638
York and Hildebrand 2011	1133488

Cultural Resources Table A3
Literature Review Results: Previously Recorded Cultural Resources

Resource Designation	Type	Description	Location	Significance	Source
Archaeological Resources					
CA-SDI-I-485/ P-37-015183	Prehistoric	Hammerstone	Record Search Area		CH2M Hill 2007
CA-SDI-I-486/ P-37-015184	Prehistoric	Lithic Core	Record Search Area		CH2M Hill 2007
CA-SDI-I-487/ P-37-015185	Prehistoric	Metate Fragment	Record Search Area		CH2M Hill 2007
CA-SDI-I-672/ P-37-015370	Prehistoric	Lithic Flake	Record Search Area		CH2M Hill 2007
P-37-027648	Unknown				CH2M Hill 2007
P-37-027649	Unknown				CH2M Hill 2007
CA-SDI-10024/ W-132	Prehistoric	Shell midden, ground stone, FAR[24], burial	Record Search Area		CH2M Hill 2007
CA-SDI-10025/ W-133	Prehistoric	Shell midden with lithics, FAR,	Record Search Area		CH2M Hill 2007
CA-SDI-10478	Prehistoric	Shell midden with lithics	Record Search Area		CH2M Hill 2007
CA-SDI-10671/ W-118	Prehistoric	Shell midden and lithic scatter, stone bead	Record Search Area		CH2M Hill 2007
CA-SDI-10672/ W-125	Prehistoric	Shell and lithic scatter	Record Search Area		CH2M Hill 2007
CA-SDI-10965/ W-131	Prehistoric	Habitation site with over 7,000 artifacts	Record Search Area		CH2M Hill 2007
CA-SDI-13008/ CA-SDI-6132/ CA-SDI-10673/ W-119/ W-129	Prehistoric	Shell and lithic scatter, modified bone	Record Search Area		CH2M Hill 2007
CA-SDI-13076	Prehistoric	Shell and lithic scatter	Record Search Area		CH2M Hill 2007
CA-SDI-13089	Prehistoric	Shell midden, FAR	Record Search Area		CH2M Hill 2007
CA-SDI-13124/ W-133	Prehistoric	FAR, sweathouse, manos, ceramics, core, hammerstone, flakes,	Record Search Area		CH2M Hill 2007
CA-SDI-13701/ P-37-019009/ W-130	Prehistoric	Shell midden, FAR, groundstone	Record Search Area		CH2M Hill 2007
CA-SDI-14335/ P-37-015589	Prehistoric	Manos, metates, lithics	Record Search Area		CH2M Hill 2007
CA-SDI-17078/ P-37-025678	Prehistoric	Shell and lithic scatter, FAR, groundstone	Record Search Area		CH2M Hill 2007

[24] FAR is an acronym for Fire Affected Rock

Resource Designation	Type	Description	Location	Significance	Source
CA-SDI-17411/ P-37-026515/ W-127	Prehistoric	Shell midden, lithics	Record Search Area		CH2M Hill 2007
CA-SDI-17413/ P-37-02657/ W-468	Prehistoric	Shell and lithic scatter	Record Search Area		CH2M Hill 2007
CA-SDI-17414/ P-37-026518/ W-469	Prehistoric	Shell and lithic scatter	Record Search Area		CH2M Hill 2007
CA-SDI-17959	Prehistoric	Shell scatter, FAR	Record Search Area		CH2M Hill 2007
CA-SDI-17960	Unknown				CH2M Hill 2007
CA-SDI-209/ W-3329	Prehistoric	Shell midden with lithic flakes, cores, hammerstone, and mano	Record Search Area		CH2M Hill 2007
CA-SDI-6134/ W-121	Prehistoric	Shell and lithic scatter, groundstone, bone, and subsurface deposits	Record Search Area		CH2M Hill 2007
CA-SDI-6830/ W-1890	Prehistoric	Shell midden with lithics	Record Search Area		CH2M Hill 2007
CA-SDI-6831/ W-1891	Prehistoric	Shell midden with lithcs	Record Search Area		CH2M Hill 2007
CA-SDI-8794	Prehistoric	Shell and lithic scatter, FAR	Record Search Area		CH2M Hill 2007
CA-SDI-8795	Historic	Wood beam feature (possibly part of dock facility)	Record Search Area		CH2M Hill 2007
CA-SDI-8796	Prehistoric	Shell and lithic scatter, groundstone, FAR	Record Search Area		CH2M Hill 2007
W-132A	Prehistoric	Shell midden with lithics	Record Search Area		CH2M Hill 2007

Cultural Resources Table A4
Historic Maps Consulted

Map Name	Scale	Survey Date	Reference
San Diego County	1:100,000	1872	SDC 1872
Historic Roads and Trails: 1769-1885	1:100,000	1769-1830	SDC Assessor 1955
San Luis Rey	1:125,000	1901	USGS 1901
Oceanside	1:62,500	1898	USGS 1898
Oceanside	1:62,500	1942	USGS 1942
San Luis Rey and Encinitas	1:24,000	1948	USGS 1948
Aerial Overview		1938	Carlsbad Energy Center LLC. 2007: Appendix 5.14A
Aerial Overview		1947	Carlsbad Energy Center LLC. 2007: Appendix 5.14A
Aerial Overview		1953	Carlsbad Energy Center LLC. 2007: Appendix 5.14A
Aerial Overview		1963	Carlsbad Energy Center LLC. 2007: Appendix 5.14A

BUILT ENVIRONMENT TABLES

Cultural Resources Table A5
Built Environment
Properties with Structures of Historic Age in the One-Parcel PAA (Excluding EPS)

Description	Address	APN	Year Constructed
Residence	241 Olive Avenue	2060920300	1930
Residence	315 Olive Avenue	2060920900	1966
Residence	5081 El Arbol Drive	2101600100	1956
Residence	5050 Los Robles Drive	2100340100	1956
Residence	5051 Los Robles Drive	2100331700	1962
Residence	5032 Tierra del Oro	2100200500	1956
Residence	5030 Tierra del Oro	2100200400	1956
Residence	5022 Tierra del Oro	2100200200	1956
Residence	5020 Tierra del Oro	2100200100	1956
Residence	5016 Tierra del Oro	2100202100	1956
SDG&E North Coast Service Center	Cannon Road	2100104000	Ca. 1953-1963

Cultural Resources Table A6
Encina Power Station
Inventory of Built Environment Resources

Structures	Year Built	Surveyed	Evaluated*	Citation
ATSF Railroad Tracks	1882/1906/2012	Yes	Yes; not eligible	JRP 2007:19; Tang 2009; NCC Carlsbad 2014
Units 1, 2, & 3	1954,1956, 1958	Yes	Yes; not eligible	JRP 2007; JRP 2014
Units 4 & 5	1974, 1978	Yes	Yes; not eligible	JRP 2007; JRP 2014
Fuel Tanks 1-2	1954,1956	Yes	Yes; not eligible	JRP 2007; JRP 2014
Fuel Tank 4	1972	Yes	Yes; not eligible	JRP 2007; JRP 2014
Fuel Tanks 5-6-7	1972, 1975, 1977	Yes	Yes; not eligible	JRP 2104
Paint Storage Building	ca. 1985	Yes	Yes; not eligible	JRP 2014
Administration Building	1985	Yes	Yes; not eligible	JRP 2014
Equipment Bay Building	1954-1978	Yes	Yes; not eligible	JRP 2014
Wastewater Storage Tanks	ca.1985	Yes	Yes; not eligible	JRP 2014
Compressor Building	ca. 1970	Yes	Yes; not eligible	JRP 2014
Machine Shop Building	ca. 1970	Yes	Yes; not eligible	JRP 2014
Storage Building	ca. 1970	Yes	Yes; not eligible	JRP 2014
Exhaust Stack	1978	Yes	Yes; not eligible	JRP 2014
Encina Substation 1 & 2	1954, 1975		Yes; not eligible	JRP 2014
Cannon Substation	1976–1984	Yes	No; less than 50 years old in 2007, not evaluated in 2014	JRP 2007:i,17
Control Houses	1954, 1958	Yes	Yes; not eligible	JRP 2014
EPS Power Plant Seawater Intake Structure	1954	Yes	Yes; not eligible	JRP 2014
EPS Outflow Pond	1954	Yes	Yes; not eligible	JRP 2014
Security Building	1954	Yes	Yes; not eligible	JRP 2014
Dredge Dock	ca. 1954	Yes	Yes; not eligible	JRP 2014
Gas Turbine Generator	ca. 1970	Yes	Yes; not eligible	JRP 2014
Hazardous Waste Building	ca. 1985	Yes	Yes-not eligible	JRP 2014
Substation Expansion Area	Unknown	No	No	
Railroad Spur	Unknown	No	No	
Marine Fuel Terminal	1954	Yes	Yes; not eligible	White 2013
Agua Hedionda Lagoon	Dredged ca.1953-1954	No	No	

Cultural Resources Table A7
Built Environment
Properties Identified by the City Carlsbad as Potential Historic Resources
(Carlsbad 2014c; pp 3.7-7 to 3.7-12)

Name	Location	Description	Year	Eligibility	Survey Year
Twin Inns/Ocean House	2978 Carlsbad Boulevard	Queen Anne Victorian	1887	NRHP	1990; 2014
Santa Fe Depot	400 Elm (Carlsbad Village Drive)	Carpenter Gothic	1887	NRHP	1990
Ramirez House	3309 Roosevelt Street	Vernacular	1917-18	NRHP	1990; 2014
Mission Santiago	3329 Roosevelt Street	B/C Spanish	1923	NRHP	1990; 2014
	2770 Sunny Creek Road	Adobe Rehab; outbuildings	1842; ca 1900s.	NRHP	1990
El Camino Real	El Camino Real	Road		CRHR Landmark No. 784	1990
Marrón Adobe	Haymar Road	Adobe remodel-Spanish	1842/1850s	CRHR	1990; 2014
Gage House/Monterey Condominiums	3080 Lincoln Street	Monterey	1925	CRHR	1990; 2014
South Coast Land Company/Garcia's Barbershop	2956 State Street	Spanish Eclectic	Pre-1925	CRHR	1990; 2014
Rancho De Los Kiotes/Quiotes	6200 Flying LC Lane	Spanish	1935-39	CRHR Landmark No. 1020	1990
Stagecoach Community Park		Adobe Ruins	1842	CRHR	1990
Carlsbad Village	Carlsbad Village Drive	New England style	varies	N/A	2014
Old Carlsbad	S. of Buena Vista Lagoon, W. of El Camino Real and N. of Cannon Road	Original town site	Varies; includes several historic structures	N/A	2014
Barrio Neighborhood	Within Old Carlsbad along Roosevelt Street, Walnut and Chestnut Avenues	Historic Barrio	1920s	N/A	2014
St. Michael's Episcopal Church	2775 Carlsbad Boulevard		1894		2014
Red Apple Inn/Army Navy Academy	2585 Carlsbad Boulevard		1927		2014
Carlsbad Mineral Springs/Carlsbad-by-the-Sea	2855 Carlsbad Boulevard		1930		2014
Cohn House/Norte	3003 Carlsbad Boulevard		1929		2014
Killian Building	2900 State Street		1920s		2014

Los Diego Hotel/Caldo Pomodoro Restaurant	2907 State Street		1925		2014
Carlsbad Theatre	2822 State Street		1926-27		2014
Barrio Museum	3304 Roosevelt Street		1943		2014
Gaus House	3442 Roosevelt Street		1929		2014
Shaw House	3081 Highland Drive		1927		2014
Shirley House	1542 Oak Street		Ca. late 1880s		2014
Culver House	3140 Highland Drive		Ca. 1887		2014
Kreutzkamp House	624 Laguna Drive		1890s		2014
Beller House	1448 Forest Avenue		Ca. 1894		2014
Ramsay House	1330 Chuparosa Way		1904		2014

Cultural Resources Table A8
Built Environment
Properties Identified by the City Carlsbad as Official Historic Resources (Carlsbad 2014c; pp 3.7-7 to 3.7-12)

Name	Location	Description/Type	Year Constructed	Listed or Eligible	Survey Year/Citation
Magee House	258 Beech Street, Magee Park	Craftsman	1887	CRHR[25]	Carlsbad 2014c
Frasier's Well/Alt Karlsbad	2802 Carlsbad Boulevard	Recreation of 12th Century European building at historic well site	1883/1964	CRHR[26]	Carlsbad 2014c
Old Santa Fe Train Depot	400 Carlsbad Village Drive	Victorian railroad station (Carpenter Gothic)	1907	NRHP	Carlsbad 2014c; P-37-017443
Rancho de Los Kiotes/Leo Carrillo Ranch Historic Park	6200 Flying Leo Carrillo Lane.	Rancho and associated structures	1868/1937	NRHP: CRHR Landmark No. 1020[27]	Carlsbad 2014c

[25] Identified by the San Diego Archaeological Center.
[26] The Envision Carlsbad report lists this as a CRHR landmark, however, the Office of Historic Preservation's website does not have it listed as of October 8, 2014.
[27] Identified by the San Diego Archaeological Center.

Cultural Resources Table A9
Sites Included in the Agua Hedionda Prehistoric Archaeological District

Site Number/Name	Site Type	Time Period	Eligibility Determination	Contributor to AHD? Under which CRHR criteria	In Archaeological PAA?
CA-SDI-6751/	Shell scatter			Yes, 1 and 4	Yes
CA-SDI-16885	Campsite with shell, FAR, bone and lithics including debitage, hammerstone, graver/scraper, and core	Shell C-14 dated 1480±40 B.P. , Archaic	Recommended not eligible under criterion 4	Yes, 1 and 4	Yes
CA-SDI-6831/ W-1891	Shell midden with lithics including chopper, cobble tools and flakes	Archaic		Yes, 1 and 4	No
W-131/Windsong Shores	Camp midden, shells, lithics including flakes, scrapers, choppers, obsidian and hammerstones, bowling stones, and animal bone	Shell C-14 dated 7000 to 8500 years B.P.; obsidian sourced from Coso and Casa Diablo, hydration suggests recent antiquity; took pollen samples, seed analysis; Archaic		Yes, 1 and 4	No
W-130	Shell midden, metates, manos,	Archaic		Yes, 1 and 4	No
W-132a	Camp midden	1625±65 B.P., 4815±90 B.P., 1310±55 B.P.; Archaic	Eligible (under 4)	Yes, 1 and 4	No
CA-SDI-210/UCLJ-M-10		9020 B.P.; Archaic		Yes, 1 and 4	No
W-124	Habitation	Archaic		Yes, 1 and 4	No
W-120	Habitation, manos and metates	Archaic –Late Prehistoric		Yes, 1 and 4	No
W-119	Habitation, cobble hearths, cobblestone sweat house, burial, manos and metates	Archaic-Late Prehistoric		Yes, 1 and 4	No
W-126	Campsite,shell midden, scarce cobble hearths,	Archaic		Yes, 1 and 4	No

W-118	Habitation , cobble hearths, burial, Canalino tools and beads	Archaic		Yes, 1 and 4	No
W-125	Campsite, cobble hearths, manos and metates, flaking and hammerstones	Archaic		Yes, 1 and 4	No
W-121	Shell and lithic scatter, manos, steatite digging weight, hematite plummet tone, burials	Archaic-Late Prehistoric	"A large and important site"	Yes, 1 and 4	No
W-127	Shell midden, stone tools	Archaic		Yes, 1 and 4	No
W-127A	Cobble hearths,	Archaic		Yes, 1 and 4	Yes
W-133	Shell midden, FAR, flakes, cores, scrapers, manos			Yes, 1 and 4	No
W-1890	Shell midden, scraper, flakes			Yes, 1 and 4	No
W-1894	Shell and lithic scatter, scraper			Yes, 1 and 4	No
CA-SDI-209/W-3329	Shell midden, core mano, hammerstone, flakes			Yes, 1 and 4	No
CA-SDI-10478/W-3666	Lithics including cores, hammerstones, flakes, shell, bone and charcoal	Shell C-14 dated to 5520±100 B.P.; Archaic	"Not important under CEQA"	Yes, 1 and 4	No
CA-SDI-13701	Habitation site with shell, manos, FAR, ceramics and lithic tools	Shell C-14 dated to 1610±40 B.P.; Archaic	Two tested portions (i.e., two different tests) were identified as not significant	Yes, 1 and 4	No
W-123	Shell midden, cobble hearths, cremation, Yuman III grave goods	Archaic-Late Prehistoric		Yes, 1 and 4	No
W-122	Midden, cobble hearths, burial, manos and metates	Archaic		Yes, 1 and 4	No
W-124	Camping, cobble hearths, platforms (?), washed-out BURIAL, shell	Archaic		Yes, 1 and 4	No

W-128	Shell midden, cobble hearths, bedrock metates	Archaic-Late Prehistoric		Yes, 1 and 4	No
W-132	Midden, cobble hearths, burial, shell, sherds, flaked and ground stone			Yes, 1 and 4	No
W-116	Midden, cobble hearths, platforms, manos, metates, lithics	Archaic-Late Prehistoric		Yes, 1 and 4	No

REFERENCES

The *tn: 00000* in a reference below indicates the transaction number under which the item is catalogued in the Energy Commission's Docket Unit. The transaction number allows for quicker location and retrieval of individual items docketed for a case or used for ease of reference and retrieval of exhibits cited in briefs and used at Evidentiary Hearings.

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Cultural Resources Appendix B Cumulative Impacts

Amended Carlsbad Energy Center Project

Cultural Resources Table B1
Projects Considered in the Archaeological and Ethnographic Cumulative Impacts Analysis

Label ID	Point/ Line	Project	Description	Location	Resource/ Impact Significance	Reference
1	line	Carlsbad Double Track	Add 2 mi of second track and replace Agua Hedionda Lagoon rail bridge.	North Coast Corridor, near Agua Hedionda Lagoon, Carlsbad	Unknown/ CEQA statutory exemption	Caltrans n.d.
2	line	Two HOV lanes from Manchester Ave to SR 78	Add one HOV lane in each direction from Manchester Ave to SR 78, including the San Elijo and Batiquitos Lagoon bridge replacements, Manchester direct access ramp, and bike/pedestrian trails under I-5 across the lagoons.	I-5, Manchester Ave to SR 78, Encinitas and Carlsbad	15 NRHP/ CRHR-eligible archaeolog-ical sites/ LTSWM	FHWA and Caltrans 2013:3.8-3, 3.8-5–3.8-7, 4-2
3	line	Manchester Ave to SR 78 Soundwalls	Construct soundwalls on private property from Manchester Ave to SR 78.	I-5, Manchester Ave to SR 78, Encinitas and Carlsbad	11 NRHP/ CRHR-eligible archaeolog-ical sites/No impact	District 11 and SANDAG 2014:5.6-5
1	point	Vista/Carlsbad Interceptor Agua Hedionda Lift Station (VC 12)	Replace existing sewer lift station and sewer line with new lift station and line. The project extends 2.35 mi north–south.	South shore of Agua Hedionda Lagoon adjacent to the east side of the railroad tracks.	Archaeologic-al site CA-SDI-6751/ LTSWM	Planning Systems 2011:51–53

Label ID	Point/ Line	Project	Description	Location	Resource/ Impact Significance	Reference
2	point	Carlsbad Desalination Project (Poseidon)	50 MGD seawater desalination plant, pipelines, pumps, and other appurtenant and ancillary water facilities to produce and distribute potable water. Includes Carlsbad Desalination conveyance pipeline: a 10-mi, 54-inch water delivery pipeline through Carlsbad, Vista, and San Marcos to the SDCWA's Second Aqueduct connection facility in San Marcos.	Carlsbad Blvd/ Cannon Rd, Carlsbad	29 archaeological sites: 9 CRHR-eligible, 7 destroyed, 7 undetermined, 6 CRHR-ineligible/ LTSWM	Guerrero and Gallegos 2004:4-4, Table 4-1
4	line	Carlsbad Blvd	Road and pedestrian improvements from Cannon Rd to Manzano Dr.	Carlsbad Blvd/Cannon Rd to Carlsbad Blvd/Manzano Dr, Carlsbad		
3	point	Hallmark Property (mitigation for I-5 Express Lanes Project)	Preserve and create 19.3 ac of coastal habitat adjacent to Agua Hedionda Lagoon.	Near Agua Hedionda Lagoon, Carlsbad		
4	point	Floral Trade Center	Development of a new 44,180-sf floral trade distribution center and marketplace, 9900-sf micro-brewery and winery building, 1984-sf culinary center, and 896-sf farm shed with the remaining land dedicated to farm plots, orchard, hops farm, vineyard	South of Cannon Rd, east of Car Country Dr	Unknown/No impact	Westman 2013:10

Label ID	Point/ Line	Project	Description	Location	Resource/ Impact Significance	Reference
			and parking on 17.22 ac within 45.6 ac.			
5	line	Carlsbad Village Double Track	Add 1 mi of second track through Carlsbad Village Station and new rail bridge across Buena Vista Lagoon.	North Coast Corridor, Carlsbad		
5	point	CP Juniper Apartments	Three-story, 4-unit apartment complex.	385 Juniper Ave, Carlsbad	Categorical exemption/ No information	Lynch and Rick 2014:8
6	point	Tram Property	Two-story building with office on ground floor and apartment on second floor.	3147 Roosevelt St, Carlsbad	Categorical exemption/ No information	Carlsbad 2013a:2
7	point	State Mixed Use 30	Four-story mixed use building.	3068 State St, Carlsbad		
8	point	Bicajessee Adventures	Convert 6 office units to condos.	2815 Jefferson St, Carlsbad		
9	point	Railroad Lofts	4 condos.	2685 State St, Carlsbad		
10	point	Costco Gas Station Canopy	Add 3 new dispensers and new canopy.	951 Palomar Airport Rd, Carlsbad		
6	line	Buena Outfall Force Main Phase 3	New sewer line belonging to Vista. 18–24 inch, 17,700-ft-long pipeline, part gravity and part force main sewer along Palomar Airport Rd.	North side of Palomar Airport Rd between Paseo Del Norte & El Camino Real, Carlsbad		
11	point	State Street Townhomes	41 market rate & 6 inclusionary housing units with ground level office/flex space for live-work. Demolition of 32,000 sf of commercial and light industrial uses.	2531–2586 State St, Carlsbad		

Label ID	Point/ Line	Project	Description	Location	Resource/ Impact Significance	Reference
12	point	De Anda Residence	Construct a 3412-sf single-family residence with attached two-car garage, and attached 640-sf dwelling unit with a one-car garage.	Jefferson St & Las Flores Dr, Carlsbad		
13	point	Robertson Ranch East Village	Build 469 residential units, 78 multi-family and the rest single-family detached.	NE corner of El Camino Real and Cannon Rd, Carlsbad	Nearly complete; no information	
14	point	Robertson Ranch West Village	Master-planned development for 653 residential units and 150,000 sf commercial.	NE corner of El Camino Real and Cannon Rd, Carlsbad	Nine archaeolog-ical sites; two significant & subjected to data recovery/ LTS	Planning Division 2012:23–24
15	point	Poinsettia Station Improvements	Improve Poinsettia Station in Carlsbad to include new grade-separated pedestrian crossing and signals.	North Coast Corridor, Poinsettia Station, Carlsbad		
16	point	Tabata 10	26 single-family residences.	2311 Camino Hills Dr, Carlsbad		
17	point	Quarry Creek	636 residential units, a 0.5-ac nature/education center, 1.5-ac community facilities site, 1.3-ac park-and-ride site, 92.4 ac of natural open space, and supporting infrastructure on 155.4 ac.	South of Haymar Dr between College Blvd & El Camino Real, Carlsbad	Sites CA-SDI-5651 (CRHR/City-eligible[1]), CA-SDI-9976 (not significant[2]), & CA-SDI-17863 (CRHR-ineligible); Indian sacred site & TCP El Salto Falls; SCMC	HDR 2013:17–24

[1] City of Carlsbad (HDR 2013:17).

[2] Criteria not specified in HDR (2013:19).

Label ID	Point/ Line	Project	Description	Location	Resource/ Impact Significance	Reference
					Hard Rock Mining Facility[3]/ LTSWM	
18	point	Daybreak Community Church	Addition of 17,391-sf, 30-ft-tall assembly building to existing church. Add 221 parking spaces on vacant parcel. New access driveway proposed off Fisherman Dr.	6515 Ambrosia Ln, Carlsbad	None/LTS	Werneke 2014:27–28
19	point	Ayoub Property (mitigation for I-5 Express Lanes Project)	Protect 21.7 ac of coastal sage scrub habitat at the Batiquitos Lagoon.	Batiquitos Lagoon, Carlsbad		
20	point	ViaSat Expansion	Two office buildings and pedestrian walkway across El Camino Real with signalized light.	NE corner of Gateway Rd and El Camino Real, Carlsbad		Fisher and Rick 2014:12
21	point	Shea Industrial Bressi Ranch	Two industrial/ warehouse buildings.	6131 Innovation Way, Carlsbad		
22	point	Holiday Inn	133-room, 83,693-sf, three-story hotel.	South of Palomar Airport Rd, east of Innovation Way, west of Colt Pl, Carlsbad	In construction	
23	point	Staybridge Suites	106-room, 73,737-sf, three-story hotel.	South of Palomar Airport Rd, east of Innovation Way, west of Colt Pl, Carlsbad	In construction	

[3] The SCMC Hard Rock Mining Facility was a rock quarry that operated from 1961 to 1995 (HELIX 2011:2). The quarry was not identified as a cultural resource in HDR (2013).

Label ID	Point/ Line	Project	Description	Location	Resource/ Impact Significance	Reference
24	point	Aviara Animal Health Center	Tenant improvements & expansion of existing animal hospital.	6986 El Camino Real Suite 1, Carlsbad		
25	point	La Costa Town Center Renovation	Build 3000 sf of retail, 60 apartment units.	La Costa Ave and El Camino Real, Carlsbad	3 CRHR-ineligible archaeological sites/LTS	EDAW 2009:3-12, 3-13, 6-42
7	line	La Costa Recycled Water Pipeline	Construction of 5200-ft-long, 8-inch pipeline for recycled water.	East side of El Camino Real between Alga Rd & Costa Del Mar Rd, Carlsbad	3 CRHR-ineligible archaeological sites/LTS	EDAW 2009:3-12, 3-13, 6-42
26	point	La Costa Villas	Build eight three-story condos.	7570 Gibraltar St, Carlsbad	3 CRHR-ineligible archaeological sites/LTS	EDAW 2009:3-12, 3-13, 6-42
27	point	La Costa Town Square	Build 258,000 sf of retail.	3434 Via Mercato, Carlsbad	3 CRHR-ineligible archaeological sites/LTS	EDAW 2009:3-12, 3-13, 6-42
28	point	Westfield Carlsbad	Remodel and expand existing mall; add 226,000 sf: movie theater, gym with indoor pool, and rooftop basketball court.	2525 El Camino Real #100, Carlsbad	None/LTS	Carlsbad 2013b:12–13
29	point	Commercial Office	Build 8025-sf commercial office building.	Rancho Santa Fe Rd and La Costa Ave, Carlsbad	In construction	
30	point	La Costa Town Square Residential 63	Build 63 single-family homes.	7329 Calle Pera, Carlsbad	3 CRHR-ineligible archaeological sites/LTS	EDAW 2009:3-12, 3-13, 6-42
31	point	Blackstone Ranch	Build 49 single-family homes	Camino Junipero and Avenida Amapola, Carlsbad		
N/A	N/A	Regional Beach Sand Project II	Potential offsite materials placement site (Oceanside, North and South	Oceanside, Carlsbad	None/No impact	AECOM et al. 2011:3.5-4, Section 4.5; Figure 2-4–2-7

Label ID	Point/ Line	Project	Description	Location	Resource/ Impact Significance	Reference
			Carlsbad, and Batiquitos beaches)			
N/A	N/A	San Elijo Lagoon Restoration	Potential offsite materials placement site (Leucadia)	Encinitas	None/No impact	AECOM 2014:3.7-15; AECOM et al. 2011:3.5-4, Figure 2-8
N/A	N/A	Blue Curl Seawall	Demolish and replace seawall	1084 Neptune Ave, Encinitas	Unknown/ CEQA exempt	Encinitas 2010:2
N/A	N/A	Law condo project	Demolish existing structures, build 4-townhome condo project	1265 N Vulcan Ave, Encinitas	No information	
N/A	N/A	La Esquina Mixed-use Project	Mixed-use project with 3 live/work units and 1 commercial unit	1578 N Coast Highway 101, Encinitas	No information	
N/A	N/A	TPM # 08-132	Build four dwelling units and remainder parcel	1967 N. Vulcan Ave, Encinitas	No information	Encinitas 2011:7–8
N/A	N/A	TPM #04-286	Build four dwelling units and remainder parcel	232 Andrew Ave, Encinitas	Unknown/ CEQA-exempt	Encinitas 2008:3
N/A	N/A	Hymettus Estates	10-lot subdivision & home construction	378 Fulvia St, Encinitas	Unknown/No impact	Encinitas 2009:3–4
N/A	N/A	La Costa Chevron Stormdrain Pipe	Grading and wall over 6 ft tall	540 La Costa Ave, Encinitas	Site CA-SDI-603/LTSWM	Encinitas 2001:4
N/A	N/A	The Leucadia Club	Private club in existing building	828 N Coast Highway 101, Encinitas	None/CEQA exempt	Planning Commission 2014
N/A	N/A	Coral Cove Subdivision #03-090	A residential project with 72 dwelling units (39 single family and 33 attached) under construction.	N.Vulcan Ave/Coral Cove Way, Encinitas	Potential historic archaeolog-ical resources/ LTSWM	Planning Commission 2006:6–11

Label ID	Point/ Line	Project	Description	Location	Resource/ Impact Significance	Reference
N/A	N/A	Shoreline Resort #00-201	A timeshare/ hotel project with 26 units.	Northeast corner of N. Hwy 101/La Costa Ave.	Three CEQA-ineligible isolated artifacts/LTS	CSE&A 2002:61–62, 64
N/A	N/A	Vista Sewer Improve-ment Project CIP No. 8175	Rehabilitate sewers by installing cured-in-place pipe liners.	Various locations in Vista	About 256 archaeolog-ical resources/ LTSWM	Dudek 2008:ES-9, Figure 2-3; Rosenberg et al. 2007:Table 4.0-1

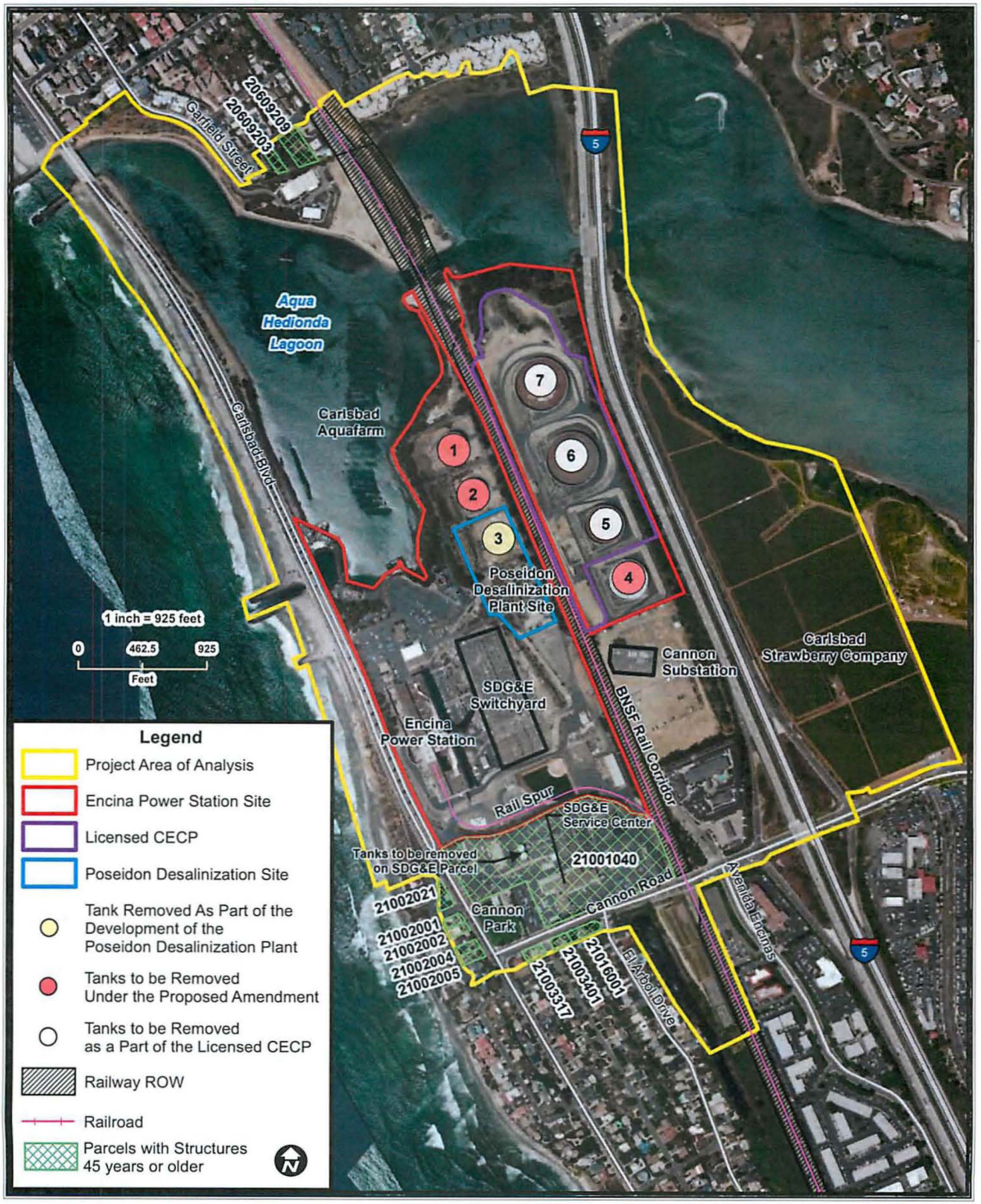
Notes and abbreviations: ac = acre(s); Ave = avenue; Blvd = boulevard; CA = California; CEQA = California Environmental Quality Act; CRHR = California Register of Historical Resources; Dr = drive; ft = foot/feet; HOV = high-occupancy vehicle(s); Hwy = highway; I = Interstate; Ln = lane; LTS = less than significant; LTSWM = less-than-significant with mitigation; MGD = million gallons per day; mi = mile(s); NE = northeast; NRHP = National Register of Historic Places; Pl= place; Rd = road; SANDAG = San Diego Association of Governments; SCMC = South Coast Materials Company; SDCWA = San Diego County Water Authority; sf = square foot/feet; SDI = San Diego County; SR = State Route; St = street; TCP = traditional cultural property

CULTURAL RESOURCES - FIGURE 1
Carlsbad Energy Center Project Amendment

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION
SOURCE: City of Carlsbad, USGS Topo - Encinitas and San Luis Rey, CA 1:24,000 (1968) Photorevised 1975

CULTURAL RESOURCES - FIGURE 2

Carlsbad Energy Center Project Amendment - Properties 45 Years or Older in Project Area of Analysis



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: CH2MHILL Figure 1-1 (07-AFC-06) Petition to Amend - Amendment No. 1, & Bing Basemap

CULTURAL RESOURCES - FIGURE 3

Carlsbad Energy Center Project Amendment - Historic Built Environment Resources within One Mile Literature Search Area

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: City of Carlsbad, USGS Topo - Encinitas and San Luis Rey, CA 1:24,000 (1968) Photorevised 1975

HAZARDOUS MATERIALS MANAGEMENT

Alvin Greenberg, Ph.D.

SUMMARY OF CONCLUSIONS

Energy Commission staff (staff) concludes in this Preliminary Staff Assessment (PSA) that if, during tank demolition, construction and operation of the amended Carlsbad Energy Center Project (amended CECP), and the closure/decommissioning and demolition of the Encina Power Station (EPS), the project owner fulfils the requirements of existing Conditions of Certification **HAZ-1** through **-10** (with minor revisions to reflect tank demolition, demolition of the EPS, scheduling, and an update to **HAZ-10**), the modified project would incorporate sufficient measures to ensure compliance with applicable laws, ordinances, regulations, and standards.

The Carlsbad Fire Department and the San Diego County Department of Environmental Health Hazardous Materials Division have both stated that their ability to supply hazmat spill response during all phases of tank removal, construction, and operation of the amended CECP and during demolition of the EPS, as well as during a major area-wide crisis will not be impacted by the activities proposed in the petition and during operation of this power plant.

Staff has therefore determined that the proposed amended CECP would not have a direct incremental or cumulative hazardous materials management impact under both normal and unique catastrophic circumstances and thus mitigation beyond that already required is not needed.

INTRODUCTION

As discussed in detail in the **PROJECT DESCRIPTION** of this PSA, the amended CECP would be different from the licensed CECP, as approved by the Energy Commission on May 31, 2012. For that reason, an evaluation of impacts, including the potential for changes or additions to the licensed CECP conditions of certification (COCs) for the project is required. The CECP amendment proposes implementing the following general changes and modifications to the licensed CECP:

1. Add the demolition of three additional above-ground fuel oil storage tanks (AST's 1, 2 and 4), and associated piping and equipment, removal of oily sands from under ASTs 1, 2, and 4, and removal of an earthen berm between ASTs 4 and 5.

2. Change in generation equipment and technology from Siemens fast response, combined-cycle to six natural gas-fired GE LMS 100 simple-cycle turbines with approximately 632 MW net output of electrical generating capacity.

3. Add retirement and demolition of Encina Power Station (EPS). Units 1 through 5 of EPS will be retired and all above-grade elements of the EPS power and support buildings will be demolished and removed.

The amended CECP will continue to be situated adjacent to the EPS, in the northeastern portion of the 95-acre parcel, between the existing North County Transit

District (NCTD) railroad tracks and Interstate-5, but the amended CECP will have a larger footprint than the licensed CECP, occupying most of that area (30 acres and 23 acres respectively). Construction equipment/material laydown and construction worker parking areas for the project will remain immediately north of the existing EPS facility and in various areas west of the existing railroad tracks. No offsite parking or laydown areas are anticipated to be necessary for the construction of the amended CECP.

The amended CECP will continue to interconnect to the electrical transmission system via 138-kilovolt (kV) and 230-kV lines that connect to the respective San Diego Gas and Electric Company (SDG&E) switchyards situated on the EPS site. Natural gas will be delivered to the amended CECP from the existing SDG&E transmission pipeline (Line TL 2009, “Rainbow line”) via a new approximate 1,100-foot-long interconnection pipeline that runs parallel to the existing NCTD railroad tracks. Similar to the licensed CECP, with the exception of short, onsite interconnections, no offsite gas supply lines are required for the amended CECP. The amended CECP will use reclaimed water and/or potable water from the Carlsbad Municipal Water District, and will connect to an existing city of Carlsbad (Encina Wastewater Authority) sanitary sewer line.

Upon completion of construction of the amended CECP and achievement of commercial operations, the EPS will be decommissioned, and the above-grade elements of the main EPS power building and all support and ancillary buildings will be demolished and removed. Upon completion of demolition of EPS, approximately 40 acres west of the railroad tracks will transition from Energy Commission regulatory jurisdiction to that of the city of Carlsbad (city), and be made available for later redevelopment. Some portions west of the railroad tracks will remain dedicated to the amended CECP, such as for transportation access, electrical interconnection, and water or gas supply.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The amended CECP would continue to comply with all currently applicable hazardous materials laws, ordinances, regulations, and standards (LORS). The proposed activities in the Petitions to Amend (petitions) do not trigger any additional hazardous materials management LORS. The following federal, state, and local laws and policies as described in the licensed CECP Commission Final Decision (Final Decision) (CEC2012a) continue to apply to the protection of public health and hazardous materials management.

Hazardous Materials Management Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable LORS	Description
Federal	
The Superfund Amendments and Reauthorization Act of 1986 (42 USC §9601 et seq.)	Contains the Emergency Planning and Community Right To Know Act (also known as SARA Title III).
The Clean Air Act (CAA) of 1990 (42 USC 7401 et seq. as amended)	Established a nationwide emergency planning and response program and imposed reporting requirements for businesses that store, handle, or produce significant quantities of extremely hazardous materials.
The CAA section on risk management plans (42 USC §112(r)	Requires states to implement a comprehensive system informing local agencies and the public when a significant quantity of such materials is stored or handled at a facility. The requirements of both SARA Title III and the CAA are reflected in the California Health and Safety Code, section 25531, et seq.
49 CFR 172.800	The U.S. Department of Transportation (DOT) requirement that suppliers of hazardous materials prepare and implement security plans.
49 CFR Part 1572, Subparts A and B	Requires suppliers of hazardous materials to ensure that all their hazardous materials drivers are in compliance with personnel background security checks.
The Clean Water Act (CWA) (40 CFR 112)	Aims to prevent the discharge or threat of discharge of oil into navigable waters or adjoining shorelines. Requires a written spill prevention, control, and countermeasures (SPCC) plan to be prepared for facilities that store oil that could leak into navigable waters.
Title 49, Code of Federal Regulations, Part 190	Outlines gas pipeline safety program procedures.
Title 49, Code of Federal Regulations, Part 191	Addresses transportation of natural and other gas by pipeline: annual reports, incident reports, and safety-related condition reports. Requires operators of pipeline systems to notify the DOT of any reportable incident by telephone and then submit a written report within 30 days.
Title 49, Code of Federal Regulations, Part 192	Addresses transportation of natural and other gas by pipeline and minimum federal safety standards, specifies minimum safety requirements for pipelines including material selection, design requirements, and corrosion protection. The safety requirements for pipeline construction vary according to the population density and land use that characterize the surrounding land. This part also contains regulations governing pipeline construction (which must be followed for Class 2 and Class 3 pipelines) and the requirements for preparing a pipeline integrity management program.
Federal Register (6 CFR Part 27) interim final rule	A regulation of the U.S. Department of Homeland Security that requires facilities that use or store certain hazardous materials to submit information to the department so that a vulnerability assessment can be conducted to determine what certain specified security measures shall be implemented.
State	
Title 8, California Code of Regulations, section 5189	Requires facility owners to develop and implement effective safety management plans that ensure that large quantities of hazardous materials are handled safely. While such requirements primarily provide for the protection of workers, they also indirectly improve public safety and are coordinated with the Risk Management Plan (RMP) process.
Title 8, California Code of Regulations, section 458 and sections 500 to 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.

Applicable LORS	Description
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.
NFPA-56 Standard for Fire and Explosion Prevention During Cleaning and Purging of Flammable Gas Piping Systems	This national professional consensus standard is designed to prohibit the use of natural gas from being used to clean and purge the natural gas piping system after construction of the power plant and before commissioning, thus eliminating the risk of explosion occurring while venting the gas.
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, construction and design of buildings and vessels storing hazardous materials would meet the seismic requirements of CCR Title 24 and the current California Building Code.

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 licensed CECP Application for Certification (AFC) (CECP 2007a). Staff agrees with the petitioner that use of F stability (stagnated air, very little mixing), wind speed of 1.5 meters per second, and a temperature of 88°F are appropriate for conducting the off-site consequence analysis for the amended CECP (LL 2014d, Section 5.5.2.3).

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.

Section 5.7.2 of the petition explains that the closest residential area to the licensed CECP is located north of the Agua Hedionda Lagoon, approximately 1,750 feet from the facility site. However, demolition of the EPS would occur approximately 400 feet from the nearest residential receptor (400 feet from the southwest corner of the power plant building and 800 feet from the 400-foot-tall stack). This receptor is identified as receptor M4 in Figure 5.7-3 of the original Application for Certification (AFC) for the licensed CECP (07-AFC-06).

Sensitive receptors in the project vicinity 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.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

Staff assessed the amendment proposals regarding hazardous materials management. The review process includes an evaluation of the consistency of the proposed changes and modifications with that of the Energy Commission's existing Final Decision, and to determine whether the project, as amended, would remain in compliance with applicable laws, ordinances, regulations, and standards (Cal. Code of Regs., tit. 20, § 1769).

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 offsite 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 petitioner 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 petitioner plans to store the materials on site.

Staff reviewed the petitioner'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 offsite and causing harm to the public.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Staff reviewed and evaluated the petitioner's proposed use of hazardous materials as described by the petitioner. Staff has made the following determinations and conclusions:

- Staff has determined that the requested activities in the removal of existing above-ground oil storage tanks ASTs 1, 2, and 4, associated piping, a berm between ASTs 4 and 5, and oily sands from under ASTs 1, 2, and 4 would not result in any significant change in hazardous materials use at the amended CECP site; only an earlier scheduled use of such materials. Staff also has determined that the project would continue to comply with all applicable LORS.
- Staff has determined that the chemicals and the amounts proposed for use and storage on-site during operations of the amended CECP, as described Tables 5.5-1, 5.5-2, and 5.5-3, are appropriate for a simple-cycle power plant and would not result in any significant change in hazardous materials use at the site.
- Staff has determined that regarding the use and storage of aqueous ammonia, as a result of the changed technology, the two 10,000-gallon aqueous ammonia storage tanks allowed in the Final Decision (CEC2012a) for the licensed CECP are now proposed to be changed to one 20,0000-gallon tank. The tank would be filled to a maximum of 17,000 gallons to allow for expansion. The changes to the tank size also would result in minimal changes to the frequency of aqueous ammonia deliveries to two deliveries per month during the summer (approximately four months), and one delivery every other month for the rest of the year (approximately eight months), for a total of 12 deliveries per year (one per month) for the amended CECP as compared to up to five tanker truck deliveries of aqueous ammonia per month during peak operation periods for the licensed CECP. This would reduce the

already insignificant risk of accidental release during transport to the licensed CECP to an even lower incidence of risk for the amended CECP.

- Staff has determined that the spill containment for the aqueous ammonia tank would continue to be provided by a secondary containment basin surrounding the tank draining into an underground sump at the amended CECP. A diked secondary containment area would be 30 feet wide by 34 feet long. The underground sump would be large enough to accommodate the full contents of the aqueous ammonia tank plus rainwater. The truck unloading area adjacent to the ammonia tank would be sloped such that any spill during unloading will flow into the tank containment area.
- Staff concludes that measures proposed by the petitioner to prevent spills, which were reviewed and evaluated in the licensed CECP, including engineering controls such as automatic shut-off valves, different-sized transfer-hose couplings, and administrative controls such as worker training and safety management programs, are adequate and appropriate to reduce the risk of a spill migrating off-site to a level of insignificance.
- Staff has determined that measures proposed by the petitioner to respond to accidents at the amended CECP, including engineering controls such as catchment basins and methods to keep vapors from spreading and administrative controls such as training emergency response crews, were also adequate and appropriate.
- Staff concludes that the theoretical impacts on the public of a worst-case accidental spill of aqueous ammonia from the storage tank, as modeled by the petitioner (LL 2014d; section 5.5.2.3 and Table 5.5-4) and reduced by the mitigation measures proposed by the petitioner, would result in an off-site airborne concentration of ammonia fumes less than the Energy Commission level of significance (75 ppm) and that therefore any accidental release of aqueous ammonia from the storage tank would result in impacts limited to the site.
- Staff has determined that natural gas proposed for use at the amended CECP would continue to pose a fire and/or possible explosion risk because of its flammability. While natural gas will be used in significant quantities, it will not be stored on site. Natural gas will be delivered to the amended CECP from the existing SDG&E transmission pipeline (Line TL 2009, “Rainbow line”) via a new approximate 1,100-foot-long 20” interconnection pipeline west of the amended CECP site that runs parallel to the existing railroad tracks. Once on the site, the natural gas will flow through a metering station, gas scrubber/filtering equipment, a gas pressure control station, and a fuel gas compressor station, prior to injection into the combustion turbines. Similar to the licensed CECP, with the exception of short, onsite interconnections, no new off-site gas supply lines are required for the amended CECP.
- Staff has determined that the risk of a natural gas fire and/or explosion onsite 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 petitioner 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. However, staff wishes to note that on June 28, 2010, the United States Chemical Safety and Hazard Board (CSB) issued Urgent Recommendations to the United States Occupational Safety and Health Administration (OSHA), the NFPA, the American Society of Mechanical Engineers (ASME), and major gas turbine manufacturers, to make changes to their respective regulations, codes, and guidance to require the use of inherently safer alternatives to natural gas blows for the purposes of pipe cleaning. Recommendations were also made to the fifty states to enact legislation applicable to power plants that prohibits flammable gas blows for the purposes of pipe cleaning. In accordance with those recommendations, staff proposes that existing Condition of Certification **HAZ-10** as found in the Final Decision (CEC 2012a) which prohibits the use of flammable gas blow for pipe cleaning at the facility, either during construction or after the start of operations, be revised to be consistent with the above agency recommendations and existing Energy Commission conditions.

- Therefore, if staff's recommended revisions to conditions of certification are approved, staff determines that all fuel gas pipe purging activities would vent any gases to a safe location outdoors, away from workers and sources of ignition, fuel gas pipe cleaning and purging would adhere to the provisions of NFPA 56 (the Standard for Fire and Explosion Prevention During Cleaning and Purging of Flammable Gas Piping Systems), and a special emphasis would be placed on sections NFPA 56 4.3.1 (written procedures for pipe cleaning and purging) and 6.111 (prohibition on the use of flammable gas for cleaning or purging at any time).
- Staff has determined that the retirement of Units 1 through 5 of EPS and the demolishment/removal of all above-grade elements of the EPS power and support buildings would not include the use of hazardous materials beyond or uniquely different to those proposed for use during demolition and removal of ASTs 1, 2, and 4 and associated piping or in the construction of the amended CECP as described in the petition. Staff therefore concludes that the activities described in the Encina Power Station Demolition Plan (Attachment DR64-1 to Petitioner's Data Response to Staff's Data request #64, dated October 1, 2014) would not result in a significant risk to the off-site public from the use and storage of hazardous materials during demolition of the EPS.

SITE SECURITY

The North American Electric Reliability Corporation (NERC) published *Security Guidelines for the Electricity Sector* in 2002 (NERC 2002; 2012; 2014) as well as issued a Critical Infrastructure Protection standard for cyber security (NERC 2009 and 2014), and the U.S. Department of Energy published a draft *Vulnerability Assessment Methodology for Electric Power Infrastructure* in 2002 (DOE 2002). The energy generation sector is one of 14 areas of critical Infrastructure listed by the U.S. Department of Homeland Security (DHS). On April 9, 2007, the U.S Department of Homeland Security published, in the Federal Register (6 CFR Part 27), an Interim Final Rule (Chemical Facility Anti-Terrorism Standards or CFATS) requiring facilities that use

or store certain hazardous materials to 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. The amended CECP is not proposing to use any material on the list in an amount which would trigger the need for compliance with the CFATS regulation.

However, even though the CFATS regulation does not apply, staff's position is that all power plants under the jurisdiction of the Energy Commission should implement a minimum level of security consistent with the guidelines listed here. And although security already exists at this site because it is an operating power plant, staff proposes that the security be reviewed and updated.

In order to ensure that this facility (or a shipment of hazardous material) is not the target of unauthorized access, the Final Decision (CEC2012a) requires implementation of Condition of Certification **HAZ-8**, resulting in the preparation and implementation of a formal written security plan. This plan would require the implementation of site security measures that are consistent with both the above-referenced documents and Energy Commission guidelines. These security measures include perimeter fencing, breach detectors, guards, alarms, site access procedures for employees and vendors, site personnel background checks, and law enforcement contact in the event of a security breach.

The goal of these conditions of certification is to provide the minimum level of security for power plants needed to protect California's electrical infrastructure from malicious mischief, vandalism, or domestic/foreign terrorist attacks. The level of security needed for this power plant is dependent upon the threat imposed, the likelihood of an adversarial attack, the likelihood of success in causing a catastrophic event, and the severity of consequences of that event.

Another site security issue addressed in the Decision involves the proposed routes for a Coastal Rail Trail and the future expansion of Interstate-5 (I-5). Regarding the future expansion of I-5, adherence to existing Condition of Certification **WORKER SAFETY-7** would not only provide for safety against runaway vehicles crashing the I-5 fence line and falling into the amended CECP site but would also protect against line-of-sight viewing of critical energy infrastructure from the I-5 corridor. Regarding the Coastal Rail Trail, staff remains very concerned about the safety and security of the amended CECP should the project be built, and should the Coastal Rail Trail be built. Staff continues to believe that placing the Coastal Rail Trail on the eastern side of the railroad ROW raises several security, safety, and fire access problems. Staff discusses the security concerns in this section of this Preliminary Staff Assessment (PSA) and refers the reader to the **WORKER SAFETY & FIRE PROTECTION** section for discussion of the safety and fire access issues.

Staff's continued serious security and safety concerns about a Rail Trail on the east side of the tracks leads to the conclusion that since NRG must place a security fence with CCTV and breach detectors along the power plant's entire perimeter as per the requirements of existing Condition of Certification **HAZ-8**, it remains problematical to move that security fence further east of the rail line and closer to power plant critical energy infrastructure.

Therefore, staff continues to support existing Conditions of Certification **HAZ-9** and **WORKER SAFETY-9** which 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. It is staff's position that the risk to the public is insignificant.

Table 1 of the Executive Summary of this PSA provides a list of more than 32 projects located within six miles of the amended CECP site that are built, under construction, or are reasonably expected to be built. With the exception of the existing Encina Power Plant which stores 19 percent ammonia and the Carlsbad Poseidon Desalination Project (currently under construction between the amended CECP site and the existing EPS), all the remaining existing or planned projects in the vicinity of the proposed amended CECP would not store or use hazardous materials that may have a potential cumulative impact. Since the EPS will cease operations as soon as the amended CECP starts commissioning, and since both the petitioner'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.

According to the Environmental Impact Report (EIR) for the Carlsbad Poseidon Desalination Project (Carlsbad 2005 section 4.6 and Table 4.6-2), the following hazardous materials that could potentially result in airborne vapors as a result of an accidental spill will be used and stored at the desalination project:

- Citric acid - (50 gal of 2 % solution)
- Sodium hydroxide B (50 gal of 0.1 % solution)
- Sulfuric acid (60,000 gal of 20% solution)
- Aqueous ammonia (3,000 gal of 10% solution)
- Sodium hypochlorite (10,000 gal of 10-15% solution)

Due to the very low vapor pressure of aqueous solutions of sulfuric acid, the potential for an airborne acid plume extending more than a few feet from the release point is below the level of significance. Staff has previously modeled accidental releases of 94 percent sulfuric acid and found that the impacts extend only a few feet from the source. Citric acid and sodium hydroxide likewise have very low vapor pressures and thus the

risk of off-site consequences is less than significant. Sodium hypochlorite and aqueous ammonia can result in off-site airborne concentrations upon an accidental release under certain circumstances; However, in this case, the Poseidon EIR states that "*a catastrophic spill of the entire 10,000 gallon volume of liquid sodium hypochlorite stored on site will not generate chlorine vapors of concentration high enough to form a gaseous plume that presents a public health hazard because of the high solubility of chlorine in water, and because of the low concentration of this chemical (only 10 to 15 %) in the bleach solution*" (Carlsbad 2005, section 4.6) and "*both the aqua ammonia volume and concentration are significantly lower than the threshold levels at which ammonia storage may present a public health hazard due to accidental spill of the entire amount of aqua ammonia stored on site*" (Carlsbad 2005, section 4.6). Furthermore, the Poseidon facility will be storing and handling these hazardous materials according to LORS and thus will be required to implement safety measures similar to those required for the amended CECP.

The amended CECP project owner would develop and implement a hazardous materials handling program independent of any other projects considered for potential cumulative impacts, as would the desalination facility. Staff believes that the facility, as proposed by the petitioner and with the additional mitigation measures proposed by staff, poses an insignificant 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 amended 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.

COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Staff concludes that construction and operation of the amended CECP project, including the demolition and removal of the EPS, 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 amended project (with proposed mitigation measures) indicates that hazardous material use will not pose a significant impact to the public. Staff's analysis also shows that there will be no significant cumulative impact. With adoption of staff's proposed revisions to the existing conditions of certification, the proposed amended CECP will comply with all applicable LORS. In response to Health and Safety Code, section 25531 et seq., the project owner would continue to be required to develop a Risk Management Plan (RMP). To ensure the adequacy of the RMP, the existing 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, existing 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 existing 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 adopt the modest revisions proposed by staff to the existing Conditions of Certification **HAZ-1, 2, 3, 6, 7** and **8** to ensure that all activities at the modified project, tank demolition, and the demolition and removal of the EPS comply with all applicable LORS in order to protect the public from significant risk of exposure to an accidental release of a hazardous material. If all mitigation measures are required and implemented, the use, storage, and transportation of hazardous materials will not present a significant risk to the public.

Staff recommends revisions to **HAZ-10** (prohibition of natural gas blows) to further enhance safety**.**

PROPOSED CONDITIONS OF CERTIFICATION

Staff proposes the following conditions of certification from the licensed CECP, with revisions applicable to the amended CECP shown in bold underline and strikeout.

HAZ-1 The project owner shall not use any hazardous materials not listed in **Attachment A**, below, or in greater quantities or strengths than those identified by chemical name in **Attachment A**, below, unless approved in advance by the Compliance Project Manager (CPM).

Verification: **No later than 60 day prior to the start of the removal of the above ground storage tanks or ancillary piping and the berm, t**~~T~~he project owner shall provide to the CPM **and to the Carlsbad Fire Department**~~, in the Annual Compliance Report,~~ a list of hazardous materials contained **and used** at the facility **site**. **An updated list shall also be provided to the CPM and the Carlsbad Fire Department no later than sixty (60) days prior to the start of construction, 60 days prior to the start of commissioning operations, and in the Annual Compliance Report.**

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 30 days prior to receiving any hazardous material on the site for **tank demolition**, commissioning, or operations, the project owner shall provide a copy of a final Business Plan to the CPM for approval **and to the San Diego County DEH HMD and the Carlsbad Fire Department for information**.

At least 30 days prior to delivery of aqueous ammonia to the site, the project owner shall provide the final RMP to the DEH HMD 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 30 days prior to the delivery of any liquid hazardous material to the facility **for demolition, commissioning, or operations**, 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 percent 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 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 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 from the CPM if an alternate route is desired.

Verification: At least 60 days prior to receipt of any hazardous materials on site **for tank demolition, construction, or operations**, 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 **tank demolition**~~construction~~, a site-specific **Demolition and** Construction Site Security Plan for the **tank demolition and** construction phase**s** 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 **demolition and** construction area**s**;

2. security guards;

3. site access control consisting of a check-in procedure or tag system for **demolition and** 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 30 days prior to commencing **tank demolition**~~construction~~, the project owner shall notify the CPM that a site-specific **Demolition and** 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 B**), 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 C**), 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 D**), 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 percent 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, seven days per week; **or**

   B. power plant personnel on site 24 hours per day, seven 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 petitioner.

Verification: At least 30 days prior to the initial receipt of hazardous materials on site **for commissioning or operations**, 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 ten 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.

~~**HAZ-10** The project owner shall not conduct or allow any fuel gas pipe cleaning activities on the site involving fuel gas pipe of four-inches or greater external diameter, either before placing the pipe into service or at any time during the lifetime of the facility, that involve "flammable gas blows" where natural (or flammable) gas is used to blow out debris from piping and then vented to atmosphere. Instead, an inherently safer method involving a non-flammable gas (e.g. high pressure air, nitrogen, steam) or mechanical "pigging" shall be used. The project owner shall prepare a Fuel Gas Pipe Cleaning Work Plan which shall indicate the method of cleaning to be used, what gas will be used, the source of pressurization, and whether a mechanical Pipeline Inspection Gizmo (PIG) will be used, and submit this Plan to the CBO for information, to the Carlsbad Fire Department for review and comment, and to the CPM for review and approval. Exceptions to any of these provisions will be made only if no other satisfactory method is available, and then only with the approval of the CPM after review and comment from the CBO and the Carlsbad Fire Department.~~

~~**Verification:** At least 30 days before any fuel gas pipe cleaning activities involving pipe of four-inches or greater external diameter, the project owner shall submit a copy of the Fuel Gas Pipe Cleaning Work Plan to the CBO for information, to the Carlsbad Fire Department for review and comment, and to the CPM for review and approval.~~

HAZ-10 The project owner shall not allow any fuel gas pipe cleaning activities on site at any power unit, either before placing the pipe into service or at any time during the lifetime of the facility, that involve "flammable gas blows" where natural (or flammable) gas is used to blow out debris from piping and then vented to the atmosphere. Instead, an inherently safer method involving a non-flammable gas (e.g. air, nitrogen, steam) or mechanical pigging shall be used as per NFPA 56. A written procedure shall be developed and implemented as per NFPA 56, section 4.3.1

Verification: At least 30 days before any fuel gas pipe cleaning activities begin at any unit, the project owner shall submit a copy of the Fuel Gas Pipe Cleaning Work Plan (as described in NFPA 56, section 4.3.1) which shall indicate the method of cleaning to be used, what gas will be used, the source of

pressurization, and whether a mechanical PIG will be used, to the CBO for information and to the CPM for review and approval.

REFERENCES

Carlsbad 2005. Precise Development Plan and Desalination Plant Project Environmental Impact Report.

CEC 2012a – California Energy Commission (TN66185). Commission Decision on the Carlsbad Energy Center Project Application for Certification, dated June 1, 2012. Submitted July 11, 2012.

CECP 2007a – California Energy Center Project/T. Hemig (tn: 42299). Application for Certification for the Carlsbad Energy Center Project. 09/11/2007.

LL 2014b – Locke Lord LLP (TN202267). Petition to Remove Obsolete Facilities to Support Construction of the Carlsbad Energy Project. Submitted 04/29/2014.

LL 2014d – Locke Lord LLP (TN202287-2). Petition to Amend Carlsbad Energy Center Project. Submitted 05/02/2014.

North American Electric Reliability Council (NERC) 2002. Security Guidelines for the Electricity Sector, Version 1.0, June 14, 2002.

U.S. Department of Energy (US DOE). 2002. Draft Vulnerability Assessment Methodology, Electric Power Infrastructure. Office of Energy Assurance, September 30, 2002.

U.S. Department of Justice (US DOJ). 2002. Special Report: Chemical Facility Vulnerability Assessment Methodology. Office of Justice Programs, Washington, D.C. July 2002.

HAZARDOUS MATERIALS - Attachment A
Hazardous Materials Proposed for Use at the Amended 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~~ **20,000** gallons	100 lbs
Citric Acid	**77-92-9**	**Cleaning RO units**	**Health: eye or lung irritation**	**100 lbs**	**NA**
Cleaning Chemicals/ Detergents	None	Periodic cleaning of combustion turbine	Health: various Physical: various	Up to 25 gallons or 100 pounds per chemical	NA
Diesel No. 2	**None**	**Fuel for fire pump, vehicles, emergency generator**	**Health: may be carcinogenic Fire hazard**	**3000 gal**	**42 gal**
General Dispersant – Cyanamer P-70	**NA**	**Anti-scaling dispersant**	**Health: irritation of the eyes and skin**	**55 gal**	**NA**
Hydraulic Oil	None	In combustion turbine and turbine control valve actuators	Health: hazardous if ingested Physical: may be flammable/combustible	~~150~~ **500** gallons	42 gal
Hydrochloric acid	**7647-01-0**	**RO cleaning**	**Health: strong corrosive; significant irritation to eyes, respiratory system, and skin**	**100 gal**	**5000 lbs**
Ion Exchange Resin	None	Demineralization of boiler feedwater	Health: immediate health hazard	110,000 pounds	NA
Lab reagents	**Various**	**Water/wastewater analysis**	**Various**	**10 gal liquids 100 lbs solids**	**NA**
Lubrication Oil	None	Lubricate rotating equipment	Health: hazardous if ingested Physical: may be flammable/combustible	~~400~~ **18,000** gallons	42 gal
Mineral Insulating Oil	8012-95-1	Transformers/switch yard	Health: hazardous if ingested Physical: may be flammable/combustible	~~550~~ **76,000** gallons	42 gal
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
Scale/Corrosion inhibitor Permatreat PC-191	**NA**	**Water treatment**	**Health: irritation with prolonged contact**	**400 gal**	**NA**
Sodium hydroxide (50%)	**1310-73-2**	**Water treatment**	**Health: very corrosive to the skin, eyes, and mucus membranes**	**500 gal**	**1000 lbs**
Sulfur hexaflouride	2551-62-4	**Switchyard/switch gear devices**	Health: hazardous if inhaled Physical: non-flammable	~~400~~ **960** pounds	NA

Source: CECP 2007a Tables 5.5-1 through 5.5-3 and LL 2014d Table 5.5-1 through 5.5-3.
a. Reportable quantities for a pure chemical, per the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

SAMPLE CERTIFICATIONS

(Attachments B, C, and D)

SAMPLE CERTIFICATION (Attachment B)

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 C)

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 D)

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.

HAZARDOUS MATERIAL MANAGEMENT - FIGURE 1

Carlsbad Energy Center Project Amendment - Photo 057

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Dr. Alvin Greenberg, June, 2009

HAZARDOUS MATERIAL MANAGEMENT - FIGURE 2

Carlsbad Energy Center Project Amendment - Photo 058

HAZARDOUS MATERIAL MANAGEMENT

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Dr. Alvin Greenberg, June, 2009

Staff EXHIBIT 223 (FSA, page 4.4-40)

HAZARDOUS MATERIAL MANAGEMENT - FIGURE 3

Carlsbad Energy Center Project Amendment - Photo 059

HAZARDOUS MATERIAL MANAGEMENT

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Dr. Alvin Greenberg, June, 2009

HAZARDOUS MATERIAL MANAGEMENT - FIGURE 4

Carlsbad Energy Center Project Amendment - Photo 060

HAZARDOUS MATERIAL MANAGEMENT

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Dr. Alvin Greenberg, June, 2009

Staff EXHIBIT 223 (FSA, page 4.4-42)

HAZARDOUS MATERIAL MANAGEMENT - FIGURE 5

Carlsbad Energy Center Project Amendment - Photo 063

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Dr. Alvin Greenberg, June, 2009

LAND USE

Michael C. Baron

SUMMARY OF CONCLUSIONS

Staff concludes that the construction and operation of the amended CECP would be consistent with applicable laws, ordinances, regulations, and land use standards (LORS), with the exception of a 35-foot height limitation in the Agua Hedionda Land Use Plan for future buildings. The May 31, 2012, Commission Final Decision for the licensed CECP adopted override findings, under both the Warren-Alquist Act and the California Environmental Quality Act (CEQA) for nonconformance with several land use LORS, including the 35-foot height limitation. Staff does not believe the nonconformance with the height limitation would be a significant impact under CEQA, and recommends that only a LORS override is needed for the amended CECP.

INTRODUCTION

This analysis considers the changes between the licensed CECP and modifications sought by petitioner/project owner Carlsbad Energy Center, LLC, in the Petition to Amend the CECP.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

Although the Energy Commission issues a license in lieu of any state or local permit, it must make findings concerning whether the proposed project conforms with state and local laws, ordinances, regulations and standards, including local land use plans and zoning. When determining whether a proposed project or amendment to a previously certified project is consistent with local land use laws, Energy Commission staff consults with local agencies to determine conformity, and, where necessary, correct or eliminate any non-compliance (Pub. Resources Code, § 25000).

At the time the original CECP was licensed, LORS applicable to land use were identified in the June 2012 Final Commission Decision. Since approval of the original CECP, no new land use LORS are identified requiring analysis under the amended CECP.

Some land use LORS analyzed as part of the original 2012 licensing of the CECP have been amended or repealed by the city of Carlsbad as part of the city's support of the amended CECP. This includes repeal of the Encina Specific Plan (SP 144).

Land Use Table 1 summarizes land use LORS applicable to the amended CECP. Discussion of the LORS amended by the city is contained in the "City of Carlsbad General Plan and Zoning Ordinance" subsection of this Land Use analysis.

Land Use Table 1 Applicable Laws, Ordinances, Regulations, and Standards (LORS)	
LORS	**Description**
Federal	None
State	
Warren-Alquist Act section 25529	Pursuant to section 25529 of the Warren-Alquist Act (Pub. Resources Code, § 25000 et seq.), the Energy Commission shall require public access to coastal resources 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 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 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."
California Coastal Act	The California Coastal Act establishes a comprehensive scheme to govern land use planning along the entire California coast (Pub. Resources Code, § 30000 et seq.). The Coastal Act sets forth general policies that govern the California Coastal Commission's review of permit applications and local plans (Pub. Resources Code, § 30200).
Subdivision Map Act	Sections 66410-66499.58 of the California Public Resources Code provide 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	
Carlsbad General Plan	The 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 Encina Power Station (EPS) property has a Public Utilities (U) land use designation. The U land use designation includes the generation of electrical energy by fossil fuel only if it is the subject of and consistent with the agreement between and among the city of Carlsbad and the Carlsbad Municipal Water District (CMWD), Cabrillo Power I LLC, Carlsbad Energy Center LLC, and San Diego Gas and Electric, and approved by the city and CMWD on January 14, 2014.
Carlsbad Municipal Code, Chapter 21.36 (Zoning Ordinance)	The Carlsbad Zoning Ordinance serves as the legal mechanism for implementation of the general plan. Chapter 21.36 of the city's municipal code addresses the Public Utilities ("P-U") Zone. The P-U Zone permits generation and transmission of electrical energy throughout the city. This section of the municipal code implements the "Public Utility" land use designation of the city's general plan.

Land Use Table 1 Applicable Laws, Ordinances, Regulations, and Standards (LORS)	
LORS	**Description**
Encina Power Station Precise Development Plan (PDP 00-02)	The purpose of the Encina Power Station Precise Development Plan is to identify existing and approved uses and provide land use information, procedures and standards for development, consistent with the requirements of the Public Utility zone. The PDP specifically allows the generation of electrical energy by natural gas using peaker technology. It also identifies that environmental review for future construction of the CECP, including demolition of the EPS, and limited remediation of the site will be conducted by the California Energy Commission according to its certified regulatory program under CEQA.
Carlsbad Local Coastal Program (LCP)/Agua Hedionda Land Use Plan (AHLUP)	The AHLUP is the segment of the city's LCP that applies to the Agua Hedionda Lagoon area and the EPS property. The AHLUP is a certified segment of the city's LCP. The city does review projects in the coastal zone for consistency with the requirements of the LCP, but has not been granted authority to issue Coastal Development Permits (CDP), which normally requires project proponent/developers to apply directly to the California Coastal Commission to obtain a CDP for their projects. The Energy Commission license is in lieu of the Coastal Commission permit.
South Carlsbad Coastal Redevelopment Plan (SCCRP)	In September 1997, 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.
Coastal Rail Trail (CRT)	The Coastal Rail Trail (CRT) is intended to provide a multi-modal transportation route that is separated from the roadway. The current trail network consists of 38 miles of open space trails and 48 miles of bike lanes. Future plans for approximately 20 more miles of trails in the city will bring the total trail mileage to approximately 58 miles.
North County Multiple Habitat Conservation Plan (NCMHCP) and the Carlsbad Habitat Management Plan (HMP) for Natural Communities	The North County Multiple Habitat Conservation Plan (NCMHCP) 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 NCMHCP 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 NCMHCP 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 NCMHCP. The Habitat Management Plan (HMP) for Natural Communities in the City of Carlsbad, which serves as the city's sub-area plan, was approved in November, 2004.

SETTING

PROPOSED MODIFIED PROJECT

As discussed in detail in the **PROJECT DESCRIPTION** section of this Preliminary Staff Assessment (PSA), the amended Carlsbad Energy Center Project (amended CECP) includes proposed modifications to change generation equipment and technology from two Siemens 5000F combined cycle turbines to six GE LMS 100 simple cycle turbines with a combined net output of approximately 632 megawatts (MW). Amended CECP activities sought by petitioner/project owner Carlsbad Energy Center, LLC, also include the permanent retirement and demolition of Encina Power Station (EPS) Units 1 through 5.

Prior to construction of the amended CECP, the petitioner proposes to demolish three above-ground fuel oil storage tanks (ASTs) 1, 2 and 4. This Phase I demolition and removal activity would follow the previously licensed removal of ASTs 5, 6 and 7. The resulting 30-acre footprint would be the location for all operational aspects of the amended CECP. Following the 21-month Phase II construction and 3-month commissioning process, the petitioner seeks a 12-month shut-down and decommissioning of the EPS (Phase III), before commencing a 21-month EPS demolition (Phase IV) and the removal of all above-ground EPS facilities west of the North County Transit District (NCTD) railroad tracks. A 2-month site restoration period would complete the 66-month amended CECP schedule.

PROJECT SITE

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 expansion of generation capacity, the addition of the 400-foot high exhaust stack that displaced five individual stacks to better disperse air emissions, and the addition and expansion of various ancillary buildings, water treatment facilities and other tanks and equipment necessary for electricity production. The 30-acre amended CECP site would be located within the boundary of the original 95-acre EPS site situated east of the NCTD rail corridor (Assessor Parcel Number (APN) 210-01-41), west of Interstate-5 (I-5) south of Agua Hedionda Lagoon, and north of San Diego Gas & Electric's Cannon substation. The amended CECP would have a footprint, encompassing acreage currently occupied by ASTs 4, 5, 6, and 7 (see **Project Description Figure 1**). Construction equipment/material laydown and construction worker parking areas for the project would be located immediately north of the amended CECP facility, and also include various areas west of the existing railroad tracks where ASTs 1 and 2 currently reside.

The primary access to the site would be from Carlsbad Boulevard via Cannon Road off I-5, through the existing EPS main gate, and east via use of the existing railroad crossing between APNs 210-01-43 and 210-01-41. No offsite parking or laydown areas outside of the 95-acre EPS are anticipated to be used during Phase II construction and commissioning of the amended CECP.

SURROUNDING AREA

Land uses surrounding the Encina Power Station include:

- Outer, Middle and Inner Agua Hedionda Lagoon to the west, north and northeast, respectively;
- Carlsbad Boulevard directly to the west, which is considered a Community Scenic Corridor pursuant to the Carlsbad General Plan;
- Carlsbad State Beach located west of Carlsbad Boulevard;
- Single-family residences to southwest, located west of Carlsbad Boulevard;
- Interstate-5 to the east;
- The Carlsbad Aqua Farm located immediately west of ASTs 1 and 2 in the Outer Lagoon's southeastern shore;
- Hubbs Sea World Research Institute and fish hatchery, located on the north side of the Outer Lagoon;
- YMCA day camp in the middle Agua Hedionda Lagoon, directly north of the amended CECP power plant site
- Car Country Park, located on Paseo Del Norte off Cannon Road, to the south and adjacent to the east side of I-5; includes privately owned/operated small greenbelt;
- Cannon Boulevard to the south; provides offramp from I-5 and intersects Carlsbad Boulevard.
- Single-family residences on the south side of Cannon Boulevard (Terramar Neighborhood Assn.).

Land uses surrounding the amended CECP site (within the EPS) consist of:

- Industrial facilities associated with the EPS to the west, south, and southwest;
- Atchison, Topeka & Santa Fe (AT&SF)/NCTD Rail Corridor to the west;
- Outer and Middle Agua Hedionda Lagoon to the west and north; 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.

The following land uses, operate, or exist on land 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.
- **Educational Facilities:** There are seventeen schools located within the Carlsbad Unified School District, which serves the city of Carlsbad (PTA Appendix 5.9A).
- **Religious Facilities:** There are five churches located within one mile of the CECP site.
- **Preschool/Daycare:** There are ten preschools and day care centers located in close proximity to the proposed site.

- **Hospitals/Clinics:** There are 10 hospitals and clinics in close proximity to the proposed project site.
- **Elder Care Facilities:** There are 8 elder care facilities in close proximity to the project site.

GENERAL PLAN LAND USE AND ZONING DESIGNATIONS

Project Site

The amended CECP site has a city of Carlsbad General Plan Land Use designation of Public Utility (U), and is zoned Public Utility (P-U). The P-U 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 U General Plan designation was amended by the city (Resolution 2014-096) on April 20, 2014, so that the CECP is the only primary fossil fuel power generation permitted within the city of Carlsbad with the U General Plan Land Use designation. The P-U 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 P-U Zone also specifies that the issuance of any building permits or entitlements cannot occur until an updated amendment to the Encina Power Station Precise Development Plan (PDP) has been approved by the city of Carlsbad for the property, were the city the permitting authority.

Land Uses Within One-Mile Radius of the Project Site

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 amended CECP site and within a one-mile radius of the project site include Schools, 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 Residential, and High Density/Residential.

Zoning designations (Carlsbad Municipal Code, Chapter 21.36) within a 1-mile radius of the amended CECP include Residential Agricultural, Public Utility, and Open Space. Zoning designations adjacent to the project site, and within a one-mile radius 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.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Energy Commission staff has analyzed the information provided in the CECP PTA, the 2012 Final Staff Assessment and Commission Decision for the licensed CECP, and information from other sources to determine the amended CECP's consistency with applicable land use LORS and its potential to have significant adverse land use impacts.

METHOD AND THRESHOLDS FOR DETERMINING SIGNIFICANCE

Significance criteria used in this document are based on Appendix G of the CEQA Guidelines and performance standards or thresholds identified by Energy Commission staff, as well as applicable LORS utilized by other governmental regulatory agencies.

An impact may be considered significant if the proposed project results in:

- Conversion of Farmland or Forest Land.
  - Conversion of Prime Farmland, Unique Farmland, or Farmland of Statewide or Local Importance (Farmland) as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program (FMMP) of the California Natural Resources Agency, to non-agricultural use.[1]
  - Conflict with existing zoning for agricultural use, or a Williamson Act contract.
  - Conflict with existing zoning for, or cause rezoning of, forest land [as defined in Pub. Resources Code, § 12220 (g)), timberland (as defined by Pub. Resources Code § 4526), or timberland zoned Timberland Production (as defined by Gov. Code § 51104(g)).
  - Loss of forest land or conversion of forest land to non-forest use.
  - Changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use[2] or conversion of forest land to non-forest use.
- Physical disruption or division of an established community.
- An unmitigated noise, odor, public health or safety hazards, visual, or adverse traffic affect on surrounding properties.
- Conflict with any applicable habitat conservation plan, natural community conservation plan, or biological opinion.
- Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction, or that would normally have jurisdiction, over the project adopted for the purpose of avoiding or mitigating environmental effects. This includes, but is not limited to, a general plan, redevelopment plan, or zoning ordinance.
- Incremental impacts that, although individually limited, are cumulatively considerable when viewed in connection with other project-related effects or the effects of past projects, other current projects, and probable future projects.

DIRECT/INDIRECT IMPACTS AND MITIGATION

The project does not contain farmland or forestland and the amended 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 1954. Therefore CEQA criteria regarding forest and farmland and the physical disruption or division of an established community would not apply to the amended CECP.

The **BIOLOGICAL RESOURCES** section of this document provides a detailed discussion of LORS applicable to wildlife and plants, including the amended CECP's consistency with the North County Multiple Habitat Conservation Plan and the Carlsbad Habitat Management Plan for Natural Communities. Biological Resources staff has determined that the amended CECP is consistent with these plans.

Staff has received verification from other technical staff that the amended CECP, including the removal of ASTs 1, 2, and 4 and decommissioning and demolition of the EPS facility, would not result in any physical land use incompatibilities in the following areas: **NOISE & VIBRATION, TRAFFIC & TRANSPORTATION, PUBLIC HEALTH, AIR QUALITY, HAZARDOUS MATERIALS MANAGEMENT, SOIL & WATER**, and **VISUAL RESOURCES**.

Conflict with Any Applicable Land Use Plan, Policy or Regulation

The following is a brief discussion of the applicable land use LORS analyzed for the licensed CECP, and various subsequent amendments to these LORS by the city of Carlsbad.

The May 16, 2011 Presiding Member's Proposed Decision (PMPD) for the licensed CECP (TN #60618) evaluated consistency of the project with applicable LORS. The PMPD analysis concluded that with the possible exception of a finding that the CECP would serve an extraordinary public purpose (a requirement under the Redevelopment Plan for the South Carlsbad Coastal Redevelopment Project); the CECP was consistent with applicable land use LORS.

In September and October 2011, the city amended its land use regulations and standards to disallow construction and operation of the project. The amendments are summarized as follows:

- **General Plan** – The Public Utility (U) land use designation was revised so that generation of electricity was no longer a "primary" function in areas so designated unless it was "located outside the Coastal Zone but only if it is conducted by a government entity or by a company and such use is authorized or approved by the California Public Utilities Commission [CPUC]."
- **Zoning Ordinance** – An amendment to the Carlsbad Municipal Code changed the descriptions of permitted uses in the Public Utility Zone (P-U) pertaining to the generation and transmission of electrical energy. Under the amended zoning code, electrical generation was permitted as an accessory use in or outside the Coastal Zone and could only be undertaken "by a government entity or by a company authorized or approved for such use by the California Public Utilities Commission [CPUC]." Generating capacity of 50 MW or more was prohibited in the Coastal Zone (including the CECP site).
- **Encina Power Station Precise Development Plan** – The amendment revised the text to mirror the amended general plan and zoning ordinance. The revisions prohibited generation of 50 MW or more of electrical energy in the Coastal Zone and disallowed expansion of the existing EPS or the addition of a new power facility.
- **Encina Specific Plan (SP 144)** – The amendment incorporated wording from the general plan and municipal code amendments to clarify the limitations on generation of electricity on properties designated "U" and zoned "P-U" in the Coastal Zone. The

amendment eliminated provisions regarding future power generation at the EPS and elsewhere in the plan area. It also eliminated an inconsistency with a policy in the Agua Hedionda Land Use Plan by revising a condition in SP 144 so that future buildings permitted at the EPS could not exceed a height of 35 feet.

- **Local Coastal Program, Agua Hedionda Land Use Plan** – The amendment deleted a policy addressing preservation of expansion opportunities for the EPS on a 45-acre parcel on the east side of I-5. Power generation was determined to be inconsistent with the general plan land use designations for the property. The 35-foot structure height limitation was maintained.

During its review and approval of the amendments listed above, the city reached a conclusion of inconsistency with the South Carlsbad Coastal Redevelopment Plan. The findings for the consistency determination were contained in the resolution for the amendment to the zoning ordinance.

The Warren-Alquist Act specifies findings that must be made before approving a project that does not comply with state or local LORS. In accordance with the Warren-Alquist Act, the Commission approved the licensed CECP in 2012, with a finding that the "facility is required for public convenience and necessity and that there are not more prudent and feasible means of achieving public convenience and necessity" (Pub. Resources Code, § 25525).

The May 31, 2012 Commission Decision on the licensed CECP (TN #66185) adopted LORS override findings for inconsistencies with the city's general plan, zoning ordinance, Encina Power Station Precise Development Plan, and Encina Specific Plan (SP 144). The original CECP was also found to be inconsistent with the policy in the AHLUP limiting structure heights to 35 feet. Because the CEQA Guidelines define inconsistency with local land use regulations and standards as a potentially significant environmental impact (Cal. Code Regs., tit. 16, Appendix G, § X(b), the Commission Decision also adopted override findings under CEQA for the specified inconsistencies with local LORS.

In its analysis of the South Carlsbad Coastal Redevelopment Plan, the 2012 Commission Final Decision determined that the licensed CECP would further the stated goal to facilitate "redevelopment of the Encina power generating facility to a smaller, more efficient power generating plant east of the railroad tracks." The redevelopment plan requires new development, including electrical generation facilities, to be found to serve an "extraordinary public purpose." The Commission Decision found that the original CECP would serve a substantial but not extraordinary public purpose. As a result, in addition to the LORS inconsistencies identified above, the Override Findings section of the Commission's 2012 Decision included override findings for the potential conflict with the redevelopment plan.

In April 2014, the Carlsbad Planning Commission approved actions demonstrating support of the amended CECP. These amendments to the city's General Plan, Zoning Ordinance, and Encina Power Station Precise Development Plan, removed prior language (added in 2012) that had created non-conformity with the original CECP project licensed in 2012. In addition, the Planning Commission repealed the Encina Specific Plan (SP144), and approved a resolution finding that the amended CECP would comply with the South Carlsbad Coastal Redevelopment Plan by virtue of the

"extraordinary benefits" it would provide to the city (COC 2014d).The city's April 2014 actions regarding the CECP did not include amending the AHLUP.

Staff concludes that with the city's actions the amended CECP would be consistent with all applicable local land use LORS, with the exception of the AHLUP's 35-foot height limitation. As discussed above, the LORS override finding in the Commission Decision on the licensed CECP for the height limitation would be required for approval of the amended CECP. The amended CECP projects nonconformity with the AHLUP 35-foot height limit may be considered a significant impact under CEQA. Staff believes that the nonconformity with the 35-foot height provision is not a significant impact because the amended CECP's exhaust stack heights would be much lower than the existing infrastructure at the Encina Power Station facility; the amended CECP stacks would be 90-feet high, whereas the present facility's stack is 400 feet high. Thus, the effect of the amended CECP is to lower visual impacts, which are the primary concern of the 35-foot limitation. Staff has solicited the views of the city of Carlsbad to see if it concurs in this conclusion.

Coastal Rail Trail Project

In November 2001, the Carlsbad City Council approved the Citywide Trails Report, which outlines trail development guidelines, resulting in a current network consisting of 38 miles of open space trails and 48 miles of bike lanes running alongside the city's roadways called the Coastal Rail Trail (CRT). The CECP would be located entirely within the fenced perimeter of the existing EPS east of the NCTD. 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. Condition of Certification **LAND-1** for the licensed CECP required the project owner to dedicate an easement for the CRT within the boundaries of the EPS area in a location mutually agreed upon with the city of Carlsbad. This condition of certification also applies to the amended CECP.

Warren-Alquist Act

Section 25529 of the Warren-Alquist Act discusses the Energy Commission's statutory requirement for a public use area for facilities proposed in the Coastal Zone. Pursuant to section 25529, 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. **LAND-1** discussed above would ensure conformance with this provision of the Warren-Alquist Act.

California Coastal Act

The California Coastal Act of 1976 (Coastal Act) establishes a comprehensive approach to govern land use planning along the entire California coast. Staff's review of the Coastal Act focuses on policies pertaining to coastal resources and land use.

The amended CECP would be located entirely within the 95-acre EPS property, with no off-site expansion or use of property necessary for either the construction or operation of the amended CECP power plant facility.

The amended CECP 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

amended CECP site (and the entire Agua Hedionda Land Use Plan area) is within the retained jurisdiction of the Coastal Commission. The Coastal Commission is responsible for issuing Coastal Development Permits in its retained jurisdiction, based on an evaluation of the project's conformity with the policies of the Coastal Act. The policies of the city of Carlsbad's LCP, general plan, and zoning ordinance, however, are used by the Coastal Commission as guidance. Because the Energy Commission has jurisdiction over power plants 50 MW or greater and all related facilities, 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 applicable federal, state and local laws, ordinances, regulations and standards, including land use plans and zoning. To that end, staff has evaluated the amended CECP's consistency with the city of Carlsbad's applicable LORS, including the city's LCP, general plan and zoning ordinance, and the Coastal Act.

As discussed above under the subsection "Conflict With Any Land Use Plan, Policy, or Regulation," staff concludes that with the city's actions, the amended CECP would be consistent with the city of Carlsbad land use LORS, except a Commission LORS override finding would be required again for the 35-foot height limitation. The 2012 Commission Decision included a detailed analysis of the potential for the original CECP to comply with the Coastal Act. This analysis was consistent with staff's analysis in the FSA for the licensed project. Although the 2012 Commission Decision reached a finding that the original CECP was consistent with the Coastal Act, precautionary override findings were adopted by the Commission in response to interveners' claims that the project would increase visual blight and adversely impact aquatic species, and therefore would be inconsistent with the Coastal Act. Given the lower profile of the amended CECP compared to the licensed CECP, and the proposed cessation of once-through cooling by the existing EPS, staff concludes that the amended CECP would greatly reduce or avoid the environmental impacts of the previously licensed project, and that the amended CECP would be consistent with the Coastal Act. Further, in its 2012 Decision the Commission found that Section 30260 of the Coastal Act, which encourages coastal-dependent industrial facilities to locate or expand within existing sites, does not prohibit non-coastal dependent facilities from locating within the coastal zone.

Environmentally Sensitive Habitat Areas

Section 30240 (b) of the Coastal Act states: Development in areas adjacent to environmentally sensitive habitat areas and parks and recreation areas shall be sited and designed to 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 comprises an inner, middle and outer section; each with its own unique habitat and recreation and aqua farming opportunities. The 95-acre EPS parcel is south of the outer and middle sections. The **BIOLOGICAL RESOURCES** section of this document provides analysis of how the proposed modifications of the amended CECP would comply with this section of the Coastal Act. The **VISUAL RESOURCES** section of this document addresses the amended CECP's visual impacts on surrounding land uses (including recreational resources).

From a land use perspective, demolition, construction, operation and decommissioning activities of the amended CECP would not significantly impact environmentally sensitive

habitat areas and parks, including the Agua Hedionda Lagoon, because the amended CECP would be entirely within the fenced perimeter of the EPS, which is an existing power plant facility.

Public Access Policies

Coastal Act section 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.

Coastal Act section 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 access 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 access.

Carlsbad Boulevard runs along the Pacific Coast north to south, crosses directly in between EPS and Carlsbad State Beach and currently provides adequate access to the sea. The amended CECP would be wholly contained within the boundary of the existing EPS and therefore construction and operation of the amended CECP would not significantly impact public access from the nearest public roadway to the shoreline and along the coast.

CUMULATIVE IMPACTS

A project may result in a significant adverse cumulative impact where its effects are cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects (Cal. Code Regs., tit.14, § 15065, subd. (a) (3)).

There are several large-scale planned and approved projects in the immediate vicinity of the proposed CECP, some of which are located at the EPS. Projects of note that may have cumulative impacts with the amended CECP include:

- **Carlsbad Seawater Desalination Project** (CSDP) – Located on the EPS site, immediately south of the Agua Hedionda Lagoon, CSDP is over 70 percent completed as of October 15, 2015 and on schedule to begin operations the second quarter of 2015. This project, owned and operated by Poseidon Industries, Inc. occupies approximately four-acres where AST 3 once resided. CSDP will produce 50-million gallons per day (mgd) of potable water for the San Diego County Water Authority from 304 mgd of seawater utilizing EPS pipelines, pumps, and other appurtenant and ancillary water and support facilities in the process (COC 2005).
- **Aqua Hedionda Sewer Lift Station** – Replacement of an existing sewer lift station and 2.35-mile long, north-south sewer line located at the south shore of the Agua Hedionda Lagoon, adjacent to east side of the NCTD rail corridor. Construction expected to begin early 2015 and end 2017.

- **Demolition of above-ground storage tanks** – Demolition of ASTs 5, 6, and 7; including berm removal between ASTs 5 and 6 and 6 and 7; and remediation activities for ASTs 5, 6, and 7 at the EPS site.
- **Buena Outfall Force Main Phase 3** – New 18-24 inch diameter, 17,700-foot long pipeline, part gravity and part force main sewer line along Palomar Airport Road. The forecasted project will go into operation sometime in late 2014.
- **Coastal Rail Trail** – The Coastal Rail Trail (CRT) currently consists of 38 miles of open space trails and 48 miles of bike lanes running alongside the city's roadways. Future plans for approximately 20 more miles of trails in the city will bring the total trail mileage to approximately 58 miles. Sections of the CRT have been completed, including in the city of Carlsbad. However, the CRT route location has not been finalized in the area of the EPS. (COC 2014c)
- **Hallmark Property** – Preservation and creation of a 19.3 acre coastal habitat adjacent to the Agua Hedionda Lagoon in Carlsbad as mitigation for the Caltrans I-5 Express Lanes Project. The restoration project is scheduled to begin sometime during 2015.
- **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. 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 nearest to the EPS facility 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 (http://www.keepsandiegomoving.com/Lossan/lossan-carlsbad-double-track.aspx).

The area in the vicinity of the proposed amended CECP site is essentially dominated by similar industrial and utility development. The proposed amended CECP would represent a similar land use type to adjacent uses. In addition, the proposed amended CECP would not require encroachment onto lands outside of the existing EPS.

Cumulative Impacts Analysis

The following land use areas have been analyzed with regard to cumulative land use impacts.

Agriculture and Forest

The amended CECP does not have any impacts to agricultural or forest lands or conflict with any land that is zoned for agricultural purposes and therefore, does not contribute to cumulative impacts related to this land use area.

Physical Disruption or Division of an Established Community

The amended CECP would be located within the boundaries of an existing power plant that has been in its current location since 1954 as well as on lands designated and zoned for public utility uses, including electrical generating facilities. The amended

CECP would not disrupt or divide an established community and would not contribute to a cumulative impact in this area.

Conflict with Any Applicable Habitat or Natural Community Conservation Plan

The amended CECP does not conflict with any habitat or natural community conservation plans and would not contribute to any cumulative impacts in this land use area.

Conflict with Any Applicable Land Use Plan, Policy or Regulation

The amended CECP would be consistent with all applicable land use LORS, with the exception of the AHLUP's 35-foot height limitation. The amended CECP's conflict would not be a significant impact under CEQA; therefore the amended project would not make a cumulatively considerable contribution to cumulative impacts in this area. Staff concludes that the amended CECP would have less than significant cumulative impacts to land use.

Compliance with LORS

Staff concludes that the amended CECP would be consistent with applicable state and local land use LORS, with the exception of the 35-foot height limitation in the city's Agua Hedionda Land Use Plan. As discussed above, the override finding in the Commission Decision on the licensed CECP for the height limitation would likewise be required for approval of the amended CECP. **Land Use Table 2** summarizes the amended CECP's conformance with applicable LORS.

Land Use Table 2 Project Compliance with Applicable State and Local Land Use LORS			
Applicable LORS	**Description of Applicable LORS**	**Consistent?**	**Basis for Consistency**
State			
Warren-Alquist Act, section 25529	The Energy Commission shall require public access to coastal resources as a condition of certification of a facility proposed in the Coastal Zone.	Yes	Condition of Certification **LAND-1** from the Commission Decision for the licensed CECP requires the project owner to dedicate an easement for the Coastal Rail Trail within the boundaries of the EPS site.
California Coastal Act	The California Coastal Act (Pub. Resources Code, § 30000, et seq.) Establishes a comprehensive scheme to govern land use planning along the entire California coast. Section 30211: Development shall not interfere with the public's right of access to the sea. Section 30212: With exceptions, new development shall provide public access to the shoreline and along the coast.	Yes	The amended CECP would be within an existing electrical generating facility and would not result in a change in land use that adversely affects coastal resources or public access. No coastal access would be denied to the public as a result of the PTA and no new access would be required. The amended CECP would be developed on the property where an existing electrical generating facility currently operates. With the reduced profile of the amended CECP and the cessation of once-through cooling of the existing EPS, staff concludes that the amended CECP would be consistent with the Coastal Act.
Subdivision Map Act (Pub. Resources Code sections 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	Prior to the 2012 Commission Decision a Certificate of Compliance (COC) was recorded with the San Diego County Recorder's Office on October 30, 2001. The COC adjusted the properties along the northeast side of the railroad tracks to accommodate the licensed CECP. In addition to the licensed CECP, removal of ASTs 1, 2, and 4 and construction of the amended CECP would also be wholly contained within the boundaries of the previously adjusted EPS property. Therefore, the amended CECP would not cause a re-evaluation of compliance with the Subdivision Map Act.

Land Use Table 2 Project Compliance with Applicable State and Local Land Use LORS			
Applicable LORS	**Description of Applicable LORS**	**Consistent?**	**Basis for Consistency**
Local			
Carlsbad General Plan	A primary function of the "U" land use designation may include the generation of electrical energy by fossil fuel only if it is the subject of and consistent with the January 2014 Agreement between the city, CMWD, the project owner, and SDG&E.	Yes	The city of Carlsbad amended general plan text so the amended CECP would be the only primary fossil fuel power generation permitted in Carlsbad under the "U" GP Land Use designation, whether in or out of the Coastal Zone. Approved by Planning Commission on 4/16/2014 (Reso. 7039) and City Council on 5/20/14 (Reso. 2014-096)
Carlsbad Municipal Code, Chapter 21.36 (Zoning Ordinance)	The P-U zone permits generation and transmission of electrical energy throughout the city. This section of the zoning ordinance implements the "Public Utility" land use designation of the city's general plan.	Yes	The city of Carlsbad adopted ZCA 14-01, which revised the permitted use table to allow power generation and transmission anywhere within the P-U Zone District. Based on the CECP's zoning and land use designation for Public Utilities ("P-U" and "U," respectively), and the fact that both designations allow for electrical generation, the amended CECP would be consistent with the Carlsbad Zoning Ordinance. Approved by Planning Commission on 4/16/2014 (Reso. 7040) and City Council on 6/3/2014 (Ord. CS-253)
Encina Power Station Precise Development Plan (PDP 00-02)	The purpose of the PDP is to identify existing and approved uses, and provide land use information, procedures and standards for development, consistent with the requirements of the P-U zone.	Yes	The city of Carlsbad amended the PDP 00-02(F), which was adopted by the Carlsbad City Council on 6/3/2014. The amended PDP defines power plant as an allowed use on the EPS property. Since the amended CECP would be located entirely within the property of the EPS the proposed amended CECP would be consistent with PDP 00-02.

Land Use Table 2 Project Compliance with Applicable State and Local Land Use LORS			
Applicable LORS	**Description of Applicable LORS**	**Consistent?**	**Basis for Consistency**
Carlsbad Local Coastal Program/Agua Hedionda Land Use Plan (AHLUP)	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. In 2016, the city expects to align a revised LCP with their new general plan and obtain local permit authority for deferred certification areas, including the Agua Hedionda segment.	Yes, **except for height limit**	The AHLUP designates the amended CECP site and the surrounding EPS as U, consistent with the city's general plan land use and zoning designations for the site, which allow for electrical generation. Based on this factor, staff concludes that the amended CECP is consistent with the AHLUP, except for the 35-foot height limitation.
South Carlsbad Coastal Redevelopment Plan (SCCRP)	The city of Carlsbad formed a redevelopment area known as the South Carlsbad Coastal Redevelopment Area, the boundaries for which include the power plant property, for the purpose of facilitating the development of a new, high efficiency replacement plant to improve air quality and other environmental conditions with the concurrent decommissioning of the existing power plant	Yes	The SCCRP details land uses permitted under the Carlsbad General Plan and Zoning Ordinance. In addition, the amended CECP would be located on the existing EPS site consistent with the SCCRP. The city of Carlsbad adopted a resolution finding extraordinary public purpose on 4/22/2014. Given these factors, staff concludes that the amended CECP is consistent with the SCCRP.
Coastal Rail Trail (CRT)	The city of Carlsbad approved the Coastal Rail Trail (CRT) project in 2001. Upon the agreements made between the project owner and the city of Carlsbad, discussions regarding alternative CRT alignments through and along the EPS property would be discussed to determine an alignment that is mutually acceptable to the city	Yes	The amended CECP would be located entirely within the fenced perimeter of the existing EPS east of the NCTD. 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. Furthermore, with implementation of Condition of Certification **LAND-1** the project owner would be required to dedicate an easement for the Coastal Rail Trail within the boundaries of the EPS area

Land Use Table 2 Project Compliance with Applicable State and Local Land Use LORS			
Applicable LORS	**Description of Applicable LORS**	**Consistent?**	**Basis for Consistency**
	and the project owner.		in a location mutually agreed upon with the city of Carlsbad.
North County Multiple Habitat Conservation Plan (NCMHCP) and the Carlsbad Habitat Management Plan (HMP) for Natural Communities	The NCMHCP is a multi-jurisdictional planning effort and establishes a regional effort conducted in conjunction with Section 10a of the 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. The Habitat Management Plan for Natural Communities in the City of Carlsbad (HMP) serves as the city's sub-area plan.	Yes	The LORS consistency analysis in the **Biological Resources** section provides a detailed discussion of the amended CECP's compliance with the NCMHCP/HMP.

NOTEWORTHY PUBLIC BENEFITS

The amended CECP includes the decommissioning, demolition, and removal of the EPS and remediation of the site, which would be beneficial to the residents of Carlsbad and provide an opportunity for future redevelopment of the EPS site west of the railroad tracks. Additionally, lands along the coastline and lagoon would be dedicated to the city and would allow for new beach and recreational opportunities and open space amenities.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Staff has not received any agency or public comments related to Land Use for the CECP.

CONCLUSIONS

Staff concludes the amended CECP:

1. Would be located on 30 acres entirely within the existing 95-acre Encina Power Station, an operating power plant site.

2. Would not convert any farmland (as classified by the Farmland Mapping and Monitoring Program) to non-agricultural use, conflict with existing agricultural zoning or Williamson Act contracts or convert forest land to non-forest use.

3. Would not conflict with existing zoning for agricultural use or a Williamson Act contract.

4. Would not conflict with existing zoning for, or cause rezoning of, forest land, timberland, or timberland zoned Timberland Production.

5. Would not result in the loss of forest land or conversion of forest land to non-forest use.

6. Would not directly or indirectly disrupt or divide an established community.

7. Would not conflict with any applicable land use plan, policy, or regulation, except for the 35-foot height limitation in the Agua Hedionda Land Use Plan.

8. Would not conflict with any applicable habitat conservation plan or natural community conservation plan.

9. Would not result in incremental impacts that, although individually limited, are cumulatively considerable when viewed in connection with other project-related effects or the effects of past projects, other current projects, and probable future projects.

Staff concludes that the amended CECP would not cause significant direct, indirect, or cumulatively adverse land use impacts and would be consistent with the applicable laws, ordinances, regulations, and standards pertaining to land use, with exception to a height provision from the Agua Hedionda Land Use Plan. The Commission Final Decision for the licensed CECP adopted override findings for, among other provisions,

the 35-foot height limitation. Assuming the Energy Commission approves the amendment, staff recommends that the Commission adopt a LORS override finding under the Warren Alquist Act for the height limit provision.

CONDITIONS OF CERTIFICATION

Staff recommends retaining Condition of Certification **LAND-1** from the Final Commission Decision for the licensed CECP, as modified herein so "timing" language only appears in the Verification portion of the condition. Staff also recommends deleting Conditions of Certification **LAND-2** and **LAND-3** because demolition of the existing EPS facility is part of the amended CECP's project description and would be inconsistent with the agreement established between the project owner and the city of Carlsbad. (Note: ~~Strikethrough~~ is used to indicate deleted language).

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 ~~within 180 days from the start of construction~~.

If the project owner and the city of Carlsbad cannot reach agreement on the location of the easement (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 of property within the boundaries of the Encina Power Station that would have been provided for a Coastal Rail Trail easement. The project owner shall select an appraiser for approval by the CPM and pay all costs associated with the appraisal.

Verification: The project owner shall provide proof of easement dedication or appraisal and payment to the city of Carlsbad within 180 days of the start of construction.

~~**LAND-2** On or before January 1, 2016, the project owner shall prepare and submit a Demolition, Removal, and Remediation Plan (DRRP) to the CPM, the city of Carlsbad, and the Carlsbad Redevelopment Agency. The DRRP shall propose the process, schedule, and legal requirements for the demolition, removal, and remediation of the Encina Power Station (Units 1 through 5), associated structures, the black start unit and the exhaust stack. As part of completion of the DRRP, project owner shall consult with the California Energy Commission, the California Coastal Commission, the city of Carlsbad, the Carlsbad Redevelopment Agency, the San Diego Regional Water Quality Control Board, the San Diego Air Pollution Control Board, and the California Independent System Operator to ensure the DRRP best reflects the procedural and substantive requirements that will apply to the site.~~

On or before January 1, 2017, project owner shall prepare and submit to the CPM, the city of Carlsbad, and the Carlsbad Redevelopment Agency, a study of the estimated costs associated with implementing the DRRP.

Project owner shall demonstrate, to the CPM's satisfaction, fiscal capability to implement the DRRP prior to commencement of demolition activities. Such demonstration could be accomplished by submittal of a financial plan, deposit of funds into a dedicated account, or any combination thereof.

Verification: On or before January 1, 2016, project owner shall provide the DRRP to the CPM for review and approval and to the city of Carlsbad, the Carlsbad Redevelopment Agency, and the California Coastal Commission for review and comment. The city of Carlsbad and the Carlsbad Redevelopment Agency shall provide comments on the DRRP to the CPM and project owner within 60 days or a date mutually agreeable to project owner and the city of Carlsbad and the Carlsbad Redevelopment Agency.

On or before January 1, 2016, project owner shall submit to the CPM evidence that the redevelopment process with the Carlsbad Redevelopment Agency for redeveloping the Encina Power Station site has begun or shall submit to the CPM evidence of a later mutually agreed upon date by project owner and the Carlsbad Redevelopment Agency to begin the redevelopment process.

On or before January 1, 2017, project owner shall submit the results of the study on estimated costs of implementing the DRRP to CPM for review and approval and to the city of Carlsbad and the Carlsbad Redevelopment Agency for review and comment. The city of Carlsbad and the Carlsbad Redevelopment Agency shall provide comments on cost estimate to the CPM and project owner within 60 days or a date mutually agreeable to the project owner and the city of Carlsbad and the Carlsbad Redevelopment Agency.

The project owner shall report to the CPM on June 30, 2012 and every June 30 thereafter until notified by the CPM that reports are no longer required, as to the progress made toward satisfaction of this Condition and Condition **LAND-3**. The reports shall include all relevant information, including an assessment of the factors which continue to require that any or all of Units 1 through 5 and the black start unit remain operational.

LAND-3 On or before January 1, 2017, project owner shall submit applications for required permits and approvals for demolition, removal, and remediation of the Encina Power Station Units 1 through 5, associated structures, the black start unit and the exhaust stack.

Upon the commencement of commissioning activities of the project, project owner shall request permission from the California Public Utilities Commission (CPUC) and California Independent System Operator to permanently shutdown Units 1 through 5 and the black start unit. The request shall be resubmitted annually thereafter until permission is granted.

Project owner shall seek partners to complete redevelopment of the Encina Power Station according to the Demolition, Removal, and Remediation Plan (DRRP) approved by the CPM pursuant to **LAND-2**. Upon the permanent

~~retirement of Units 1 through 5 at Encina Power Station, Project Owner shall actively pursue fiscally viable redevelopment of the Encina Power Station. Such pursuit could include selling or transferring the land and facilities to a developing entity or entering into a joint venture with one or more developers. The project owner is not expected to commence demolition and remediation without a viable city approved redevelopment plan. Redevelopment of the site to the west of the rail corridor shall be for a purpose other than the generation of electricity.~~

~~**Verification:** Project Owner shall report to CPM on annual basis the status of the redevelopment efforts at the Encina Power Station. Within 60 days of receiving the report, the CPM shall schedule and hold a public workshop to present the report and solicit public comments and questions.~~

REFERENCES

CEC 2012a – California Energy Commission (TN66185). Commission Decision on the Carlsbad Energy Center Project Application for Certification, dated June 1, 2012. Submitted July 11, 2012.

CEC 2014b – California Energy Commission (TN202392). Notice of Receipt Petition to Amend Final Decision for the Carlsbad Energy Center Project. Submitted 05/29/2014.

CEC 2014c – California Energy Commission (TN202415). Notice of Receipt Petition to Amend 5/31/12 CEC decision for CECP 07-AFC-6C. Submitted 06/02/2014.

CEC 2014c – California Energy Commission (TN203131). Public Workshop General Plan Update Fact Sheet. Submitted 09/24/2014

COC 2014a – City of Carlsbad Land Use Provisions Related to the Amended CECP Table 08/02/2014.

COC 2014b – City of Carlsbad Precise Development Plan and Desalination Plant Final Environmental Impact Report. December 2005.

COC 2014c – City of Carlsbad City Rails to Trails Program, 2001. http://web.carlsbadca.gov/services/departments/parksandrec/trails/Pages/Trails-home.aspx, 10/06/2014.

COC 2014d – City of Carlsbad A Report to the Planning Commission. April 16, 2014. http://carlsbad.granicus.com/GeneratedAgendaViewer.php?view_id=8&clip_id=750, 10/26/2014.

LL2014d – Locke Lord LLP (TN202287-2). Petition to Amend Carlsbad Energy Center Project. Submitted 05/02/2014.

NOISE & VIBRATION

Joseph Hughes, Ed Brady, and Shahab Khoshmashrab

SUMMARY OF CONCLUSIONS

If built and operated in conformance with the following conditions of certification, the modifications sought by the petitioner/project owner (Carlsbad Energy Center, LLC) for the Carlsbad Energy Center Project (amended CECP) would comply with all applicable noise and vibration laws, ordinances, regulations and standards (LORS), and would produce no significant adverse noise impacts on people within the affected area, directly, indirectly, or cumulatively. To ensure that these modifications to the licensed CECP (permitted by the Energy Commission on May 31, 2012) avoid any significant adverse impacts, and comply with applicable LORS, the Energy Commission staff (staff) proposes appropriate updates to the existing conditions of certification.

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 proposed facility to sensitive receptors all combine to determine whether the facility would meet applicable noise control laws and ordinances and whether it would cause significant adverse environmental impacts. In some cases, vibration may be produced as a result of power plant construction practices such as blasting or pile driving. The ground-borne energy of vibration has the potential to cause structural damage and annoyance.

This analysis identifies and examines the noise and vibration impacts from the four phases of amended CECP, and recommends procedures to ensure that the resulting noise and vibration impacts would be adequately mitigated to comply with applicable LORS and to lessen the impacts to less than significant. For an explanation of technical terms used in this section, please refer to **Noise Appendix A** immediately following.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

FEDERAL

Under the Occupational Safety and Health Act of 1970 (OSHA) (California Code of Regulations, tit. 29, § 651 et seq.), the Department of Labor's Occupational Safety and Health Administration (OSHA) adopted regulations (California Code of Regulations, tit. 29, § 1910.95) designed to protect workers against the effects of occupational noise exposure. These regulations list permissible noise exposure levels as a function of the amount of time during which the worker is exposed (see **Noise Appendix A, Table A4**, immediately following this section). The regulations further specify a hearing protection 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 in hearing.

Guidelines are available from the U.S. Environmental Protection Agency (USEPA) to assist state and local government entities in developing state and local LORS for noise. Because there are existing local LORS that apply to this project, the USEPA guidelines are not applicable.

There are no federal laws governing off-site (community) noise.

Noise Table 1
Laws, Ordinances, Regulations and Standards

Applicable LORS	Description
Federal:	
Occupational Safety & Health Act (OSHA): 29 U.S.C. § 651 et seq.	Protects workers from the effects of occupational noise exposure
U.S. Environmental Protection Agency (USEPA) Guidelines	Assists state and local government entities in development of state and local LORS for noise
State:	
California Occupational Safety & Health Act (Cal-OSHA): California Code of Regulations, Title 8, §§ 5095-5099	Protects workers from the effects of occupational noise exposure
Local:	
City of Carlsbad General Plan, Noise Element	Establishes goals, objectives, and procedures to protect the public from noise intrusion. Sets community noise exposure limits at 60 dBA CNEL[1]
City of Carlsbad Municipal Code - Noise Ordinance, Title 8: Chapter 8.48, Section 8.48.010	Specifies construction hour limitations.

The Federal Transit Administration (FTA) has published guidelines for assessing the impacts of ground-borne vibration associated with construction of rail projects, which have been applied by other jurisdictions to other types of projects. The FTA-recommended vibration standards are expressed in terms of the "vibration level," which is calculated from the peak particle velocity measured from ground-borne vibration. The FTA measure of the threshold of perception is 65 vibrational decibels (VdB), which correlates to a peak particle velocity of about 0.002 inches per second (in/sec). The FTA measure of the threshold of architectural damage for conventional sensitive structures is 100 VdB, which correlates to a peak particle velocity of about 0.2 in/sec.

STATE

California Government Code section 65302(f) encourages each local governmental entity to perform noise studies and implement a noise element as part of its general plan. In addition, the California Office of Planning and Research has published

[1] For an explanation of technical terms and acronyms employed in this section, please refer to **Noise Appendix A** immediately following.

guidelines for preparing noise elements, which include recommendations for evaluating the compatibility of various land uses as a function of community noise exposure.

The State of California, Office of Noise Control, prepared the Model Community Noise Control Ordinance, which provides guidance for acceptable noise levels in the absence of local noise standards. This model also defines a simple tone, or "pure tone," as one-third octave band sound pressure levels that can be used to determine whether a noise source contains annoying tonal components. The Model Community Noise Control Ordinance further recommends that, when a pure tone is present, the applicable noise standard should be lowered (made more stringent) by five A-weighted decibels (dBA).

The California Occupational Safety and Health Administration (Cal-OSHA) has promulgated occupational noise exposure regulations (Cal. Code Regs., tit. 8, §§ 5095-5099) that set employee noise exposure limits. These standards are equivalent to federal OSHA standards (see **Noise Appendix A, Table A4**).

LOCAL

The project is located within the city of Carlsbad. The City of Carlsbad General Plan Noise Element (COC 2014a) and the City of Carlsbad Noise Ordinance (COC 2014b) apply to this project.

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 2014a).

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 6:00 p.m. on weekdays and between 8:00 a.m. and 6:00 p.m. on Saturdays, and prohibits such noise on Sundays and any federal holiday. Note that previously the code required construction to end at sunset, but sometime after the approval of the licensed CECP, it was modified to 6:00 p.m.

PROPOSED MODIFIED PROJECT DESCRIPTION

The modifications proposed for the amended CECP include replacing the licensed combined-cycle power generating facility, consisting of two Siemens SCC6-5000F natural gas-fired combustion turbines and two steam turbine generators, with a simple-cycle generating facility, consisting of six GE LMS100 natural gas-fired combustion turbines. The amended CECP would be located at the same, slightly larger northeastern parcel of the 95-acre Encina Power Station (EPS) in an area called the "east tank farm" with a footprint of 30 acres.

[2] For an explanation of technical terms and acronyms employed in this section, please refer to **Noise Appendix A** immediately following.

The amended CECP would involve modification in the following four phases. Phase I includes demolition of above-ground fuel oil storage tanks (ASTs) 1, 2, and 4 (the licensed CECP permitted demolition and removal of ASTs 5, 6, and 7). Following the completion of the first phase, the second phase would begin and would involve the construction, commissioning, and operation of the amended CECP power plant. Following the start of commercial operation of the power plant, Phase III activity would include the shutdown of EPS power generating Units 1-5 and decommissioning. The last phase would consist of the demolition of the existing EPS, which includes power generating Units 1-5, the concrete enclosure building housing the units, the 400-foot-tall exhaust stack, and other above-ground ancillary facilities.

SETTING AND EXISTING CONDITIONS

The land use surrounding the amended CECP site is substantially the same as previously analyzed for the licensed CECP. The project site is bounded by the San Diego Gas & Electric (SDG&E) service center property and Cannon Road to the south, I-5 to the east, Carlsbad Boulevard, the Pacific Ocean, and Carlsbad State Beach to the west, and the Agua Hedionda Lagoon to the north. The north/south AT&SF/North County Transit District Rail Corridor bisects the 95-acre parcel. Land uses surrounding the project site include planned industrial, open space, travel/recreation, commercial, and residential land uses. The amended CECP's existing land uses within the project site boundaries are similar to the licensed CECP (LL2014d, PTA § 5.7.2).

The closest residential area to the licensed and amended CECP is located north of the Agua Hedionda Lagoon, approximately 1,750 feet from the power block site. The closest residential receptor to the proposed demolition of the EPS is located approximately 400 feet from the southwest corner of the EPS power plant building. I-5 is the dominant noise source at the project's closest receptors. The COASTER commuter rail service, Amtrak rail services, and heavy rail traffic are also prominent existing noise sources (LL2014d, PTA § 5.7.2).

Construction and operational noise impacts from the amended CECP are proposed to be the same as the approved project, with the exception of the additional noise impacts generated from Phase IV, demolition of the EPS.

AMBIENT NOISE MONITORING

In order to establish a baseline for comparison of predicted project noise to existing ambient noise for the licensed CECP, the project owner presented the results of an ambient noise survey conducted in 2007 (CH2M2007a, AFC § 5.7.4.1; Tables 5.7-5 through 5.7-12; Figure 5.7-3). Sections 5.7.2 and 5.7.5 of the amended CECP petition explain that there have not been substantial changes to the surrounding environment since licensing of the CECP. Because the existing environment is similar to that previously monitored for the licensed CECP, a new ambient noise survey is not necessary. Thus, in this analysis, staff uses the results of the 2007 survey to evaluate the noise impacts of the amended CECP. Seven locations were monitored during this survey, labeled M1 through M7; see **Noise & Vibration Figure 1**. The nearest noise-sensitive receptors among these monitoring locations included the following:

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 licensed CECP site and near the San Diego Gas & Electric switchyard. Short-term monitoring showed that ambient noise consisted chiefly of traffic on I-5, with some noise from the switchyard and intermittent rail traffic.

2. Measuring Location M4: On a bluff above the ocean, just north of Tiera Del Oro, approximately 2,800 feet southwest of the center of the licensed CECP site and approximately 400 feet southwest of the EPS power plant building. Short-term monitoring showed noise due to surf and traffic on Carlsbad Boulevard, with some aircraft over flights.

3. 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 licensed CECP site. Long-term (25-hour) monitoring showed noise due to traffic on Carlsbad Boulevard and I-5, as well as rail traffic and surf noise.

4. Measuring Location M7: On a bluff at the end of Harbor Drive, overlooking the Agua Hedionda Lagoon and I-5, approximately 1,750 feet north northwest of the center of the licensed CECP site. Short-term noise monitoring showed a noise regime dominated by traffic on I-5.

Noise Table 2 summarizes the ambient noise measurements at these five locations as presented in the Final Staff Assessment (FSA) for the licensed CECP (CEC2009a, FSA § 4.6, Table 2):

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
M4: North of Tierra Del Oro	62	—	—
M5: Above Hubs-SeaWorld	56	55	47
M7: End of Harbor Drive	57	56	52

Source: CEC2009a, FSA § 4.6, Table 2; and staff calculations.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Assessment of impacts and discussion of mitigation below includes methods and thresholds for determining significance based on the California Environmental Quality Act (CEQA) guidelines, determination of compliance with applicable noise and vibration LORS, and discussion of mitigation measures to ensure compliance with CEQA and applicable LORS.

METHODS AND THRESHOLDS FOR DETERMINING SIGNIFICANCE

California Environmental Quality Act

The CEQA requires that significant environmental impacts be identified and either eliminated or mitigated to the extent feasible. Section XI of Appendix G of CEQA's guidelines (Cal. Code of Regs., tit.14, Appendix G) describes some characteristics that could signify a potentially significant impact. Specifically, a significant effect from noise may exist if a project would result in:

1. exposure of persons to, or generation of, noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;

2. exposure of persons to or generation of excessive ground-borne vibration or ground-borne noise levels;

3. substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project; or,

4. substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

Staff, in applying Item 3, above, to the analysis of this and other projects, has concluded that a potential for a significant noise impact exists where the noise of the project plus the background exceeds the background by more than 5 dBA at the nearest sensitive receptor.

Staff has concluded that an increase in background noise levels, up to and including 5 dBA, in a residential setting is insignificant; an increase of more than 10 dBA, however, is significant. An increase of between 5 and 10 dBA should be considered adverse, but could be either significant or insignificant, depending upon the particular circumstances of a particular case.

Factors to be considered in determining the significance of an adverse impact as defined above include:

1. the resulting noise level[3];

2. the duration and frequency of the noise;

3. the number of people affected; and,

4. the land use designation of the affected receptor sites.

Noise due to construction activities is usually considered to be insignificant in terms of CEQA compliance if:

[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, the project noise level would not be significant if the resulting noise level does not exceed 40 dBA.

- the construction activity is temporary; and,
- the use of heavy equipment and noisy activities is limited to daytime hours.

Staff uses the above method and threshold to protect the most sensitive populations, including the area's minority population. For purposes of evaluating impacts on residential uses, the project noise is compared with measured nighttime ambient noise levels, when residents are trying to sleep.

DIRECT IMPACTS AND MITIGATION

Noise impacts associated with the project can be created by short-term demolition and construction activities and normal long-term operation of the project.

Construction and Demolition Impacts and Mitigation

Construction

Construction of the amended CECP would utilize similar construction equipment and consist of similar activities to those identified for the licensed CECP (LL2014d, PTA§ 5.7.3). Phase II, construction of the amended CECP power plant, would take approximately the same amount of time as the licensed CECP power plant (amended CECP would be 24 months; the licensed CECP would be 25 months).

Compliance with LORS

Construction of an industrial facility such as a power plant is typically noisier than permissible under standard noise ordinances. In order to allow the construction of new facilities, the applicable local noise LORS do not limit the loudness of construction noise, and instead limit the hours of day in which construction can occur. To evaluate construction noise impacts, staff compares the projected noise levels to the ambient levels (see CEQA Impacts below). Since construction noise typically varies continually with time, it is most appropriately measured by, and compared to, the L_{eq} (energy average) metric.

The petitioner commits to performing noisy construction work during the times specified in the city of Carlsbad Noise Ordinance, to the hours of 7:00 a.m. to 6:00 p.m. Mondays through Fridays, and 8:00 a.m. to 6:00 p.m. on Saturdays, with no construction allowed on Sundays and federal holidays (LL2014d, PTA § 5.7.6). To ensure that these hours are, in fact, enforced, staff proposes Condition of Certification **NOISE-6**.

CEQA Impacts

Construction activities associated with the amended CECP would occur within the same property boundary as the licensed CECP. However, due to the change in operating technology, there is a slight reconfiguration of project equipment that would extend the site boundary further south than previously approved. Removal of AST 4 would make way for construction and installation of combustion turbine Units 10 and 11, which would be located approximately 200 feet south/southeast of the licensed CECP site boundary within the existing property boundary line. The reconfiguration is not expected to create additional noise impacts beyond what was previously analyzed and approved. Construction noise from the amended CECP is expected to be the same as the licensed

CECP. There are no new pieces of construction equipment or methods of construction that were not proposed previously for the approved project. Therefore, staff uses the predicted power plant construction noise impacts as identified in the FSA for the licensed CECP (CEC2009a, FSA § 4.6, Table 3) to evaluate the amended CECP's construction impacts.

The FSA for the licensed CECP showed that construction noise may be expected to reach levels as high as 55 dBA L_{eq} at the residential property line at M5 and 58 dBA L_{eq} at the residence at M7 (the nearest sensitive noise receptor). Comparing projected noise levels to the ambient noise levels at M5 and M7 shows an increase at M5 of 3 dBA, and an increase at M7 of 4 dBA. As described in the Methods and Thresholds for Determining Significance, an increase in background noise levels up to and including 5 dBA is considered less than significant.

To ensure the project construction would create less than significant adverse impacts at the nearest noise-sensitive receptors, in addition to Condition of Certification **NOISE-6**, staff proposes Conditions of Certification **NOISE-1** and **NOISE-2**, which would establish a public notification and noise complaint process to resolve any complaints regarding construction noise. In light of these conditions of certification, the noise impacts of the amended CECP construction activities would be less than significant.

Demolition

The amended CECP includes Phase I, demolition of ASTs 1, 2, and 4 (above-ground fuel oil storage tanks 1, 2, and 4) (the licensed CECP already permitted demolition of ASTs 5, 6, and 7), and Phase IV, demolition of the EPS, which includes Units 1-5, the concrete enclosure building housing the units (power plant building), the 400-foot-tall exhaust stack, and other above-ground ancillary facilities. Phase I demolition and removal of ASTs 1, 2, and 4 would utilize similar construction equipment and consist of activities similar to those demolition and removal activities approved for the licensed CECP. Phase IV demolition activities for the EPS facilities would occur over an 8-step process lasting 22 months (including a five-month demolition period for removal of the 400-ft EPS exhaust stack, which consists of 12,829 tons of concrete, 233 tons of scrap metal and 45 tons of miscellaneous debris). Following demolition activity, site restoration (grading and contouring) would last two months, completing the 64-month amended CECP schedule.

Compliance with LORS

Demolition is evaluated in the same manner as construction. As described in the construction impacts section above, the applicable local noise LORS do not limit the loudness of demolition/construction noise, and instead limit the hours of day in which demolition/construction can occur. To evaluate demolition noise impacts, staff compares the projected noise levels to the ambient levels (See CEQA Impacts below).

The petitioner commits to performing noisy demolition/construction work during the times specified in the city of Carlsbad Noise Ordinance, to the hours of 7:00 a.m. to 6:00 p.m. Mondays through Fridays, and 8:00 a.m. to 6:00 p.m. on Saturdays, with no construction allowed on Sundays and Federal holidays (LL2014d, PTA § 5.7.4). To

ensure that these hours are, in fact, enforced, staff proposes modifications to Condition of Certification **NOISE-6**.

CEQA Impacts

Although demolition and removal of the EPS would utilize some similar construction equipment and consist of activities similar to those demolition and removal activities approved for the licensed CECP, the Phase IV activities would occur in different locations than previously analyzed, and could have different impacts on nearby residences. For example, Section 5.7.2 of the PTA (LL2014d) explains that the closest residential area to the licensed CECP is located north of the Agua Hedionda Lagoon, approximately 1,750 feet from the facility site (M7). However, the residential receptor M4 is only approximately 400 feet from the southwest corner of the EPS' power plant building.

To evaluate the impacts associated with demolition and removal of the EPS, staff issued data requests 67-72 (CEC2014kk), to which the petitioner responded (LL2014pp).

Noise Table 3 shows the maximum predicted noise impact at the nearest residential receptor, M4, as a result of demolition of the EPS.

Noise Table 3
Predicted Encina Power Station Demolition Noise Impacts

Receptor	Highest Construction Noise Level (dBA L_{eq})	Measured Existing Ambient - Daytime (dBA L_{eq})	Cumulative (dBA L_{eq})	Change (dBA)
M4 — North of Tierra Del Oro	72	62	72	+10

Sources: LL2014d; LL2014pp; and staff calculations.
Notes: Construction and demolition equipment estimated to be 90 dBA at 50 feet (LL2014pp).

The predicted demolition noise may be expected to reach levels as high as 72 dBA L_{eq} at the residence at M4. Comparing the projected noise level to the ambient noise level at M4 shows an increase of 10 dBA (see **Noise Table 3**). As described in the Methods and Thresholds for Determining Significance, an increase of between 5 and 10 dBA should be considered adverse, but could be either significant or insignificant, depending upon the particular circumstances of a particular case. Because noise impacts from demolition of the EPS would be limited to daytime hours and because these impacts would be short-term in nature, staff does not consider them to be significant.

The plan for the demolition of the EPS' 400-foot-tall exhaust stack is to use an engineered mast-climbing platform system that would be installed on the exterior of the stack. Demolition work would begin starting at the top of the stack and move downwards using work crews or robotic units equipped with hammers, crushers, or shears. As the crews break apart the stack, the material would be pushed inside the stack where it is funneled to the base. The platform would be lowered as necessary to remove each section until the remaining stack height is approximately 80 feet. At this point, the mast climbing platform system would be removed and the remaining portion

of the stack would be demolished using high-reach excavators. Staff asked the petitioner to explain how this work would be controlled, if necessary, to reduce its noise impacts. The petitioner explained that the project would take feasible measures to reduce project-related noise (Requests Set 3, number 72, LL2014pp). The project owner and its contractors would develop reasonable and feasible measures to reduce the level of noise associated with demolition and construction activities (LL2014pp). Precise noise mitigation measures would be developed by the construction contractor. Factors to be considered include any additional wind loading and other safety considerations. Blasting mats or similar structures may be used to reduce the impact of falling debris inside the stack (LL2014pp). Staff believes these steps would provide appropriate and effective mitigation measures.

Staff expects the removal of ASTs 1, 2, and 4 to be very similar to the removal of ASTs 5, 6, and 7 which was approved in the licensed CECP, and expects the impacts to be less significant than the removal of the EPS since these tanks are further away from residential receptors than the EPS.

To ensure the project's demolition activities would create less than significant adverse impacts at the most noise-sensitive receptors, in addition to Condition of Certification **NOISE-6**, staff proposes Conditions of Certification **NOISE-1** and **NOISE-2**, which would establish a public notification and noise complaint process to resolve any complaints regarding demolition noise. In light of the following conditions of certification, the noise impacts of the amended CECP construction activities would be less than significant.

Steam Blows

Because the amended CECP would be a simple-cycle generating facility, consisting of only natural gas-fired combustion turbines, there would be no steam turbine, so steam blows would no longer be needed. Staff is proposing to delete Condition of Certification **NOISE-7**, which limits steam blow noise to 89 dBA measured at a distance of 50 feet.

Linear Facilities

Linear facilities include pipelines for natural gas, water and wastewater, and lines interconnecting to the electrical transmission system. Linear facilities would lie within the boundaries of the existing project site, so their construction noise impacts at project receptors would be similar to those of the power plant itself (LL2014d, § 5.7.1). Limiting noisy construction to daytime hours would provide adequate mitigation of impacts. To ensure compliance with this, staff proposes Condition of Certification **NOISE-6**.

Vibration

The petitioner predicted that pile driving would be required as part of the licensed CECP (CH2M2007a, AFC § 5.7.5.2.3). Similar to the licensed CECP, pile driving would be required for the amended CECP.

The FSA for the licensed CECP explained that information from other projects examined by staff shows that noise from unsilenced 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 receptors to

this activity. 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 14 dBA at M5 and 16 dBA at M7; see **Noise Table 4** below.

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	70	56	70	+14
M7	73	57	73	+16

Sources: CEC2009a, FSA § 4.6, Table 4; and staff calculations.

These increases confirm that unsilenced pile drivers can cause a significant noise impact at the nearest noise-sensitive receptors. However, several methods are available for reducing noise generated by pile driving. These methods are: (1) the use of pads or impact cushions of plywood; (2) dampened driving, which involves some form of blanket or enclosure around the hammer; and (3) the use of vibratory drivers. These methods can be effective in reducing the noise by 8-15 dBA compared to unsilenced impact drivers.

Even though no condition of certification for pile driving was proposed by staff for the licensed CECP, staff believes that due to the proximity of pile driving to nearest noise-sensitive receptors, unsilenced pile driving could cause an adverse community reaction. Therefore, staff proposes Condition of Certification **NOISE-8** (Pile Driving Management), below. This condition of certification requires that pile driving be performed in a manner to reduce the potential for project-related noise complaints. **NOISE-8** also requires the project owner to submit to the compliance project manager (CPM) a description of the pile driving technique to be employed, including calculations showing its projected noise impacts at monitoring locations M5 and M7.

The FTA measure of the threshold of architectural damage for conventional sensitive structures is 100 VdB (vibrational decibels), which correlates to a peak particle velocity of about 0.2 in/sec (inches per second). **NOISE-8** would ensure potential vibrations from pile driving are limited to a peak particle velocity of 0.2 in/sec at the nearest sensitive receptors.

Nighttime Concrete Pouring Activities

For the amended CECP, it is inevitable that concrete pours would take place during nighttime (LL2014d, PTA § 5.7.3). Pouring of equipment foundations may require a full 24-hour cycle to complete. Ambient temperatures at night improve the curing and improve the strength and durability of the concrete. When the noise generated by these kinds of activities exceeds the nighttime limit of significance of 5 dBA, mitigation measures must be implemented.

For nighttime conditions at the project site, an exception must be requested by the project owner to the CPM to handle concrete pour that would require continuous 24-hour operation. As shown in **Noise Table 5** below, ambient L_{eq} measurements are used to evaluate the impact of nighttime construction activities, instead of ambient L_{90}

measurements used for steady-state operational noise, because the L_{eq} metric correlates to the variable nature of construction-related noise.

Noise Table 5
Predicted Nighttime Concrete Pour Noise Levels

	Nighttime (L_{eq})			
Receptor	**Nighttime Ambient Noise L_{eq} (dBA)**	**Nighttime Concrete Noise L_{eq} (dBA)**	**Nighttime Cumulative Noise (dBA)**	**Nighttime Change (dBA)**
M5	55	53	57	+2
M7	56	54	58	+2

Source: LL2014pp, Table DR67-1; and staff calculations.
Notes: Noise levels for concrete activities: 85 dBA at 50 feet.

As seen in **Noise Table 5** above, concrete pouring would result in an increase of 2 dBA in the nighttime ambient levels at M5 and M7, which are the closest residential receptors to these activities. Because staff regards an increase of up to 5 dBA as a less-than-significant impact, this nighttime activity would be less than significant. Nevertheless, the sensitivity to nighttime construction activities in the surrounding residential areas should not be undermined. Therefore, the petitioner should be prepared to take mitigation measures quickly. So, the potentially excessive noise levels caused by nighttime concrete pour need to be mitigated by anticipating and controlling noise. To ensure nighttime noise from concrete pour would be effectively managed to reduce the impacts to less than significant, staff proposes Condition of Certification **NOISE-9** (Concrete Pour Noise Control), which would require this noise not to exceed the nighttime ambient levels by more than 5 dBA at M5 and M7.

A host of appropriate mitigation measures are available to accomplish this. Examples include:

- portable partitions that can be placed so that noise receptors are protected;
- encasing the transfer (concrete) pump boom arm to reduce effect of pump pulsing;
- repair of defective mufflers and tightening of rattling components;
- arranging work sites to avoid or minimize concrete truck reversing movements (the use of backup alarms), ensuring vehicles enter and exit work sites in a forward direction when possible, and installation of non-tonal and automatically adjusting reversing alarms;
- reorienting noisy equipment to minimize impact to residential receptors;
- using silenced powered equipment, and silencing unsilenced powered equipment; and
- assuring that vibration is sufficiently isolated, i.e., no more than 0.2 in/sec at nearest noise-sensitive receptors.

NOISE-9 also requires the following:

- written notification of the initiation and duration of nighttime concrete pouring activities to the CPM and all the residents that could potentially be affected by this work; and
- written notification to the CPM when and if nighttime concrete pour activities could potentially exceed a threshold of ambient noise baseline plus 5 dBA.

In light of the requirements contained in Condition of Certification **NOISE-9**, nighttime concrete pours would create a less-than-significant impact.

Worker Effects

The petitioner has acknowledged the need to protect construction workers from noise hazards and has recognized those applicable LORS that would protect construction workers (LL2014d, PTA § 5.7.4). To ensure that construction workers are, in fact, adequately protected, staff proposes modifications to Condition of Certification **NOISE-3**.

Operation Impacts and Mitigation

The Application for Certification (AFC) for the licensed CECP described the power plant components that were included in the noise modeling that was used to predict operational noise impacts. The primary noise sources incorporated into the model included the combustion turbine generators (CTGs), heat recovery steam generators (HRSGs) duct walls, exhausts stacks, steam turbine generators (STGs), steam turbine fin fan coolers, fuel gas compressor enclosure, and step-up transformers (CH2M2007a, AFC § 5.7.5.3.2, Table 5.7-16). Because the amended CECP would be a simple-cycle facility, the STGs, steam turbine fin fan coolers, and HRSG duct walls, would no longer be included, thus eliminating those noise sources from facility operation. However, there would be six smaller CTGs in place of the two larger CTGs, and two of the CTGs would be located approximately 200 feet south/southeast of the previously approved project site boundary, but within the same property boundary line. Staff does not expect the amended CECP's overall operational noise levels to differ substantially from the licensed CECP. Thus, the results of the modeling done for the licensed CECP apply to the amended CECP.

Compliance with LORS

This modeling shows that project operational noise at M1 is predicted not to exceed 52 dBA L_{eq}, and at M7 is predicted not to exceed 51 dBA L_{eq} (CH2M2007a, AFC § 5.7.5.3.2). 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 6**. Project noise at the sensitive receptors is thus predicted to comply with this LORS; no other LORS apply to project operational noise. Staff proposes a minor modification to Condition of Certification **NOISE-4**, below, to ensure compliance.

Noise Table 6
Plant Operating Noise LORS Compliance

Receptor	City of Carlsbad General Plan Noise Element Limit	Projected Noise Level
M1— West Hotel and Restaurant	60 dBA CNEL (equivalent to 53 dBA L_{eq})	52 dBA L_{eq}
M7— Residence at end of Harbor Drive		51 dBA L_{eq}

Sources: COC2014a; CEC2009a, FSA § 4.6, Table 5.

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 nighttime 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.
The licensed CECP noise levels at both M5 and M7 are predicted to reach 51 dBA L_{eq}. **Noise Table 7**, below, compares the projected power plant noise to the existing nighttime ambient background (L_{90}) noise levels.

Noise Table 7
Power Plant Operational Noise Impacts at Sensitive Receptors

Receptor	Power Plant Noise Level, dBA L_{eq}	Nighttime Ambient Background Level, dBA L_{90}	Cumulative Noise Level, dBA	Change from Ambient Background Level
M5	51	47	52	+5
M7	51	52	54	+2

Source: CEC2009a and staff calculations

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 7**). This increase is less than significant. When projected plant noise at M7 is added to the nighttime ambient value, the cumulative level is 2 dBA above the ambient value; also less than significant. To ensure that operational noise levels would be controlled appropriately, staff proposes a minor modification to Condition of Certification **NOISE-4**.

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 petitioner plans to avoid the creation of annoying tonal (pure-tone) noises by balancing the noise emissions of various power plant features

during plant design (LL2014d, PTA § 5.7.7). To ensure that tonal noises do not cause annoyance, staff proposes a minor modification to 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 (LL2014d, § 5.7.1).

Vibration

Vibration from an operating power plant could be transmitted by two chief means; through the ground (ground-borne vibration) and through the air (airborne vibration).

The operating components of the amended CECP, a simple-cycle power plant, consist of high-speed gas 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, staff believes that ground-borne vibration from the amended 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 amended CECP are typically imperceptible at any significant distance from the plant. The amended CECP's chief source of airborne vibration would be the gas turbines' exhaust. In a power plant such as the amended CECP, however, the exhaust must pass through the selective catalytic reduction (SCR) modules and the stack silencers before it reaches the atmosphere. The SCRs act as efficient mufflers. The combination of SCR units and stack silencers ensure that the amended CECP would not cause perceptible airborne vibration effects.

Worker Effects

The petitioner has acknowledged the need to protect plant operating and maintenance workers from noise hazards and has committed to comply with applicable LORS (LL2014d, PTA § 5.7.7). Condition of Certification **NOISE-5** continues to ensure that plant operation and maintenance workers are, in fact, adequately protected.

Facility Closure

All operational noise from the project would cease when the amended CECP closes, and no further adverse noise impact from its operation would be possible. The remaining potential temporary noise source would be the dismantling of the project structures and equipment, as well as any site restoration work that may be performed. Since this noise would be similar to that caused by the original demolition and construction, it could be similarly treated -- that is, noisy work could be performed during daytime hours with machinery and equipment that are properly insulated and/or equipped with mufflers. Any noise LORS in existence at that time would apply.

Applicable conditions of certification included in the Energy Commission decision would also apply to facility closure, unless modified by a Petition to Amend.

CUMULATIVE IMPACTS

Section 15130 of the CEQA guidelines (Cal. Code of Regs., tit. 14) requires a discussion of cumulative environmental impacts. Cumulative impacts are two or more individual impacts (from existing and/or reasonably foreseeable projects) that, when considered together, compound or increase other environmental impacts. CEQA guidelines require that this discussion reflect the severity of the impacts and the likelihood of their occurrence, but do not need to provide as much detail as the discussion of impacts solely attributable to the project.

As part of the licensed CECP, the petitioner identified several projects in the vicinity of the proposed site for consideration in the cumulative impact assessment (CH2M2007a, AFC § 5.7.5.3.6). As part of preparation of the petition, the relevant planning agencies were contacted and identified many of the same projects which were previously assessed for the licensed CECP (LL2014d, PTA § 5.7.5). The only project identified to most likely pose a potential for cumulative noise impacts was the Carlsbad Seawater Desalination Project, to be located at the existing EPS site, along the southern edge of the Aqua Hedionda Lagoon. The Desalination Plant, at a predicted operational noise level of 35 dBA CNEL (28 dBA L_{eq}), would not contribute significantly to ambient noise levels. Staff concludes that the amended CECP, when combined with this project, would not create a significant cumulative noise impact.

Noise generated from operation of the amended CECP is expected to be similar to the licensed CECP. Condition of Certification **NOISE-4** limits the amended CECP operational noise impacts to the same levels that were previously analyzed and approved from the licensed CECP, and would therefore have similar cumulative impacts as those approved for the licensed CECP.

The remaining projects would likely only have the potential for cumulative impacts during demolition or construction, which is generally short-term in nature. With the implementation of Conditions of Certification **NOISE-1**, **NOISE-2**, **NOISE-6**, **NOISE-8**, and **NOISE-9**, the amended CECP's demolition and construction-related impacts are not expected to result in any significant cumulative noise impacts beyond those addressed and approved for the licensed CECP.

COMPLIANCE WITH LORS

The proposed amended CECP would comply with all LORS and would not cause significant noise impacts. Condition of Certification **NOISE-4** would ensure compliance with the City of Carlsbad General Plan Noise Element and CEQA requirements, and **NOISE-6** would ensure compliance with the City of Carlsbad Municipal Code Noise Ordinance. **NOISE-3** and **NOISE-5** reduce employee exposure to high noise levels during construction and operation, and ensures compliance with applicable OSHA and Cal/OSHA standards.

CONCLUSIONS

If built and operated in conformance with the following conditions of certification, the amended CECP would comply with all applicable noise and vibration LORS and would produce no significant adverse noise impacts on people within the affected area, directly, indirectly, or cumulatively.

To ensure that the modifications to the licensed CECP avoid any significant adverse impacts and would comply with applicable LORS, and to ensure pile driving and nighttime concrete pours would be performed in a manner to reduce the potential for any noise or vibration complaints, staff proposes modifications to the existing conditions of certification. Staff has also updated Condition of Certification **NOISE-3** to identify the applicable regulations. Also note that the allowed construction time in Condition of Certification **NOISE-6** has been updated to reflect the recent change in the local code.

CONDITIONS OF CERTIFICATION

The added text is identified as **bold and underlined**, and the deleted text is identified as ~~strikethrough~~.

NOISE-1 At least 15 days prior to the start of **any demolition activities associated with the amended CECP** ~~ground disturbance~~, the project owner shall notify all residents within one mile of the site to the north and northeast and one-half mile in all other directions, by mail or other effective means, of the commencement of project **demolition and** 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 **demolition,** construction**,** and operation of the **amended CECP** ~~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 amended CECP has been operational for at least one year**, and all subsequent demolition activities at the Encina Power Station have been completed**.

Verification: Prior to **the start of any demolition activities** ~~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 **demolition of above-ground fuel oil storage tanks 1, 2, and 4 (ASTs 1, 2, and 4),** construction and operation of the **amended** CECP, **and demolition of the Encina Power Station,** 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 **(within 12 hours if the complaint is related to nighttime concrete pour)**;
- 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 that states that the noise problem has been resolved to the complainant's satisfaction.

Verification: Within five days of receiving a noise complaint, the project owner shall file a 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 **(within 24 hours for noise complaints related to nighttime concrete pour)**, 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 **all** construction **and demolition activities associated with** ~~of~~ the **amended CECP** ~~project~~. The noise control program shall be used to reduce employee exposure to high noise levels during **demolition and** construction **in accordance with Title 8, California Code of Regulations, sections 5095-5099, and Title 29, Code of Federal Regulations, section 1910.95** ~~and shall also comply with applicable OSHA and Cal/OSHA standards~~.

Verification: At least 30 days prior to the start of **any demolition activities** ~~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 **OSHA and** 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 53 dBA L_{eq} measured at monitoring locations M1 and M7. No new pure-tone components shall be caused by the project. No single piece of equipment

shall be allowed to stand out as a source of noise that draws ~~legitimate~~ **project-related noise** 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 locations M1 and M7 or at closer locations acceptable to the CPM. These surveys 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 M1 or 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 first achieving a sustained output of 80 percent or greater of rated capacity **with all turbine generators operating**. Within 15 days after completing the survey, the project owner shall submit a summary report of the survey to the CPM. Included in the survey report shall be a description of any additional mitigation measures necessary to achieve compliance with the above-listed noise limit and a schedule, subject to CPM approval, for implementing these measures. When these measures are in place, the project owner shall repeat the noise survey(s).

Within 15 days of completion of the new survey(s), the project owner shall submit to the CPM a summary report of the new noise survey(s), performed as described above and showing compliance with this condition.

NOISE-5 Following the project first achieving a sustained output of 80 percent or greater of rated capacity, the project owner shall conduct an occupational noise survey to identify the noise 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 **and demolition** work relating to any project features shall be restricted to the times of day delineated below:

Weekdays	7:00 a.m. to **6:00 p.m.** sunset
Saturdays	8:00 a.m. to **6:00 p.m.** 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 caused by the construction **or demolition activities associated with** of the **amended** CECP project, as opposed to another source, as verified by the CPM. A legitimate **project-related noise** complaint constitutes either: a violation by the project of any noise condition of certification, which is documented by an individual or entity affected by such noise **or vibration**; or a minimum of three complaints over a 24-hour period that are **is** 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 **the start of the demolition of ASTs 1, 2, and 4** ground disturbance, the project owner shall transmit to the CPM a statement acknowledging that the above restrictions will be observed throughout **the demolition of ASTs 1, 2, and 4,** the construction of the project **amended CECP power plant, and the subsequent demolition of the Encina Power Station**.

~~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.~~

PILE DRIVING MANAGEMENT

NOISE-8 The project owner shall perform pile driving in a manner to reduce the potential for any project-related noise or vibration complaints. The project owner shall notify the residents in the vicinity of pile driving prior to start of this activity. Vibrations from pile driving shall be limited to a peak particle velocity of 0.2 inches per second at receptors M5 and M7.

Verification: At least 15 days prior to first pile driving, the project owner shall submit to the CPM a description of the pile driving technique to be employed, including calculations showing its projected noise impacts at monitoring locations M5 and M7.

At least ten days prior to first production pile driving, the project owner shall notify the residents within one-half mile of the pile driving. The notification may be in the form of letters, or other effective means, as approved by the CPM. In this notification, the project owner shall state that it will perform this activity in a manner to reduce the potential for any project-related noise and vibration complaints. The project owner shall submit a copy of this notification to the CPM prior to the start of pile driving.

CONCRETE POUR NOISE CONTROL

NOISE-9 When concrete work requires continuous pouring that may extend beyond the times specified in Condition of Certification NOISE-6, the project owner shall notify all residences in the vicinity of the project site of the commencement date and the duration of concrete pouring activities.

The average L_{eq} noise levels from these activities shall not exceed the hourly average nighttime ambient L_{eq} levels at M5 and M7, by more than 5 dBA.

Verification: At least ten days prior to concrete pouring activities that are anticipated to extend beyond the times specified in Condition of Certification NOISE-6, the project owner shall submit a statement to the CPM, specifying the time of night and the number of nights for which activities will occur, the approximate distance of activities to receptor locations M5 and M7, and the expected sound levels at these receptors, stating that the expected sound levels from this activity do not exceed the nighttime noise limits specified above.

At the same time, the project owner shall notify the residents within one-half mile of this work. The notification may be in the form of letters, or other effective means as approved by the CPM. In this notification, the project owner shall state that it will perform this activity in a manner to ensure excessive noise is prohibited, and include a telephone number that will be staffed throughout this activity for use by the public to report any undesirable noise conditions associated with these activities. The project owner shall submit a copy of this notification to the CPM prior to the start of this work.

REFERENCES

CEC2009a – California Energy Commission (TN54068). Carlsbad Energy Center Project, Final Staff Assessment, dated November 12, 2009. Submitted 11/12/2009.

CEC2014kk – California Energy Commission (TN203149). Data Request Set 3 (Nos. 67-85), dated October 2, 2014. Submitted 10/02/2014.

CH2M2007a – CH2MHILL/Robert Mason (TN42299). Application for Certification for the Carlsbad Energy Center Project, dated September 11, 2007. Submitted 09/11/2007.

COC 2014a - City of Carlsbad General Plan Noise Element. Accessed November, 2014.

COC 2014b - City of Carlsbad Municipal Code. Accessed November, 2014.

LL2014b – Locke Lord LLP (TN202267). Petition to Remove Obsolete Facilities to Support Construction of the Carlsbad Energy Project. Submitted 04/29/2014.

LL2014d – Locke Lord LLP (TN202287-2). Petition to Amend Carlsbad Energy Center Project. Submitted 05/02/2014.

LL2014pp – Locke Lord LLP (TN203300). Project Owner Responses to Data Request Set 3 (Nos. 67-84), dated October 31, 2014. Submitted 10/31/2014.

EXHIBIT 1 - NOISE COMPLAINT RESOLUTION FORM

Amended Carlsbad Energy Center Project
(07-AFC-6C)

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).

NOISE APPENDIX A
FUNDAMENTAL CONCEPTS OF COMMUNITY NOISE

To describe noise environments and to assess impacts on noise sensitive areas, a frequency weighting measure, which simulates human perception, is customarily used. It has been found that A-weighting of sound intensities best reflects the human ear's reduced sensitivity to low frequencies and correlates well with human perceptions of the annoying aspects of noise. The A-weighted decibel scale (dBA) is cited in most noise criteria. Decibels are logarithmic units that conveniently compare the wide range of sound intensities to which the human ear is sensitive. **Noise Table A1** provides a description of technical terms related to noise.

Noise environments and consequences of human activities are usually well represented by an equivalent A-weighted sound level over a given time period (L_{eq}), or by average day and night A-weighted sound levels with a nighttime weighting of 10 dBA (L_{dn}). Noise levels are generally considered low when ambient levels are below 45 dBA, moderate in the 45 to 60 dBA range, and high above 60 dBA. Outdoor day-night sound levels vary over 50 dBA depending on the specific type of land use. Typical L_{dn} values might be 35 dBA for a wilderness area, 50 dBA for a small town or wooded residential area, 65 to 75 dBA for a major metropolis downtown (e.g., San Francisco), and 80 to 85 dBA near a freeway or airport. Although people often accept the higher levels associated with very noisy urban residential and residential-commercial zones, they nevertheless are considered to be levels of noise adverse to public health.

Various environments can be characterized by noise levels that are generally considered acceptable or unacceptable. Lower levels are expected in rural or suburban areas than what would be expected for commercial or industrial zones. Nighttime ambient levels in urban environments are about seven decibels lower than the corresponding average daytime levels. The day-to-night difference in rural areas away from roads and other human activity can be considerably less. Areas with full-time human occupation that are subject to nighttime noise, which does not decrease relative to daytime levels, are often considered objectionable. Noise levels above 45 dBA at night can result in the onset of sleep interference effects. At 70 dBA, sleep interference effects become considerable (Effects of Noise on People, U.S. Environmental Protection Agency, December 31, 1971).

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

Noise Table A1
Definition of Some Technical Terms Related to Noise

Terms	Definitions
Decibel, dB	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals (20 micronewtons per square meter).
Frequency, Hz	The number of complete pressure fluctuations per second above and below atmospheric pressure.
A-Weighted Sound Level, dBA	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. All sound levels in this testimony are A-weighted.
L_{10}, L_{50}, & L_{90}	The A-weighted noise levels that are exceeded 10%, 50%, and 90% of the time, respectively, during the measurement period. L_{90} is generally taken as the background noise level.
Equivalent Noise Level, L_{eq}	The energy average A-weighted noise level during the noise level measurement period.
Community Noise Equivalent Level, CNEL	The average A-weighted noise level during a 24-hour day, obtained after addition of 4.8 decibels to levels in the evening from 7 p.m. to 10 p.m., and after addition of 10 decibels to sound levels in the night between 10 p.m. and 7 a.m.
Day-Night Level, L_{dn} or DNL	The Average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10 p.m. and 7 a.m.
Ambient Noise Level	The composite of noise from all sources, near and far. The normal or existing level of environmental noise at a given location.
Intrusive Noise	That noise that intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.
Pure Tone	A pure tone is defined by the Model Community Noise Control Ordinance as existing if the one-third octave band sound pressure level in the band with the tone exceeds the arithmetic average of the two contiguous bands by 5 decibels (dB) for center frequencies of 500 Hz and above, or by 8 dB for center frequencies between 160 Hz and 400 Hz, or by 15 dB for center frequencies less than or equal to 125 Hz.

Source: Guidelines for the Preparation and Content of Noise Elements of the General Plan, Model Community Noise Control Ordinance, California Department of Health Services 1976, 1977.

Noise Table A2
Typical Environmental and Industry Sound Levels

Noise Source (at distance)	A-Weighted Sound Level in Decibels (dBA)	Noise Environment	Subjective Impression
Civil Defense Siren (100')	140-130		Pain Threshold
Jet Takeoff (200')	120		Very Loud
Very Loud Music	110	Rock Music Concert	
Pile Driver (50')	100		
Ambulance Siren (100')	90	Boiler Room	
Freight Cars (50')	85		
Pneumatic Drill (50')	80	Printing Press Kitchen with Garbage Disposal Running	Loud
Freeway (100')	70		Moderately Loud
Vacuum Cleaner (100')	60	Data Processing Center Department Store/Office	
Light Traffic (100')	50	Private Business Office	
Large Transformer (200')	40		Quiet
Soft Whisper (5')	30	Quiet Bedroom	
	20	Recording Studio	
	10		Threshold of Hearing

Source: Handbook of Noise Measurement, Arnold P.G. Peterson, 1980

Subjective Response to Noise

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

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

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

One way to determine a person's subjective reaction to a new noise is to compare the level of the existing (background) noise, to which one has become accustomed, with the level of the new noise. In general, the more the level or the tonal variations of a new noise exceed the previously existing ambient noise level or tonal quality, the less acceptable the new noise will be, as judged by the exposed individual.

With regard to increases in A-weighted noise levels, knowledge of the following relationships can be helpful in understanding the significance of human exposure to noise.

1. Except under special conditions, a change in sound level of one dB cannot be perceived.

2. Outside of the laboratory, a three dB change is considered a barely noticeable difference.

3. A change in level of at least five dB is required before any noticeable change in community response would be expected.

4. A ten dB change is subjectively heard as an approximate doubling in loudness and almost always causes an adverse community response. (Kryter, Karl D., The Effects of Noise on Man, 1970).

Combination of Sound Levels

People perceive both the level and frequency of sound in a non-linear way. A doubling of sound energy (for instance, from two identical automobiles passing simultaneously) creates a three dB increase (i.e., the resultant sound level is the sound level from a single passing automobile plus 3 dB). The rules for decibel addition used in community noise prediction are:

Noise Table A3
Addition of Decibel Values

When two decibel values differ by:	Add the following amount to the larger value
0 to 1 dB 2 to 3 dB 4 to 9 dB 10 dB or more	3 dB 2 dB 1 dB 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 ten times reduces the sound pressure level by 20 dB.

Worker Protection

OSHA noise regulations are designed to protect workers against the effects of noise exposure, and list permissible noise level exposure as a function of the amount of time to which the worker is exposed:

Noise Table A4
OSHA Worker Noise Exposure Standards

Duration of Noise (Hrs/day)	A-Weighted Noise Level (dBA)
8.0	90
6.0	92
4.0	95
3.0	97
2.0	100
1.5	102
1.0	105
0.5	110
0.25	115

Source: 29 CFR § 1910.95.

NOISE AND VIBRATION - FIGURE 1

Carlsbad Energy Center Project Amendment - Noise Monitoring Locations

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: 07-AFC-06 - Figure 5.7-3

PUBLIC HEALTH

Alvin Greenberg, Ph.D.

SUMMARY

Staff concludes that the amended Carlsbad Energy Center Project (amended CECP), would incorporate sufficient measures to ensure that the risks to public health are less than significant and that it would comply with applicable laws, ordinances, regulations, and standards. The amended CECP includes tank demolition, construction and operation of the amended CECP and the closure/decommissioning and demolition of the Encina Power Station (EPS).

NTRODUCTION

As discussed in detail in the **PROJECT DESCRIPTION** of this PSA, the amended CECP would be different than the licensed CECP approved by the Energy Commission on May 31, 2012. For that reason, an evaluation of impacts, including the potential for changes or additions to the licensed CECP Conditions of Certification (COCs) for the project is required. The amended CECP proposes implementing the following general changes and modifications to the licensed CECP:

1. Add the demolition of three additional above-ground fuel oil storage tanks (AST's 1, 2 and 4), and associated piping and equipment, removal of oily sands from under ASTs 1, 2, and 4, and removal of an earthen berm between ASTs 4 and 5.

2. Change in generation equipment and technology from Siemens fast response, combined-cycle to six natural gas-fired GE LMS 100 simple-cycle turbines with approximately 632 MW net output of electrical generating capacity.

3. Add retirement and demolition of Encina Power Station (EPS). Units 1 through 5 of EPS would be retired and all above-grade elements of the EPS power and support buildings would be demolished and removed.

The amended CECP would continue to be situated adjacent to the EPS, in the north eastern portion of the 95-acre parcel, between the existing North County Transit District (NCTD) railroad tracks and Interstate-5, but the Amended CECP would have a larger footprint, occupying most of that area (30 acres). Construction equipment/material laydown and construction worker parking areas for the project would remain immediately north of the existing EPS facility and in various areas west of the existing railroad tracks. No offsite parking or laydown areas are anticipated to be necessary for the construction of the amended CECP.

The amended CECP would continue to interconnect to the electrical transmission system via 138-kilovolt (kV) and 230-kV lines that connect to the respective San Diego Gas and Electric Company (SDG&E) switchyards situated on the EPS site. Natural gas would be delivered to the amended CECP from the existing SDG&E transmission pipeline (Line TL 2009, "Rainbow line") via an approximate 1,100-foot-long interconnection pipeline that runs parallel to the existing NCTD railroad tracks. Similar to the licensed CECP, with the exception of short, onsite interconnections, no offsite gas

supply lines would be required for the amended CECP. The amended CECP would use reclaimed water and/or potable water from the Carlsbad Municipal Water District, and would connect to an existing City of Carlsbad (Encina Wastewater Authority) sanitary sewer line.

Upon completion of construction of the amended CECP and achievement of commercial operations, the EPS would be decommissioned, and the above-grade elements of the main EPS power building and all support and ancillary buildings would be demolished. Upon completion of demolition of EPS, approximately 40 acres west of the railroad tracks would transition from Energy Commission regulatory jurisdiction to that of the city, and be made available for future redevelopment. Some portions west of the railroad tracks would remain dedicated to the amended CECP, such as for transportation access, electrical interconnection, and water or gas supply.

LAWS, ORDINANCES, REGULATION, AND STANDARDS

Public Health Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable LOR	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

The amended CECP would be located on the northeastern section of the Encina Power Station (EPS) site, located immediately south of the Agua Hedionda Lagoon, within the city of Carlsbad, in northern San Diego County. The EPS and the amended CECP (as well as the Carlsbad Poseidon Seawater Desalination Project) are located at 4600 Carlsbad Boulevard, along the southern edge of the Agua Hedionda Lagoon on the Pacific Ocean. The EPS comprises approximately 95 acres, and is generally bounded by SDG&E property on the south, the Pacific Ocean and Carlsbad Boulevard on the west, Interstate 5 on the east, and the southern shore of the outer and middle basins of the Agua Hedionda Lagoon on the north (see **Project Description Figure 1**).

The amended CECP would involve several phases, including:

Phase I: Tank Demolition and Remediation:
This would consist of demolition of above-ground fuel oil storage tanks (ASTs) 1, 2 and 4. Also slated for demolition are AST's 5, 6 and 7 (previously permitted for demolition as part of the licensed CECP Final Decision), which would occur just prior to Phase I demolition activities.

Phase II: Construction / Commissioning / Operation of amended CECP:
This would involve the construction, commissioning and operation of the amended CECP power plant.

Phase III: Retirement and Decommissioning of EPS units:
This would involve the permanent shut-down and decommissioning of the EPS. Several activities would occur prior to the commencement of demolishing EPS structures, including the removal from EPS of materials and equipment to be reused, sold or recycled as well as the removal of all Hazardous Building Materials (HBM; materials containing asbestos, lead, mercury, PCBs, or chlorofluorocarbons) which must occur prior to demolition activities.

Phase IV: EPS Demolition:
The final phase of the amend CECP includes demolition and removal of all EPS structures and building to ground level, including operating Units 1-5, the 400-ft. tall stack, and the 600-ft. long concrete enclosure building.

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.

Section 5.7.2 of the petition explains that the closest residential area to the licensed CECP is located north of the Agua Hedionda Lagoon, approximately 1,750 feet from the facility site. However, demolition of the EPS would occur approximately 400 feet from the nearest residential receptor (400 feet from the southwest corner of the power plant building and 800 feet from the 400-foot-tall stack). This receptor is identified as receptor M4 in Figure 5.7-3 of the original Application for Certification (AFC) for the CECP (07-AFC-06).

Sensitive receptors in the project vicinity 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.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Staff assessed the amendment proposals regarding potential impacts to public health. The review process includes an evaluation of the consistency of the proposed changes and modifications with that of the Energy Commission's existing Final Decision, and to determine whether the project, as amended, would remain in compliance with applicable laws, ordinances, regulations, and standards (20 Cal. Code of Regs., § 1769).

Staff reviewed and assessed the potential for tank demolition, construction of the amended CECP, operations of the amended CECP, and the demolition and removal of the EPS to impact public health in the surrounding community. Staff's analysis addresses the potential impacts of Toxic Air Contaminants (TACs) 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 emitted TACs.

Staff has reviewed the proposed changes and the reasoning behind the petitions to remove and amend and has made the following conclusions:

Phase I Tank Demolition

Staff determined that the petitioner does not propose to add any new equipment to the project during tank demolition and project construction. The petitioner indicates that no additional impacts are anticipated above those evaluated in the original AFC despite the fact that the additional demolition of ASTs 1, 2 and 4 would add another six months to the 25-month construction period because the demolition is not scheduled to overlap the previously approved project construction phase.

Staff also determined that the **AIR QUALITY** section (LL 2014b, Section 3.1) further indicates that the number of equipment and vehicles necessary for removal of ASTs 1, 2 and 4 would be fewer than the number used in the worst-case construction phase scenario evaluated in the approved project. The petition concludes that: "project modification is not expected to affect the peak emission levels or air quality impacts previously analyzed for the demolition/construction phase of the CECP." Peak 12-month emission levels are projected to occur during the power plant construction phase, not the demolition phase. The Public Health section (LL 2014b Section 3.2) concludes that the activities are not expected to result in an increase over the peak toxic air contaminant emission levels previously analyzed in the approved licensed CECP project. A health risk assessment was not conducted to substantiate this projection.

Staff notes that the demolition phase as proposed would add an additional six months to a 25-month construction phase. The demolition phase proposed would involve emissions from additional equipment and vehicles and emissions from additional excavation,

grading and earth moving. These emissions would include criteria air pollutants as well as diesel exhausts which contain the toxic air contaminant Diesel Particulate Matter (DPM).

The Final Staff Assessment prepared by Energy Commission staff in November 2009 (CEC 2009) reported the applicant modeled worst-case construction emissions for the licensed CECP project, adjusted to a 25-month construction period. The maximum calculated cancer risk due to construction emissions of DPM was calculated to be 9.1 in a million, which is below the level of significance of ten excess cancers in one million exposed people. Extrapolation of this value to a 31-month construction period that includes both approved activities and the proposed activities would result in a value of 11.3 in a million, slightly above the level of significance.

Staff concludes that despite the lack of a quantitative health risk assessment to substantiate the petitioner's projection that petition activities are not expected to result in an increase over the peak toxic air contaminant emission levels previously analyzed in the approved licensed CECP project", the following facts support that statement:

(1) the number of equipment and vehicles necessary for removal of ASTs 1, 2 and 4 would be fewer than the number used in the worst-case construction phase scenario evaluated in the approved project; and

(2) the peak 12-month emission levels are projected to occur during the power plant construction phase, not the demolition phase.

Therefore, staff concludes that there would be no significant impact on public health due to the requested activities.

Phase II Operations of the amended CECP

Staff has determined that the proposed change in generation equipment and technology from the licensed CECP (Siemens fast response combined-cycle) to the amended CECP (six natural gas-fired GE LMS 100 simple-cycle turbines) would result in a lower health risk to the off-site public. Staff makes this determination based upon the results of two Human Health Risk Assessments conducted by staff: one using the current Cal-EPA Office of Environmental Health Hazard Assessment (OEHHA) approved methodology (OEHHA 2012); and another using a newly proposed OEHHA methodology (OEHHA 2014b; 2014c). Staff used the August 2012 approved methodology and the most recent toxicity values (OEHHA 2014a; EPA 2014) to determine compliance but offers the results of the newly proposed methodology for informational and comparison purposes.

Modeling Procedure

Emitting units for the proposed amended CECP would include six natural gas-fired combustion turbines, a diesel emergency generator and a diesel firewater pump, for a total of eight emitting sources staff evaluated.

Staff's quantitative analysis of facility operations is based on air dispersion modeling results for the proposed amended facility contained in April 2014 modeling files provided by the petitioner. The petitioner used AERMOD (American Meteorological Society/Environmental Protection Agency Regulatory Model) to conduct air dispersion modeling and used the HARP (Hotspots Analysis and Reporting Program) On-Ramp

program to load AERMOD results into the ARB/OEHHA HARP, Version 1.4f for the risk analysis. The most recent update to the HARP program available on the ARB website is dated May 4, 2012. Meteorological data for Camp Pendleton were used in AERMOD. Exposure point concentrations used in staff's analysis were generated using data available in the modeling files provided by the petitioner.

The most current exposure methodology developed by Cal-EPA OEHHA and approved for human health risks assessment was used in this assessment (OEHHA 2012). Exposure pathways assessed include inhalation, dermal absorption, soil ingestion, homegrown produce, local angler-caught fish and mother's milk.

Four operational scenarios were evaluated in this analysis for potential health risks:

- New equipment normal operation (gas turbines and emergency generators). The hourly and annual emission factors used in staff's analysis are listed in **Public Health Table 2**
- Gas turbine startups/shutdowns
- Gas turbine commissioning period (includes impacts for existing Encina units)
- Gas turbine long-term commissioning (over a period of months) case

Four receptor types were evaluated in this analysis and risk results for the highest of five years of modeling are presented, as follows:

- Point of maximum impact (PMI) – appears to be located on the property
- Maximally exposed individual resident (MEIR) – located about 0.6 miles (0.9 km) east of the project location
- Maximally exposed individual worker (MEIW) – located at the PMI
- Receptor at a nearby school (conservatively modeled as a residential receptor which would be more health-protective because the hours a child spends at home are greater than the hours spent at school) – located at Kelly Elementary School, approximately 1.5 miles (2.4 km) from the project location

Public Health Table 2
Emission Rates for Combustion Turbines and Emergency Generators Used in this Analysis for Normal Operations for Cancer Risk and Hazard Analyses

Chemical Name	Emission Factor lb/hr	Emission Factor lb/yr
1,3-Butadiene	1.27E-03	4.93E+00
Acenaphthene	5.50E-05	2.14E-01
Acenapthyene	4.25E-05	1.65E-01
Acetaldehyde	1.18E-01	4.58E+02
Acrolein	1.90E-02	7.38E+01
Ammonia	4.06E+01	1.09E+05
Anthracene	9.78E-05	3.80E-01
Benzene	3.53E-02	1.37E+02
Benzo(a)anthrace	6.54E-05	2.54E-01
Benzo(a)pyrene	4.03E-05	1.56E-01
Benzo(b)fluorant	3.27E-05	1.27E-01
Benzo(e)pyrene	1.58E-06	6.12E-03
Benzo(g,h,i)pery	3.97E-05	1.54E-01
Benzo(k)fluorant	3.19E-05	1.24E-01
Chrysene	7.32E-05	2.84E-01
Dibenz(a,h)anthr	6.78E-05	2.63E-01
Diesel PM		1.31E+01
Ethylbenzene	9.42E-02	3.67E+02
Fluoranthene	1.25E-04	4.85E-01
Fluorene	1.68E-04	6.54E-01
Formaldehyde	2.66E+00	1.03E+04
Hexane, n-	7.50E-01	2.91E+03
Indeno(1,2,3-cd)	6.78E-05	2.63E-01
Naphthalene	3.85E-03	1.49E+01
Phenanthrene	9.12E-04	3.53E+00
Propylene	2.23E+00	8.64E+03
Propylene oxide	8.58E-02	3.32E+02
Pyrene	8.04E-05	3.11E-01
Toluene	3.85E-01	1.49E+03
Xylene	1.89E-01	7.32E+02

Results of Operations Scenarios

Results of staff's analysis for all four scenarios are summarized in **Public Health Table 3** and are compared to the results presented in the petitioner's analysis. Substance-specific risks for Normal Operations are presented in **Public Health Table 4** for the Point of Maximum Impact and in **Public Health Table 5** for the maximum impacted residence.

Public Health Table 3
Results of Staff's and Petitioner's Analysis for Cancer Risk, Chronic Hazard and Acute Hazard

Amended CECP	Staff's Analysis			Petitioner's Analysis[1]		
	Cancer Risk (per million)	Chronic HI	Acute HI	Cancer Risk (per million)	Chronic HI	Acute HI
New Equipment Normal Operation (gas turbines/emergency engines)						
PMI (Rec 7772 for chronic, Rec 14092 for acute)	6.4	0.0054	0.027	2.9	0.0015	0.027
MEIR (Rec 7277 for chronic, Rec 2012 for acute)	0.27	0.0020	0.017	0.078	0.00047	0.016
MEIW (Rec 7772 for chronic, Rec 14092 for acute)	0.44	-	0.027	0.45	-	0.027
School (Rec 3831)[2]	0.10	0.0022	0.014	-	-	-
Gas Turbine Startups/Shutdowns (acute impact only)						
MEI (Rec 9538)	-	-	0.092	-	-	0.090
Gas Turbine Commissioning Period (includes impacts for existing Encina units)						
MEI (Rec 9327)	-	-	0.080	-	-	0.078
Gas Turbine Long-Term Commissioning Period						
MEI (Rec 9682)	0.34[3]	0.00044	-	0.0074	0.000090	-

[1] Source: LL 2014d, Table 5.9-4
[2] Kelly Elementary School was determined to be the local school with the highest predicted airborne concentrations. It is located approximately 1.5 miles (2.4 km) east of the project location.
[3] This value includes the fish ingestion pathway whereas the applicant's analysis does not. The text of the applicant's report indicates that the fish ingestion pathway is quantified but the HARP modeling report files show 0 risk for that pathway. In staff's analysis, if the fish ingestion pathway is removed, the resulting risk would be reduced to 0.012 in a million from 0.34 in a million.
Note: The term "Rec" means "Receptor" number as found in the PTA (LL 2014d)

Public Health Table 4

Contribution to Total Cancer Risk by Individual Substances at the Point of Maximum Impact (PMI), Determined for Normal Operations

Chemical Name	Cancer Risk (per million)
1,3-Butadiene	4.5E-11
Acetaldehyde	7.0E-11
Benzene	2.1E-10
Benzo(a)anthracene	9.7E-09
Benzo(a)pyrene	5.9E-08
Benzo(b)fluoranthene	4.8E-09
Benzo(k)fluoranthene	4.7E-09
Chrysene	1.1E-09
Dibenz(a,h)anthracene	3.4E-08
Diesel PM	6.3E-06
Ethylbenzene	4.9E-11
Formaldehyde	3.3E-09
Indeno(1,2,3-cd)	1.0E-08
Naphthalene	2.7E-11
Propylene oxide	6.6E-11
TOTAL RISK	6.4E-06

A review of **Public Health Table 3** shows that staff's health risk assessment results in an overall maximum theoretical risk at the Point of Maximum Impact (PMI) and the MEIR (a residential receptor) is greater by a factor of 2.2 to 3.5 than that calculated by the petitioner. This is because the May 2012 HARP program used by the petitioner is the most recent version available but has not yet been updated to include the August 2012 OEHHA methodology and therefore the petitioner's HRA used the older methodology no longer approved. Although staff used the August 2012 approved methodology and determined the risk to be greater, those risks remain well below the level of significant (ten in one million). Furthermore, staff determined that the PMI is located on or very near the amended CECP fence line and therefore no residents or members of the public could possibility be placed at that location (see **Public Health Figure 1**).

Staff also determined that the toxic air contaminants (TACs) that would be emitted from the amended CECP that contribute the most to cancer risk and noncancer hazard can be found in **Public Health Table 4** (for the PMI) and **Table 5** (for the MEIR). The TAC which contributes the most to risk at both locales is DPM (diesel particulate matter) which would be emitted from the emergency diesel engines during required periodic testing and not from the natural gas-fired combustion turbines.

Public Health Table 5
Contribution to Total Cancer Risk by Individual Substances at the Maximally Exposed Individual Receptor (MEIR), Determined for Normal Operations

Chemical Name	Cancer Risk (per million)
1,3-Butadiene	6.1E-10
Acetaldehyde	9.4E-10
Benzene	2.8E-09
Benzo(a)anthrace	1.0E-08
Benzo(a)pyrene	6.3E-08
Benzo(b)fluoranthene	5.1E-09
Benzo(k)fluoranthene	5.0E-09
Chrysene	1.1E-09
Dibenz(a,h)anthracene	3.6E-08
Diesel PM	8.8E-08
Ethylbenzene	6.5E-10
Formaldehyde	4.4E-08
Indeno(1,2,3-cd)	1.1E-08
Naphthalene	3.7E-10
Propylene oxide	8.9E-10
TOTAL RISK	2.7E-07

As mentioned above, staff also calculated the maximum theoretical risk and noncancer hazard using the recently proposed OEHHA methodology (OEHHA 2014b; 2014c). In this case, the risk to the PMI drops to 5 in one million (from 6.4 in one million as shown in **Public Health Table 3**) and the risk to the MEIR drops to 0.24 in one million from (0.27 in one million, also as shown in **Public Health Table 3**). The noncancer hazard values remain the same. The slight drop in calculated cancer risk is because the proposed methodology has a new exposure duration value not presently used in the currently approved method, a “Fraction of Time Spent at Home” (FAH) adjustment factor which would become the new required approach should it become approved by Cal-EPA.

Staff also used this method to determine that the maximum calculated risk due to DPM emitted from demolition and construction vehicles during the Phase I demolition activities would be reduced by a factor of 72-85 percent from what would be calculated under the existing approved OEHHA methodology. This reduction would more than offset any potential increase in the calculated maximum risk to nearby residents due to the extended time-frame of emissions during Phase I demolition and thus results in an estimated overall risk due to emissions of diesel particulate matter less than the level of significance (ten excess cancers in one million exposed people). However, staff supplies these calculations for informational purposes only and is relying upon the August 2012 approved method to calculate the risk for regulatory and CEQA purposes. However, staff wishes to reiterate that for the amended CECP, all risks to all receptors calculated using all methodologies are less than the level of signicance (10 in one million).

Staff also reviewed the HRA prepared by the San Diego Air Pollution District (SDAPCD) provided to staff as a November 21, 2014 draft. The SDAPCD's HRA used the same version of HARP as the petitioner and emission factors from U.S. EPA (AP-42 Table 3.1-3) and CATEF (California Air Toxics Emission Factor) database. The results are therefore very similar to the petitioner's, 2.3 in one million for the PMI and 0.065 in a million for the MEIR. All acute and chronic noncancer hazards are well below the level of significance.

In summary, staff used the most recent OEHHA approved methodology (August 2012) as well as the most recent OEHHA proposed methodology (June and September 2014) and determined that all risks and hazards posed to the off-site public would be less than the level of significance. Staff also notes that the petitioner's HRA and the SDAPCD's HRA also showed the level of risk and hazard to be less than significant. Therefore, staff concludes that the amended CECP would not cause a signficant impact to public health.

Phase IV EPS Demolition

Staff notes that the potential exists for off-site impacts to public health during demolition of the EPS stack and buildings. The petition (LL 2014d) along with the responses to staff's data requests (LL 2014x and LL 2014cc) provide adequate information for staff to review and assess potential impacts to public health associated with the requested activities. Staff is satisfied that the demolition and removal of the 400-ft. stack and the adjoining power station buildings and units, as described in the "*Encina Power Station Demolition Plan*" (LL 2014cc, attachment to DR64-1) would provide a sound basis for safely removing the stack with minimal impact to the surrounding off-site community. Staff finds that inclusion of this plan in proposed revised Condition **WORKER SAFETY-1** would enhance safety and assure that the risks to workers and the off-site public during the demolition and removal of the EPS would be less than significant.

CUMULATIVE IMPACTS

Staff analyzed the potential for the existence of cumulative impacts. A significant cumulative public health impact is defined as the short-term or long-term emissions of TACs from multiple facilities that could cause a significant impact where the emissions from one facility alone would not cause a significant impact. Existing locations that emit TACs, 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 requirements to control the releases of TACs and the significant dispersion once airborne. The chances of two airborne plumes of TACs mingling to create a significant cumulative impact are remote. Staff has modeled numerous sources in the past (over 50 sources within a six-mile radius) and has found that the sources must be very close to each other, within a few blocks, for this to even potentially occur.

Table 1 of the Executive Summary of this PSA provides a list of more than 32 projects located within six miles of the amended CECP site that are built, under construction, or are reasonably expected to be built. With the exception of the existing Encina Power Station and the Carlsbad Poseidon Desalination Project (currently under construction between the amended CECP site and the existing EPS), all the remaining existing or planned projects in the vicinity of the proposed amended CECP would either not emit TACs or the distance between the source and the amended CECP would be so great as to preclude the airborne plumes from both sources mingling sufficiently to have a potential cumulative impact. Since the EPS would cease operations as soon as the amended CECP starts commissioning, cumulative impacts from these two facilities are not expected to occur.

According to the EIR for the Carlsbad Poseidon Desalination Project (Carlsbad 2005 section 4.2): "*Long-term air emissions associated with operation of the desalination plant consist of vehicle emissions generated during maintenance visits and employee vehicle trips, stationary source emissions produced at the project site, and consumption of electricity and natural gas. The desalination plant would operate 24 hours per day, seven days a week upon completion of construction. All of equipment will utilize electric power, will not utilize any combustion or other fuel sources, and will not generate any air emissions during their operation. The desalination plant does not involve the direct emission of toxic air contaminants and therefore not have the potential to expose sensitive receptors to substantial pollutant concentrations*."

However, the Poseidon EIR makes note that the electrical power provided to the facility would include indirect emissions associated with the generation of the electrical power consumed by the desalination plant. Staff believes that the power generated would come from the grid or from the amended CECP. If from the grid, the emissions source would be too distant to pose a cumulative impact; if from the amended CECP, then the source is already accounted for in the HRA of the amended CECP. In either case, staff finds that the presence of both the Carlsbad Poseidon Desalination Project and the amended CECP would not pose a cumulative risk to public health.

Staff finds that the amended CECP, as proposed by the petitioner and with the additional mitigation measure proposed by staff, poses an insignificant risk of off-site impacts to public health. It is unlikely that emissions of TACs from the amended CECP

would merge with emissions from another facility at the same location so as to create a significant cumulative risk where an individual facility risk was less than significant. Therefore, staff concludes that the facility would not contribute to a significant public health cumulative impact.

COMPLIANCE WITH LORS

Staff concludes that construction and operation of the amended CECP would 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 amended 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 amended CECP uses the most recent and 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 amended 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 amended CECP shows that the maximum theoretical risk to nearby residents would be lower than those calculated by staff for the licensed CECP. Staff also concludes that no significant cumulative impacts would occur.

Because of the uncertainty of the shutdown of the EPS during commissioning of the amended CECP, staff continues to recommend that existing Condition **PUBLIC HEALTH-1** be kept. Should it be clarified that the EPS would cease operations during commissioning of the amended CECP staff recommends that Condition **PUBLIC HEALTH-1** be deleted as it would be unnecessary.

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 pipeline quality natural gas has been used to fuel the CECP and the EPS.

REFERENCES

CEC 2012a – California Energy Commission (TN66185). Commission Decision on the Carlsbad Energy Center Project Application for Certification, dated June 1, 2012. Submitted July 11, 2012.

CECP 2007a – California Energy Center Project/T. Hemig (tn: 42299). Application for Certification for the Carlsbad Energy Center Project. 09/11/2007.

EPA 2014. U.S. Environmental Protection Agency (EPA). Integrated Risk Information System. July.

LL 2014b – Locke Lord LLP (TN202267). Petition to Remove Obsolete Facilities to Support Construction of the Carlsbad Energy Project. Submitted 04/29/2014.

LL 2014d – Locke Lord LLP (TN202287-2). Petition to Amend Carlsbad Energy Center Project. Submitted 05/02/2014.

LL2014x – Locke Lord LLP (TN203094). Responses to Data Request Set 2 (Nos. 40-57), dated September 23, 2014. Submitted 09/24/2014.

LL2014cc – Locke Lord LLP (TN203143). Response to Data Request Set 2A (No.64), dated October 1, 2014. Submitted 10/01/2014.

OEHHA 2012. Cal-EPA Office of Environmental Health Hazard Assessment (OEHHA). 2012. “Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments.” August.

OEHHA 2014a. Cal-EPA Office of Environmental Health Hazard Assessment (OEHHA). “Consolidated Table of OEHHA/ARB Approved Risk Assessment Health Values. January 30.

OEHHA 2014b. Cal-EPA Office of Environmental Health Hazard Assessment. “The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments”. June Review Draft

OEHHA 2014c. Cal-EPA Office of Environmental Health Hazard Assessment. “The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments”. September Scientific Review Panel Draft

PUBLIC HEALTH - FIGURE 1

Carlsbad Energy Center Project Amendment - Exposure Context

Project receptors are indicated by yellow push pins

Normal operations

Rec 7772 – PMI & MEIW, risk & chronic HI (UTME 468812.76, UTMN 3666785.52)

Rec 7277 – MEIR, risk & chronic HI (UTME 469650, UTMN 3667370)

Rec 14092 – PMI & MEIW, acute HI (UTME 481950, UTMN 3669640)

Rec 2012 – MEI, acute only (UTME 482050, UTMN 3660950)

Startups

Rec 9538 – MEI, acute study only (UTME 475730, UTMN 3668020)

Acute commissioning

Rec 9327 – MEI, acute only (UTME 475720, UTMN 3667920)

Long-term commissioning

Rec 9682 – MEI, risk and chronic HI only (UTME 475950, UTMN 3667890P

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Dr. Alvin Greenberg, December 2014

SOCIOECONOMICS

Lisa Worrall

SUMMARY OF CONCLUSIONS

Energy Commission staff (staff) has reviewed the amended Carlsbad Energy Center Project (amended CECP) in accordance with the requirements of the California Environmental Quality Act (CEQA). Staff's analysis considers the changes between the May 31, 2012 licensed project (licensed CECP) and the modified project (amended CECP) as proposed by Carlsbad Energy Center, LLC (petitioner/project owner).

Staff has determined that like the licensed CECP, the demolition, remediation, construction, decommissioning, site restoration, and operation activities associated with the amended CECP in Carlsbad, California, would not cause a significant adverse direct, indirect or cumulative socioeconomic impact on the area's housing, schools, law enforcement or parks and recreation. Staff also concludes that like the licensed CECP, the amended CECP would not induce a substantial population growth or displacement of population, or induce substantial increases in demand for housing, law enforcement services, or parks and recreation. Condition of Certification **SOCIO-1** was included in the June 2012 Commission Decision for the licensed CECP. To clarify the verification process, staff has proposed minor edits to the verification process (CEC 2012a, pg. 8.3-6). Staff proposes a new condition of certification, **SOCIO-2**, to ensure the amended CECP complies with state laws, which were not applicable to the licensed CECP (California Education Code and California Government Code). The existing condition of certification and new staff-proposed condition of certification would ensure project compliance with state and local laws, ordinances, regulations, and standards (LORS).

Staff concludes the minority population in the six-mile project radius does not constitute an environmental justice population as defined by *Environmental Justice: Guidance Under the National Environmental Policy Act*.

INTRODUCTION

In this socioeconomics analysis, staff presents an impact analysis of the project-caused changes on existing population, housing, employment patterns, and community services. Staff analyzes the potential impacts of the demolition, remediation, construction, decommissioning, and site restoration activities (construction), plus operation associated with the amended CECP on local communities, community resources, and law enforcement services, and also provides a discussion of the estimated beneficial economic impacts of the construction and operation of the proposed project.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Socioeconomics Table 1 contains socioeconomics laws, ordinances, regulations, and standards (LORS) applicable to the proposed project.

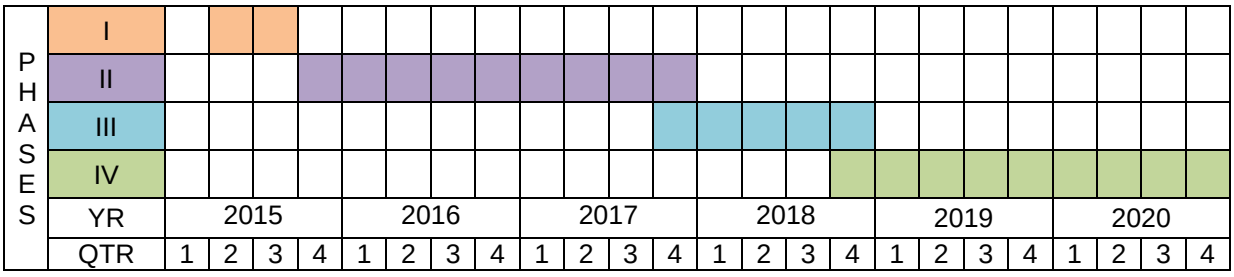
Socioeconomics Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable LORS	Description
State	
California Education Code, Section 17620	The governing board of any school district is authorized to levy a fee, charge, dedication, or other requirement for the purpose of funding the construction or reconstruction of school facilities.
California Government Code, Sections 65996-65997	Except for a fee, charge, dedication, or other requirement authorized under Section 17620 of the Education Code, state and local public agencies may not impose fees, charges, or other financial requirements to offset the cost for school facilities.

PROPOSED MODIFIED PROJECT

The changes from the licensed CECP to the amended CECP relevant to Socioeconomics involve the number of workforce needed for the project's demolition, remediation, construction, decommissioning, and site restoration (construction). Other changes include the number of operations workforce needed, changes in the duration of construction, and estimated fiscal benefits. The amended CECP would involve four phases. In brief, the four phases include Phase I - Tank Demolition and Remediation, Phase II - Construction / Commissioning / Operation of amended CECP power plant, Phase III - Retirement and Decommissioning of the EPS, and Phase IV - EPS Demolition and Site Restoration. If approved by the Energy Commission, the amended CECP would take 64 months to complete with an estimated start date in the second quarter of 2015 and project completion in the fourth quarter of 2020.[1] An average workforce of 95 workers and a peak of 279 workers during month 13 of Phase II would be needed for the amended CECP based on the complete 64-month schedule. Conversely, the licensed CECP had a 25-month construction schedule and required a construction workforce that peaked at 357 (CEC 2012a, pgs. 1-1 and 8.3-2). **Socioeconomics Table 2** presents a graphic representation of the estimated construction schedule for the amended CECP.

Socioeconomics Table 2
Amended CECP Estimated Schedule



An operations workforce of 18 employees would work at the amended CECP power plant, all of whom would be pulled from the existing 50-member EPS operations

[1] The October 30, 2014 Revised Committee Scheduling Order estimated a final decision from the Energy Commission in the second quarter of 2015 (CEC 2014ww). Based on this estimate, start of project construction with Phase I could be pushed back to the third quarter of 2015, thereby pushing the 66-month project schedule back by one quarter.

workforce (LL 2014d, pg. 2-36). The licensed CECP required 14 employees who would also have come from the EPS operations staff.

The changes to the fiscal benefits are presented in **Socioeconomics Table 11**. The petitioner has not provided estimated fiscal benefits for activities associated with Phase I, Phase III, and the site restoration activities in Phase IV of the amended CECP.

The proposed amended CECP power plant (Phase II) would be located on the same, but slightly larger, parcel as the licensed CECP and the Phase I activities would be carried out adjacent to the amended CECP power plant; therefore, the study areas are not changed from the licensed CECP.

SETTING

The proposed amended CECP is located in the city of Carlsbad in San Diego County. San Diego County also encompasses the San Diego-Carlsbad-San Marcos Metropolitan Statistical Area (MSA). The amended CECP would be built on 23 of the approximate 95 acres of the existing Encina Power Station site which is currently occupied by the east tank farm and above-ground fuel oil storage tanks (ASTs) 4, 5, 6 and 7.

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.

USING THE 2010 US CENSUS AND US CENSUS BUREAU'S AMERICAN COMMUNITY SURVEY IN STAFF ASSESSMENTS

The detailed social, economic, and housing information previously collected only in the decennial census was not collected for the 2010 Census (US Census 2011). This information is now collected through the U.S. Census Bureau's American Community Survey (ACS). Decennial census data is a 100 percent count collected once every ten years and represents information from a single reference point (April 1st). The main function of the decennial census is to provide *counts* of people for the purpose of congressional apportionment and legislative redistricting. ACS estimates are collected from a sample of the population based on information compiled continually and aggregated into one, three, and five-year estimates ("period estimates") released every year. The primary purpose of the ACS is to measure the changing social and economic characteristics of the U.S. population. As a result, the ACS does not provide official counts of the population in between censuses. Instead, the Census Bureau's Population Estimates Program will continue to be the official source for annual population totals, by age, race, Hispanic origin, and sex.

ACS collects data at every geography level from the largest level (nation) to the smallest level available (block group (BG)).[2] Census Bureau staff recommends the use

[2] Census Block Group - A statistical subdivision of a census tract. A BG consists of all tabulation blocks whose numbers begin with the same digit in a census tract; for example, for Census 2000, BG 3 within a census tract includes all blocks numbered between 3000 and 3999. The block group is the lowest-level

of data no smaller than the Census tract level.[3,4] Data from the five-year estimates is used for our analysis as it provides the greatest detail at the smallest geographic level. Because ACS estimates come from a sample population, a certain level of variability is associated with these estimates. This variability is expressed as a margin of error (MOE). The MOE is used to calculate the coefficient of variation (CV). CVs are a standardized indicator of the reliability of an estimate. While not a set rule, the US Census Bureau considers the use of estimates with a CV of more than 15 percent a cause for caution when interpreting patterns in the data (US Census 2009). In situations where CVs for estimates are high, the reliability of an estimate improves by using estimates for a larger geographic area (e.g. city or community versus census tract), or by aggregating estimates of adjacent geographic areas, such as cities.

PROJECT-SPECIFIC DEMOGRAPHIC SCREENING

Staff's demographic screening analysis is based on information contained in two documents: *Environmental Justice: Guidance Under the National Environmental Policy* Act (CEQ 1997) and the U.S. Environmental Protection Agency's (EPA) document "*Final Guidance for Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analyses* (US EPA1998). The intention is to identify potentially sensitive populations, which could be disproportionately impacted by the proposed action. Due to the changes in the data collection methods used by the U.S. Census Bureau, the screening process relies on 2010 U.S. Census data to determine the number of minority populations and data from the 2008-2012 ACS to evaluate the presence of individuals and households living below the federal poverty level.

Staff's demographic screening is designed to identify the presence of minority and below-poverty-level populations within a six-mile radius of the proposed project site. The six-mile radius is based on air quality modeling. See the Air Quality section for more information. No other technical area has identified potential impacts that might exceed this distance, therefore, staff uses a six-mile distance from the project to conservatively assess impacts, and to obtain data resulting in the best possible understanding of the demographic makeup of the communities potentially impacted by the amended project. When Socioeconomics staff identifies the presence of an environmental justice population, staff from the thirteen affected technical areas would then evaluate the project for potential disproportionate impacts on the environmental justice population.[5]

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geographic entity for which the Census Bureau tabulates sample data from the decennial census. http://www.census.gov/dmd/www/glossary.html.

[3] Census Tract - A small, relatively permanent statistical subdivision of a county or statistically equivalent entity, delineated for data presentation purposes by a local group of census data users or the geographic staff of a regional census center in accordance with Census Bureau guidelines. Census tracts are designed to be relatively homogeneous units with respect to population characteristics, economic status, and living conditions at the time they are established. Census tracts generally contain between 1,000 and 8,000 people, with an optimum size of 4,000 people. Census tract boundaries are delineated with the intention of being stable over many decades, so they generally follow relatively permanent visible features. http://www.census.gov/dmd/www/glossary.html.

[4] Census Workshop: Using the American Community Survey (ACS) and The New American Factfinder (AFF) hosted by Sacramento Area Council of Governments on May 11 & 12, 2011. Workshop presented by Barbara Ferry, U.S. Census Partnership Data Services Specialist.

[5] The thirteen technical staff/areas are Air Quality, Hazardous Materials Management, Land Use, Noise and Vibration, Public Health, Socioeconomics, Soils and Surface Water Resources, Water Supply, Traffic

When staff's screening analysis does not identify the population in the six-mile radius to be an environmental justice population, as defined by *Environmental Justice: Guidance Under the National Environmental Policy Act*, no further scrutiny of this population is required, or necessary, for purposes of an environmental justice analysis.

Minority Populations

According to *Environmental Justice: Guidance Under the National Environmental Policy Act*, minority individuals are defined as members of the following groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic. An environmental justice population is identified when the minority population of the potentially affected area is greater than fifty percent or the minority population percentage is meaningfully greater than the minority population in the general population or other appropriate unit of geographical analysis.

Socioeconomics Figure 1 shows the total population within the six-mile radius of the project site was 158,518 persons, with a minority population of 61,357 persons, or about 38.7 percent of the total population (US Census 2010a). The population in the six-mile radius lives primarily within the cities of Carlsbad, Oceanside, Vista, and Encinitas. When compared with minority populations in the larger geographic area of the Census County Division (CCD), which encompasses the project radius and San Diego County, the minority population in the six-mile radius is less than the minority populations in these reference geographies (**Socioeconomics Table 3**).

Socioeconomics Table 3
Minority Populations within the Project Area

Area	Total Population	Not Hispanic or Latino: White alone	Minority	Percent Minority
Six-Mile Radius of Project Site (**Socioeconomics Figure 1**)	158,518	97,161	61,357	38.70
CITIES IN THE SIX-MILE RADIUS				
Carlsbad	105,328	78,879	26,449	25.11
Encinitas	59,518	46,881	12,637	21.23
Oceanside	167,086	80,849	86,237	**51.61**
Vista	93,834	38,287	55,547	**59.20**
REFERENCE GEOGRAPHIES				
Oceanside-Escondido CCD*	627,851	319,010	308,841	49.19
San Diego County	3,095,313	1,500,047	1,595,266	**51.54**
California	37,253,956	14,956,253	22,297,703	**59.85**

Notes: Bold text- minority population 50 percent or greater. *CCD - Census County Division.
Source: US Census 2010a.

Staff concludes that the minority population in the six-mile radius is not greater than 50 percent or meaningfully greater than the minority populations in the reference geographies, and therefore does not constitute an environmental justice population as defined by *Environmental Justice: Guidance Under the National Environmental Policy Act*, and would not trigger further scrutiny for purposes of an environmental justice analysis.

and Transportation, Transmission Line Safety and Nuisance, Visual Resources, Cultural Resources, and Waste Management.

Below-Poverty-Level-Populations

The poverty status of households and individuals is determined based on a set of income thresholds, set by the U.S. Census Bureau, that vary by family size and composition. If the total income of the family is less than the family's threshold, that family and every individual in it is considered in poverty. The official poverty thresholds do not vary by geography (e.g. state, county, etc.), but are updated annually to allow for changes in the cost of living. The population for whom poverty status is determined does not include institutionalized people, people in military quarters, people in college dormitories, and unrelated individuals under 15 years old.

Staff identified the below-poverty-level population in the project area using place level data from the 2009-2013 ACS Five-Year Estimates from the United States Census Bureau (US Census 2013).[6] Within six miles of the amended CECP site, approximately 13 percent, or 54,247 people, live below the federal poverty threshold.[7] **Socioeconomics Table 4** presents poverty data for the area that approximates a six-mile radius of the project site.

The Council on Environmental Quality (CEQ) and US EPA guidance documents identify a 50 percent threshold to determine whether minority populations are considered environmental justice populations, but do not provide a similar threshold for below poverty level populations. As an initial indicator of whether a low-income population of sufficient size is present and would warrant status as an environmental justice community, staff compared the below-poverty-level populations in the six-mile radius to other appropriate reference geographies. As shown in **Socioeconomics Table 4**, staff used data for the Oceanside-Escondido Census County Division, San Diego County, and California as reference geographies to compare levels of poverty in populations near the project.

[6] Staff determined that the data at the place level is the lowest level available that retains reasonable accuracy. The data represents a period estimate, meaning the numbers represent an area's characteristics for the specified time period.

[7] ACS estimates for the cities within a six-mile radius of the project site were aggregated using the ACS calculator at the Oklahoma Department of Commerce, consistent with instructions received during the May 11 & 12, 2011 Census Workshop.

Socioeconomics Table 4
Poverty Data within the Project Area

Area	Total			Income in the past 12 months below poverty level			Percent below poverty level		
	Estimate*	MOE	CV (%)	Estimate	MOE	CV (%)	Estimate	MOE	CV (%)
Cities Used to Determine Poverty Status-Total[6]	428,786	±489	0.07	54,247	±3013	3.38	12.65%	±0.70	3.36
--Carlsbad	106,807	±198	0.11	11,358	±1,173	6.28	10.60%	±1.1	6.31
--Encinitas	59,931	±134	0.14	5,574	±982	10.71	9.30%	±1.6	10.46
--Oceanside	168,873	±250	0.09	22,398	±1,943	5.27	13.3%	±1.1	5.03
--Vista	93,175	±345	0.23	14,197	±1,721	7.01	16.0%	±1.9	7.22
REFERENCE GEOGRAPHIES									
Oceanside Escondido CCD**	629,406	±2,303	0.22	90,674	±3,359	2.25	14.40%	±0.5	2.11
San Diego County	3,057,308	±1,961	0.04	441,648	±8,222	1.13	14.40%	±0.3	1.27
California	36,913,404	±3,433	0.01	5,855,417	±40,552	0.42	15.9%	±0.1	0.38

Note: * Population for whom poverty status is determined. **CCD – Census County Division.
Source: US Census 2013a.

Roughly 13 percent of the population within six miles of the project site lives below the poverty level. Of the cities used to determine the poverty status within the six-mile radius, the city of Vista stands out with 16 percent of the population living below the poverty level, compared with the three other cities' (Carlsbad, Encinitas, and Oceanside) more moderate nine to 13 percent below-poverty-level population. Other reference geographies had percentages ranging from 14.4 percent for the project area CCD to California's 15.9 percent. Staff concludes that the below-poverty-level population in the six-mile radius is not meaningfully greater than the below-poverty-level population in the reference geographies and does not constitute an environmental justice population as defined by *Environmental Justice: Guidance Under the National Environmental Policy Act*.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

The California Environmental Quality Act (CEQA) requires a list of criteria to determine the significance of identified impacts. A significant impact is defined by CEQA as "a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project" (Cal. Code Regs., tit. 14, section 15382). Thresholds serve as the benchmark for determining if a project will result in a significant adverse impact when evaluated against existing conditions (e.g., "baseline" conditions). CEQA Guidelines section 15064(e) specifies that: "[e]conomic and social changes resulting from the project shall not be treated as significant effects on the environment." Section 15064(e) states that when "a physical change is caused by economic or social effects of a project, the physical change may be regarded as a significant effect in the same manner as any other physical change resulting from the project. Alternatively, economic and social effects of a physical change may be used to determine that the

physical change is a significant effect on the environment. If the physical change causes adverse economic or social effects on people, those adverse effects may be used as a factor in determining whether the physical change is significant."

If a sufficient number of workers is not available within the project area, workers would 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, schools, law enforcement services, and parks and recreation.

Staff has used Appendix G of the CEQA Guidelines for this analysis, which specifies that a project could have a significant effect on population, housing, schools, law enforcement services, and parks and recreation if it would:

- Induce substantial population growth in an area either directly or indirectly;
- Displace substantial numbers of people and/or existing housing, necessitating the construction of replacement housing elsewhere; or
- Adversely impact acceptable levels of service for police protection, schools, parks and recreation.

Staff's assessment of impacts on population, housing, police protection, schools, and parks and recreation are based on professional judgments, input from local and state agencies, and the industry-accepted two-hour commute range for construction workers and one-hour commute range for operational workers. Emergency medical services, capacities, and response times are analyzed in the **WORKER SAFETY & FIRE PROTECTION** section of this document.

To determine if the amended CECP would have any impacts within the project area, staff analyzed the current status of community services (law enforcement and schools) and capacities to determine if project-related impacts would significantly strain or degrade those services. If services and capacities were significantly affected by the amended CECP, staff would consider that to be a significant adverse impact and propose mitigation.

Conversely, the amended 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 funding. Consequently, in this socioeconomic analysis, staff examines the beneficial impacts on local finances from property and sales taxes.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Induce Substantial Population Growth

For the purpose of this analysis, staff defines "induce substantial population growth" as workers moving into the project area because of project construction and operation, thereby encouraging construction of new homes or extension of roads or other infrastructure. To determine whether the project would induce population growth, staff analyzes the availability of the local workforce and the population within the region. Staff defines "local workforce" for project construction as those workers residing within a two-

hour commute of the project site. This area includes the San Diego-Carlsbad-San Marcos Metropolitan Statistical Area (MSA). Construction workers residing in this MSA with greater than a two-hour commute would be considered non-local and would likely seek lodging closer to the project site. Staff defines "local workforce" for project operation as workers residing within a one-hour commute of the project.

San Diego County's annual average seasonally unadjusted unemployment rate in 2013 was 7.5 percent (San Diego-Carlsbad-San Marcos MSA) compared with California's rate of 8.3 percent (EDD 2014a). The annual average seasonally unadjusted unemployment rate for the construction industry in the San Diego-Carlsbad-San Marcos MSA for 2013 was 11.3 percent (EDD 2014b).

Socioeconomics Table 5 shows the historical and projected populations for the cities within the six-mile radius plus San Diego County for reference. The city of Carlsbad is projected to grow about 19 percent between 2010 and 2035, compared with a more sizable growth of 30 percent for San Diego County. Population growth within the study area is projected to be concentrated in the cities of Encinitas, Oceanside, and Vista.

Socioeconomics Table 5
Historical and Projected Populations

Population	Cities within the Project Study Area					San Diego County
	Total	Carlsbad	Encinitas	Vista	Oceanside	
2000[1]	387,147	78,247	58,014	89,857	161,029	2,813,833
2010[2]	425,766	105,328	59,518	93,834	167,086	3,095,313
2020[3]	481,722	117,657	68,594	100,016	195,455	3,535,000
2035[3]	529,195	125,293	74,218	117,471	212,213	4,026,131
Projected Population Change 2010-2035						
Number	103,429	19,965	14,700	23,637	45,127	930,818
Percent	24.29	18.96	24.70	25.19	27.01	30.07

Sources: [1]US Census 2000, [2]US Census 2010a, [3]SANDAG 2010.

Construction Phase Employment

Socioeconomics Table 6 shows the total labor by skill for the San Diego-Carlsbad-San Marcos MSA would be more than adequate to provide construction labor for all phases of the project. The table identifies the workforce needed for each phase of the project, except for the site restoration workforce for Phase IV, by peak month. The petitioner has not indicated if a workforce would need to be employed for the site restoration activities in Phase IV.

If approved by the Energy Commission, the amended CECP would take 64 months to complete with an estimated start date in the second quarter of 2015 and project completion in the fourth quarter of 2020. An average workforce of 95 workers and a peak of 279 workers during month 13 of Phase II would be needed for the amended CECP based on the complete 64-month schedule.

Phase I would require an average of 15 workers during the six-month demolition period and a peak workforce of 20 (LL 2014b). Phase I demolition would begin following the final Energy Commission approval of the amended CECP. Completion of Phase I is anticipated in the third quarter of 2015.

Phase II would employ an average of 169 workers during the 24-month construction/demolition period and reach a peak with 279 workers during month 13 of the plant construction (LL 2014d, pg.2-33 & 2-46). Phase II is estimated to begin in the fourth quarter of 2015 with completion in the fourth quarter of 2017.

Phase III would span 12 months, from approximately the fourth quarter of 2017 to the fourth quarter of 2018. The petitioner would use the existing EPS operations staff to perform the majority of work during this phase (LL 2014pp, pg. 7). In the last three to six months of the 12-month phase, the petitioner may need to supplement the EPS workforce by employing up to six workers (four electricians, one boilermaker or pipefitter, and one machinist) on an intermittent basis.

Phase IV demolition and site restoration would take 22 months and require an average of 67 workers and a peak of 197 workers during month 6 (LL 2014d, pg. 2-46). The petitioner has not indicated the need to employ workers for site restoration. Phase IV would begin in the fourth quarter of 2018 and be completed in the fourth quarter of 2020.

Socioeconomics Table 6
Total Labor by Skill in the San Diego-Carlsbad-San Marcos MSA versus Project Labor Needs

San Diego-Carlsbad-San Marcos MSA					Amended CECP Construction				Licensed CECP Construction
Craft	Total Workforce (2010)	Total Projected Workforce (2020)	Growth from 2010		Phase I	Phase II	Phase III	Phase IV: Demolition of EPS	Maximum Needed Per Month (Single-Phased Construction)*
					Construction Period				
					2nd quarter 2015 to 3rd quarter 2015/ 6 months	4th quarter 2015 to 4th quarter 2017/ 24 months	4th quarter 2017 to 4th quarter 2018/ 12 months	4th quarter 2018 to 4th quarter 2020/ 22 months	25 months
					Peak Month(s)				
			Number	Percent	Month 6	Month 13	Months 6 to 12	Month 6	
Carpenter	8,200	9,690	1,490	18.2	0	15 (26)		0	32
Laborer	8,840	10,620	1,780	20.1	16	46		165	46
Teamster	5,720	7,160	1,440	25.2	0	6 (27)		0	28
Electrician	4,850	5,950	1,100	22.7	0	25 (35)	4	0	40
Ironworker	610	670	60	9.8	0	20 (31)		0	34
Millwright	No data	No data	No data	No data	0	11 (14)		0	18
Boilermaker	110	120	10	9.1	0	19 (22)	1	0	24
Pipefitter/Sprinkler Fitter	4,440	5,410	970	21.8	0	48		0	50
Insulation Worker	210	260	50	23.8	0	0 (18)		0	20
Operating Engineer	1,470	1,890	420	28.6	1 (2)	19 (30)		4 (12)	38
Masons	1,210	1,520	310	25.6	0	1 (4)		0	5
Sheet Metal Worker	2,050	2,330	280	13.7	0	10 (11)		0	12
Painters	7,300	8,460	1,160	15.9	0	3 (4)		0	5
Plasterers	480	540	60	12.5	0	3 (4)		0	5
Surveyors	640	850	210	32.8	0	3 (5)		0	6
Machinist	3,760	3,990	230	6.1	0	0	1	0	0

Contractor Staff (total)	No data	No data	No data	No data	3	0		23	52
Construction Manager	6,170	7,270	1,100	17.8	1 (2)	0		20	No data
Engineering Supervisor[1]	2,990	3,680	690	23.1	1 (2)	0		1 (3)	No data
Health & Safety Engineer	180	210	30	16.7	1 (2)	0		2	No data
Other Plant Staff	No data	No data	No data	No data	0	46		0	0
Linear Construction Staff	No data	No data	No data	No data	0	4		0	0
Plant & System Operators	1,620	1,860	240	14.8	0	0		0	54
				Total	20	279	6	194	357**

Notes: ( ) Peak workforce by trade by phase when different from workforce in peak month(s).*Includes commissioning and operating phases.** Workforce by trade does not add up to the total shown in the total line, as the number in the total line reflects the total peak workforce by month, and the number shown for each trade reflects the peak workforce by trade irrespective of the month they are onsite.[1]Architectural & Engineering Managers. Sources: CEC 2012a, pgs. 1-3 & 8.3-3; LL 2014b, pg. 1-1; LL 2014d, pgs. 2-33 & 2-46; LL 2014pp, pg. 7; EDD 2012.

In comparison, the licensed CECP estimated the 25-month, single-phased construction, including connecting to the 230-kV switchyard, would reach a peak workforce of 357 workers (CEC 2012a, pgs. 1-3, 8.3-1, and 8.3-2). All of the components in the project enhancement and refinement project would be completed during the first months of the licensed CECP. Construction workers employed for the licensed CECP would participate in the construction of the new SDG&E 230-kV switchyard (one of the components in the project enhancement and refinement project).

The petitioner estimates that approximately 90 percent of the construction workforce for the amended CECP would come from the local San Diego County area (LL 2014d, pg. 5.10-8). With the large labor supply in the San Diego- Carlsbad-San Marcos MSA, a small workforce, about ten percent (28 workers at peak construction of the amended CECP), would come from outside of the local commute area. Staff concurs with the petitioner's local versus non-local workforce supply estimates (90 percent local and ten percent non-local).

The amended CECP would employ fewer workers during peak construction than the licensed CECP, but would employ workers over a longer project schedule. By extension, the number of workers coming from outside the local commute area would be less with the amended CECP than the licensed CECP.

Operational Phase Employment

Currently, 50 workers are employed at the Encina Power Station (EPS) (LL 2014d, pg. 2-36). The amended CECP is estimated to begin operating in the fourth quarter of 2017 and would require 18 full-time employees during project operation, all of whom would be sourced from the existing EPS workforce (LL 2014d, pgs. 1-5, 1-6, & 2-36). Once the amended CECP is operational, existing EPS Units 1-5 would be retired, demolished, and the site restored (Phases III and IV) (LL 2014d, pg. 2-3). Refer to the "Construction Phase Employment" subsection above for a discussion of the demolition schedule and estimated workforce.

The licensed CECP was expected to employ up to 14 full-time employees (CEC 2012a, pgs.1-3 & 8.3-3). Once the licensed CECP became operational, the project owner would retire EPS Units 1-3 and begin the planning process for retiring Units 4 and 5. Due to the retirement of Encina Units 1 through 3, operations employees for the licensed CECP would be transferred from the Encina plant. Therefore, with both the amended CECP and the licensed CECP, no additional operations workers would be necessary.

The 2012 Final Decision concluded that the licensed CECP would not cause an influx of new permanent workers (CEC 2012a, pg. 8.3-2). Similarly, staff concludes the amended CECP's construction and operation workforce would not directly or indirectly induce a substantial population growth in the project area, and therefore, the amended project would create a less than significant impact under this criterion.

Housing

Socioeconomics Table 7 presents housing supply data for the project area. U.S. Census Bureau housing counts showed, as of April 1, 2010, that there were 165,834 housing units within a six-mile radius of the project site with a vacancy of 11,194 units,

representing a 6.7 percent vacancy rate. Housing data for San Diego County is presented for reference. The housing counts in the project area indicate a sufficient amount of available housing units in a six-mile radius of the project site.

Socioeconomics Table 7
Housing Supply in the Project Area

Subject	Area			
	Cities in a Six Mile Radius of Project Site*		San Diego County	
	Number	Percent	Number	Percent
OCCUPANCY STATUS				
Total housing units	165,834	100	1,164,786	100
--Occupied housing units	153,982	92.9	1,086,865	93.3
--Vacant housing units	11,852	7.2	77,921	6.7
VACANCY STATUS				
Vacant housing units	11,852	100	77,921	100
--For rent	3,708	31.3	29,236	37.5
--For sale only	1,649	14.1	11,682	15.0
--For seasonal, recreational or occasional	4,484	37.8	20,768	26.7
--Other**	2,011	17.0	16,235	20.8

Notes: *Cities include Carlsbad, Oceanside, Vista, and Encinitas. **Other includes rented, not occupied; sold, not occupied; migratory workers, and other vacant. **Source:** US Census 2010b

Changes to population and housing stock have been updated by the California Department of Finance for 2013. As of January 1, 2013, San Diego County had an estimated 1,174,866 total housing units, with 77,933 vacant units, equaling a vacancy rate of 6.6 percent (DOF 2014). Year 2013 housing estimates for the city of Carlsbad indicated 45,522 housing units, with a vacancy of 15,931, for a vacancy of 7.4 percent. A five percent vacancy is industry-accepted as a minimum benchmark for a sufficient amount of housing available for occupancy (Virginia Tech 2006).

During construction, approximately 90 percent of workers would commute daily to the project from within the local commute area of San Diego County. Workers living outside of the local commute area would more likely seek lodging closer to the project site and return to their residence over the weekend. Based on the peak workforce of 279 during month 13 of Phase II, approximately 28 construction workers could seek lodging closer to the project site. There is an ample supply of hotels and motels for these non-local workers within the city of Carlsbad and San Diego County. Staff contacted the San Diego County Building and Construction Trades Council to solicit comments and concerns they may have about the workforce requirements of the amended CECP and current labor supply, but did not receive a response.

Staff's independent data gathering from the California Employment Development Department and discussions with the San Diego County Building and Construction Trades Council on several previous power plant siting cases proposed in San Diego County show there would be a large availability of labor to fulfill the amended CECP's labor requirements. Carlsbad has over 30 hotels/motels with over 2,600 rooms, suites, and villas (Visit Carlsbad 2014). San Diego County has a large supply of lodging options with over 21 million rooms available in 2013 (July 2012 to June 2013) and an average

hotel occupancy rate of 70.7 percent (SDTA 2014). There are several recreational vehicle camping sites within six miles of the project site, offering up to 500 spaces with amenities including electricity, water, and washroom facilities (Good Sam 2014, Olive Avenue 2014). Given the large supply of lodging choices in and around Carlsbad and San Diego County and the estimated ten percent non-local project construction workers (28 during the peak) who would likely use this lodging, staff expects no new housing would be required as a result of the project.

The amended CECP would employ fewer workers during peak construction than the licensed CECP, but would employ workers over a longer construction period. By extension, fewer workers would be coming from outside the local commute area with the amended CECP than with the licensed CECP.

The amended CECP would require 18 full-time employees during project operation, compared with 14 full-time employees required for the licensed CECP. This workforce would be sourced from the existing 50-person workforce at EPS, and thus there would be no influx of new residents and no need for additional housing.

The 2012 Final Decision concluded that the licensed CECP would not cause an influx of new permanent workers or any noticeable impact upon local housing (CEC 2012a, pg. 8.3-2). Similarly, staff concludes the amended CECP construction and operation workforce would not have a significant adverse impact on the housing supply in the project area, the city of Carlsbad or San Diego County, and therefore, the amended project would create a less than significant impact under this criterion.

Displace Substantial Numbers of Existing Housing and People

The amended CECP is proposed on the site of the licensed CECP, in an area zoned for public utilities, so the project would not directly displace existing housing or people. The amended CECP would not induce substantial population growth or create the need for replacement housing to be constructed elsewhere, as previously discussed.

The 2012 Final Decision concluded that the licensed CECP would not create new population influx into the project area, and thus it would not create additional demands for housing (CEC 2012a, pg. 8.3-3). Similarly, staff concludes the amended CECP would have no impact on area housing as the amended project would not displace any people or necessitate the construction of replacement housing elsewhere.

Result in Substantial Physical Impacts to Government Facilities

The 2012 Final Decision concluded that the licensed CECP would not create new population influx into the project area, and thus it would not create additional demands for housing, schools, parks, or law enforcement (CEC 2012a, pg. 8.3-3). Similarly as discussed under the subject headings below, the amended CECP would not cause significant impacts to service ratios, response times, or other performance objectives relating to law enforcement, schools, or parks.

Please refer to the **WORKER SAFETY & FIRE PROTECTION** section of this document for a detailed discussion of fire protection and emergency medical services.

Schools

Senate Bill 50 allows agencies to exclude discussion or analysis of new construction's impacts on school facilities; however, statutory school fees are still levied (see the "School Impact Fees" discussion below) (DWK 2011). Because the Final Staff Assessment for the licensed CECP discussed and analyzed the project's impacts on school facilities (local school district enrollment, capacity, and possible new students added by the project), staff has included an update to the discussion specific to the amended CECP.

The Carlsbad Unified School District (CUSD) serves the city of Carlsbad, including the amended CECP site, and the adjoining communities of Oceanside and San Marcos. CUSD provides Kindergarten through 12th grade education at nine elementary, three middle, two high, and two alternative schools, with a combined enrollment of 10,993 students for the 2013/2014 school year (CDE 2014). **Socioeconomics Table 8** presents the enrollment for the current and two previous years, average pupil-to-teacher ratio, and average classroom size for the school district. Correlating data for San Diego County is provided for reference.

Socioeconomics Table 8
Current School District Data

	Year	Enrollment	Pupil-to-Teacher Ratio	Average Class Size
Carlsbad Unified School District	2013/2014	10,993*	Not available	Not available
	2012/2013	10,956	26.1	33.6
	2011/2012	11,063	25.1	30.0
San Diego County*	2013/2014	503,096*	Not available	Not available
	2012/2013	499,850	22.3	28.8
	2011/2012	498,003	22.4	22.9

Notes: *Preliminary data. **Source:** CDE 2014

Based on the pupil-to-teacher ratio and the average class size for the school district compared with the corresponding data for San Diego County, presented in **Socioeconomics Table 8** above, the CUSD appears slightly more crowded than the county average.

During construction, staff expects the majority of the labor force would be hired locally with approximately ten percent of the workforce coming from outside the local area. Based on a peak employment of 279 workers during month 13 of Phase II, approximately 28 new workers could temporarily relocate closer to the project site. Comparatively, the 2012 Final Decision for the licensed CECP anticipated a peak construction workforce of 357 workers, 36 of whom would potentially have relocated closer to the site (CEC 2012a, pg. 8.3-2). Staff's research and communication with building and construction trades' councils has shown that construction workers do not move their families with them when working on a project. Therefore, staff does not expect a significant impact to schools from construction of the amended CECP.

Eighteen employees would be required to operate the amended CECP power plant, compared with 14 employees for the licensed CECP. The workers would be drawn from the operators of the existing EPS, therefore no new workers are expected to relocate to

the project area and no new children would relocate to the CUSD (LL 2014d, pg. 2.36). There would be no school population growth, and by extension, the amended CECP would not necessitate the provision of new or physically altered government facilities (e.g. schools) in order to maintain acceptable service ratios. Therefore, there would be no impact to the existing school system as a result of the construction or operation of the amended project.

There were no significant impacts to schools during construction or operation identified for the licensed CECP.

School Impact Fees

California Education Code, section 17620, authorizes a school district to levy statutory school fees 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 (May 12, 2014), the one-time school impact fee for new or redeveloped commercial or industrial development is $0.54 per square foot (CEC 2014r).

The licensed CECP did not propose any chargeable, covered and enclosed space; rather the workers would occupy a building already on site (at the EPS power plant).

The amended CECP proposes a new administrative/control room building and a warehouse (LL 2014d, pg. 2-2). The applicable fees are calculated prior to the issuance of building permits during plan review. Staff is proposing Condition of Certification **SOCIO-2** to ensure the payment of fees to the CUSD. The amended CECP would comply with section 17620 of the Education Code through the one-time payment of statutory school impact fees to the CUSD.

Parks and Recreation

The city of Carlsbad has 31 parks, community centers, and recreation facilities totaling 228 acres, offering such amenities as playground equipment, dog park, amphitheatre, picnic facilities, sports fields (e.g. softball and soccer), horseshoes, hiking trails, sports courts (e.g. volleyball, basketball, tennis), swimming pools, golf course, and a skate park (Carlsbad City 2014a). Recreation amenities also include approximately 40 miles of walking trails. The closest parks to the project site are Cannon Park and Poinsettia Park. There are two parks planned in the future, Robertson Park (13 acres) and Veterans' Park (100-acre site with 30 developable acres and the remaining site with possibilities for trails), both scheduled for construction in 2020 or later (Carlsbad City 2014b).

The city has an overall park standard of 5.5 acres per 1,000 people (Carlsbad City 2003, pg. 4). ACS five year data (2009 - 2013) show the estimated population in Carlsbad as 107,307[8] (US Census 2013b). Based on this current estimate, approximately 590 acres of parks would be needed to meet the park standard. The city

[8] The five-Year ACS estimate for population in Carlsbad is 107,307, with a margin of error of +/- 71 and a coefficient of variation of 0.04.

currently has 228 acres of parks and the two future parks would bring the count up to 341 acres.

Staff's analysis shows there would not be a large number of workers moving into the project area during project construction (approximately 28 workers during peak construction), and no new operations workers would move into the project area. Therefore, there would be little, if any, increase in the usage of or demand for parks or other recreational facilities. Also, construction workers do not tend to use such facilities, particularly as they tend to return to their residences over the weekend.

No significant impacts on parks and recreation were identified for construction and operation of the licensed CECP. Similarly, staff concludes the amended CECP would not result in substantial adverse physical impacts associated with the provision of new or physically altered government facilities in order to maintain acceptable service ratios, response times, or other performance objectives with respect to parks. The project would not increase the use of neighborhood or regional parks or recreational facilities to the extent that substantial physical deterioration of the facility would occur, or be accelerated. The project would not necessitate the construction of new parks in the area, nor does the project propose any park facilities. For the above reasons, staff concludes the amended project would have a less than significant impact on neighborhood or regional parks and recreational facilities.

Law Enforcement

The city of Carlsbad Police Department (CPD) would provide services for the amended CECP. Located approximately five miles from the amended CECP project site at 2560 Orion Way, the Carlsbad Police Department's average time to a call from the amended CECP is 5.8 minutes for a Priority 1 call and an average of 12.2 minutes for Priority 2 calls (CEC 2014mm). The Carlsbad Police Department has one police station with 112 sworn officers and 48 civilian personnel. At the time of the licensing of the CECP, the estimated average response time for Priority 1 calls was five minutes with an average of five to ten minutes for a Priority 2 call. Also during this same period, the Carlsbad Police Department employed approximately 148 authorized officers.

Two project site-security conditions of certification (**HAZ-7** and **HAZ-8**) were applied to the licensed CECP and would be carried through to the amended CECP; one requiring a construction site security plan, and the second requiring a site security plan for the commissioning and operational phases. Between the two conditions, requirements included perimeter fencing and security gate, site access control, and procedures for employees, contractors, and vendors when encountering suspicious objects or packages on- or off-site. Also included are protocol for contacting law enforcement in the event of suspicious activity or an emergency, and evacuation procedures. Background investigations are required on all project personnel, contractors who visit the project site, and hazardous materials transport vendors, in accordance with state and federal laws regarding security and privacy. Also required are a closed circuit TV monitoring system and site access controls for employees, contractors, vendors, and visitors. During construction, security guards are required during the commissioning and operations phases, either security guard(s) would be present 24 hours per day, seven days per week, or power plant personnel would be on site 24 hours per day, seven days

per week. Perimeter breach detectors or on-site motion detectors are required to ensure adequate perimeter security.

Staff contacted CPD to discuss the proposed project, ascertain their ability to provide law enforcement services to the project, and solicit comments or concerns they might have about the project. Ms. Fiona Everett, Senior Management Analyst with the CPD expressed concern that partial or complete road closures during construction along roadways adjacent to the project site could have the potential to delay emergency responses and cause an impact to emergency response times (CEC 2014mm). Traffic and Transportation staff concluded the amended CECP would add traffic to local roadways during the construction period and this increase in traffic could result in impacts to emergency access. However, staff concluded that the amended CECP would generate less construction traffic than the licensed CECP, resulting in reduced traffic impacts. Condition of Certification **TRANS-1** would require preparation and implementation of a traffic control plan, which would mitigate these traffic impacts to less than significant. **TRANS-1** is a condition of certification for the licensed CECP, which Traffic and Transportation staff has recommended be included for the amended CECP as well.

Ms. Everett also expressed concern that during construction and operation activities, crimes against people, theft of materials, and/or vandalism could occur, but she did not indicate that the amended project would trigger the need for additional law enforcement services. The two existing site-security conditions of certification (**HAZ-7** and **HAZ-8)** already include requirements for perimeter fencing and security gate, site access control, a closed circuit TV monitoring system, security guard(s), and either perimeter breach detectors or on-site motion detectors.

The California Highway Patrol (CHP) is the primary law enforcement agency for state highways and roads. Segments of Interstate 5 freeway, state highway 78, El Camino Real (State Route 11), Palomar Airport Road (State Route 12), and Carlsbad Boulevard (Coast Highway 101) are in the city of Carlsbad and are served by both the CHP and CPD. The CHP enforces applicable laws; controls traffic, investigates accidents; and manages hazardous materials spills. The nearest CHP office is located in Oceanside (CHP 2014). The **HAZARDOUS MATERIALS MANAGEMENT** section of this document discusses response times for hazardous material spill incidents.

Based on communication with local law enforcement who would serve the project, staff concludes the project would not result in law enforcement response times being affected so that they exceed adopted response time goals. The project would not necessitate alterations to the police station or the construction of a new police station to maintain acceptable response times for law enforcement services; therefore, no associated physical impact would result from demolition, construction, or operation. Staff concludes that for the above reasons, the project would create a less than significant impact.

The demand for law enforcement should not be significantly increased because most of the labor force would be commuting. For the operational phase, there would be no change in population, as the operational workforce would be transferred from EPS to

work at the amended CECP power plant. Hence, there would be no change to existing demand for law enforcement services.

No significant adverse impacts associated with law enforcement were identified for construction and operation the licensed CECP.

CUMULATIVE IMPACTS AND MITIGATION

A project may result in significant adverse cumulative impacts when its effects are cumulatively considerable; that is, 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 [Pub. Resources Code § 21083; Cal. Code Regs., tit. 14, §§ 15064(h); 15065(c); 15130; and 15355]. Mitigation involves taking feasible measures to avoid or substantially reduce the impacts.

In a socioeconomic analysis, cumulative impacts could occur when more than one project in the same area has an overlapping construction schedule, thus creating a demand for workers that cannot be met by local labor, or when a project's demand for public services does not match a local jurisdiction's ability to provide such services. An influx of non-local workers and their dependents can strain housing, schools, parks and recreation, and law enforcement services.

Because of the large labor supply in the San Diego area and the mobility of the labor supply, staff conducted a CEQANet[9] database search using San Diego County and the nearby cities to the project site within San Diego County as the geographic search parameters. Staff considered projects within these search parameters that would likely employ a similar workforce to the amended CECP as part of the project's cumulative impact analysis for socioeconomics. Staff contacted planning staff with the city of Carlsbad, and the cities adjacent to Carlsbad (Encinitas, Oceanside, and Vista) to develop a list of large residential development, industrial, and commercial projects that could have construction schedules overlapping with the amended CECP. The petitioner anticipates that if the amended CECP is approved, the project's 64-month construction period would begin in the second quarter of 2015.

Staff considers the following projects in **Socioeconomics Table 9** part of the cumulative setting for socioeconomic resources. Construction timing is estimated based on the best information available during the preparation of this analysis.

[9] The CEQANet database lists CEQA documents that have been submitted to the State Clearinghouse for state agency review.

Socioeconomics Table 9
Cumulative Projects

Project Name	Location	Status	Estimated or Actual Construction State Date & Duration	Project Description
Demolition of above-ground storage tanks 5, 6, and 7	amended CECP power plant site, Carlsbad	Approved	Speculative, but estimated in the first or second quarter of 2015 (prior to Phase I of the amended CECP).	Demolition of above-ground storage tanks (ASTs) 5, 6, and 7; berm removal between ASTs 5 and 6 and 6 and 7; and remediation activities for ASTs 5, 6, and 7.
Two HOV Lanes from Manchester Avenue to SR 78	Interstate 5 (I-5), Manchester Ave. to State Route 78 (SR-78), Encinitas and Carlsbad	Approved	Construction Begins: Late 2015	Add one HOV lane in each direction from Manchester Avenue to SR 78 including the San Elijo and Batiquitos lagoon bridge replacements, Manchester direct access ramp, and bike/pedestrian Trails under I-5 across the lagoons.
Manchester Avenue to SR 78 Soundwalls	Interstate 5 (I-5), Manchester Ave. to State Route 78 (SR-78), Encinitas and Carlsbad	Approved	Construction Begins: Early 2016	Construct soundwalls on private property from Manchester Avenue to SR 78.
CIP – Vista/Carlsbad Interceptor Agua Hedionda Lift Station (VC 12)	South shore of Agua Hedionda Lagoon adjacent to the east side of the railroad tracks.	CDP has been issued by Coastal Commission.	Construction expected to begin early 2015 and end 2017.	Replace existing sewer lift station and sewer line with new lift station and line. The total project extends 2.35 miles north-south.
Carlsbad Desalination Project (Poseidon)	Carlsbad Blvd./ Cannon Road, Carlsbad	In construction	Construction began late 2012, estimated to be operational Nov. 2015	50-million-gallon-per-day seawater desalination plant, pipelines, pumps, and other appurtenant and ancillary water facilities to produce and distribute potable water. Includes conveyance pipeline: a ten-mile, 54-inch water delivery pipeline that will travel eastward from the seawater desalination plant through Carlsbad, Vista, and San Marcos to San Diego County Water Authority's second aqueduct connection facility in San Marcos.
Buena Outfall Force Main Phase 3	North side of Palomar Airport Rd between Paseo Del Norte & El Camino Real, Carlsbad	Awaiting more info to complete Coastal Development Permit	Estimated start sometime 2015; 1 year duration	New sewer line belonging to Vista. 18-24 inch 17,700 foot long pipeline, part gravity and part force main sewer line along Palomar Airport Road.

Project Name	Location	Status	Estimated or Actual Construction State Date & Duration	Project Description
State Street Townhomes	2531-2586 State St, Carlsbad	Pending approval of Final Map	Construction expected to start November 2014 with estimated completion by the end of 2015 or early 2016	41 market rate & six inclusionary housing units with ground level office/flex space for live-work. Includes demo of approx. 32,000 sq. ft. existing commercial and light industrial uses.
Quarry Creek	South of Haymar Dr between College Blvd & El Camino Real, Carlsbad	Master Plan project. Can start grading, putting in utilities, but needs more permits to build	Estimated construction start January 2015, duration 5 years	636 residential units, a 0.5-acre nature/education center, a 1.5-acre community facilities site, a 1.3-acre park and ride site, 92.4 acres natural open space, and supporting infrastructure on a 155.4-acre site in Carlsbad.
La Costa Town Center Renovation	La Costa Avenue and El Camino Real, Carlsbad	Approved but must appeal to city council; lawsuit possible	Unknown	Additional 3,000 sq. ft. retail, 60 apartment units
La Esquina mixed-use project	1578 N Coast Highway 101, Encinitas	In review	Unknown	Mixed-use project with three live/work units and one commercial unit
Sports Shinko Condominium Hotel #93-172	2100 N. Hwy 101, Encinitas	Entitlements Approved, but not constructed	Unknown	A hotel project with 130 units
Capri Mixed Use	960 S Coast Highway 101, Encinitas	Approved	Unknown	5,000+ sq. ft. commercial space below two stories with four residential units
ENV 13-0007 (Recycled Water Easterly Main Extension Project)	Escondido	Unknown	Unknown	Expand the existing recycled water pipeline approximately 7.4 miles and construct and operate a recycled water pump station and recycled water storage tank. Install 12-inch brine disposal pipeline and fiber optic cables parallel to proposed recycled water pipeline from existing infrastructure located near the City's Hale Avenue Resource Recovery Facility.
Park Station at the Crossroads of La Mesa Specific Plan EIR	Bordered by El Cajon Blvd, Baltimore Dr, University Ave, and Nebo Drive, La Mesa	Unknown	Unknown	Specific plan to allow for the development of a mixed-use urban village, including a combination of up to 416 multi-family residential units, 61,000 sq. ft. commercial or neighborhood-serving retail, 146,000 sq. ft. commercial office space, and 146,000 sq. ft. hotel use (500 rooms). three planning areas: Baltimore Drive, Spring Street, and University Avenue.

Project Name	Location	Status	Estimated or Actual Construction State Date & Duration	Project Description
Shelter Island Boatyard Crane Replacement and Pier Addition Project	Shelter Island Drive, San Diego	Unknown	Unknown	Replace two existing gantry cranes with two new 70 and 150 ton capacity cranes; a new pier system to support the new larger crane; replace concrete slab; demolish small structures; repair existing bulkhead; 1,240 sq. ft. new piers, docks, and piles; remove 1,247 sq. ft. existing docks.
Jean Drive Storm Drain Replacement	Miracle Drive, San Diego	Unknown	Unknown	Remove and abandon failed 24-inch storm drain corrugated metal pipe (CMP), repair extensive erosion around failed pipe, and install new 24-inch reinforced concrete pipe (RCP). Also remove 140 ft. of sidewalks and 25 ft. of curbs and gutters and install 80 ft. of sidewalk and 45 ft. of curb and gutter.
Nob Hill Improvements	Scripps Ranch Blvd., & Scripps Lake Dr, San Diego	Unknown	Unknown	Remove and abandon failed 24-inch storm drain corrugated metal pipe (CMP), repair extensive erosion around failed pipe, and install new 24-inch reinforced concrete pipe (RCP). Also remove 140 ft. of sidewalks and 25 ft. of curbs and gutters and installation of 80 ft. of sidewalk and 45 ft. of curb and gutter.
Pacific Highlands Ranch, Units 23-28 - Applicant: Pardee Homes	Carmel Valley Road and Mill Creek Road, San Diego	Unknown	Unknown	Mixed-use development containing 331 multi-dwelling units; 195,000 sq. ft. commercial use, a civic use area, other accessory improvements, and a lot reserved for future development of a public library. Also construct various site improvements, including associated hardscape, retaining walls and landscaping.
CP Kelco Cooling Tower Replacement	Port of San Diego, San Diego	Unknown	Unknown	Replace cooling towers and associated apparatus-remove five cooling towers and two chillers and replace with one tower and three fans.
Camino Del Rio Mixed Use	Camino del Rio North/Camino de la Reina / Camino del Arroyo, San Diego	Unknown	Unknown	Demolish existing structures and on-site surface parking and construct a mixed-use development consisting of 291 residential units, 14 shopkeepers units, and 9,000 sq. ft. retail and commercial space in a "wrap design". The project would range in height from two stories to five stories and a total of 514 parking spaces in a six-story, above ground parking structure, in addition to 78 surface parking spaces, for a total of 592 parking spaces.

Project Name	Location	Status	Estimated or Actual Construction State Date & Duration	Project Description
Sunroad Harbor Island Hotel Project & East Harbor Island Subarea PMPA (UPD 83356-EIR-783)	Harbor Island Drive, San Diego	Unknown	Unknown	175-room, four-story limited service hotel with ancillary meeting and fitness space, common areas, an exterior pool, surface parking, and replacing existing locker building and some parking. Existing marina offices remain. PMPA would allow up to two other hotels, with combined maximum of 500 rooms to be developed on East Harbor Island, west of existing marina building. Extend public promenade along Harbor Island East Basin. Reconfigure a portion of eastern Harbor Island Drive and the traffic circle at its terminus. Realign utilities to accommodate project.
Ocotillo Wells Solar Major Use Permit	Split Mountain Road, San Diego County	Unknown	Unknown	336-acre photovoltaic (PV) or concentrator PV (CPV) solar facility on an approximately 440-acre property.
Pier 1 North Drydock, Future Real Estate Agreements & Removal of Cooling Tunnels	2205 and 400 E. Belt Street, Port of San Diego	Unknown	Unknown	New drydock, extend existing lease term, and enter into future real estate agreement on neighboring two-acre land parcel and four-acre water area for potential shipbuilding, repair and parking activities. Drydock component involves 395,000 cubic yards of dredging; pile driving; installation of two drydock mooring dolphins and two wharf structures; construction of a permanent sheetpile wall, and associated infrastructure and utilities.
Soitec Solar Projects Program Environmental Impact Report (LanWest, LanEast, Rugged and Tiedrra Del Sol)	McCain Valley Road, Ribbonwood Road, & Tierra Del Sol Road, San Diego County	Unknown	Unknown	Development of four solar energy sites (Tierra del Sol, Rugged Solar, LanWest, and LanEast) that would collectively include approximately 1,473 acres of Concentrated Photovoltaic (CPV) trackers and generate approximately 168.5 megawatts of electricity.
Laurel Creek Condominiums, PC24-027	Grapevine Rd/Date St., Vista	Unknown	Unknown	71 single-family, detached condominiums on a 9.24-acre parcel.
Hallmark Communities PC24-026	2025 E. Vista Way, Vista	Unknown	Unknown	73 detached condominium units and associated site improvements
Vista Ridge PC14-293	521 and 553 West Bobier Drive, Vista	Unknown	Unknown	290 unit multi-family project and associated site improvements

The petitioner/project owner would employ an average of 95 workers during the 64-month construction activities for the amended CECP and employ a peak workforce of 279 during month 13 of Phase II. As shown in **Socioeconomics Table 6** and graphically represented in **Socioeconomics Table 2**, Phase I demolition and remediation activities would begin in the second quarter of 2105, following project approval by the Energy Commission (if granted, currently expected late in second quarter of 2015), and would reach completion after demolition and site restoration activities conclude in Phase IV in the fourth quarter of 2020.

Once operational, the amended CECP would permanently employ 18 workers, all of whom would transfer from EPS. The licensed CECP would have employed 14 workers from the EPS staff. **Socioeconomics Table 10** presents the total labor force for the crafts specifically needed for the construction of amended CECP. As shown in the table, the labor force within the San Diego-Carlsbad-San Marcos MSA is more than sufficient to accommodate the labor needs for construction of the amended CECP including other future planned projects in the cumulative study area.

Socioeconomics Table 10
Total Labor Supply for San Diego-Carlsbad-San Marcos MSA

Total Labor for Selected MSAs/MD (**Construction Workforce**)*	**Total Workforce for 2010**	**Total Projected Workforce for 2020**	**Growth from 2010**	**Percent Growth from 2010**
San Diego-Carlsbad-San Marcos MSA	55,470	66,630	11,160	20.1

Note: Total workforce includes only the crafts specifically needed for the amended CECP (Phase II and demolition in Phase IV). *See **Socioeconomics Table 6** for a list of crafts and occupations included in the total construction workforce figures. **Source:** EDD 2012

Because of the large supply of lodging choices and housing supply in Carlsbad and San Diego County, staff does not anticipate the project's 28 non-local construction workers would create a significant reduction in the housing supply. No permanent population increase would result from the operation of the project, as the operations workforce would come from the existing EPS staff. Staff's proposed Condition of Certification **SOCIO-2** would ensure applicable school fees are paid by the project. The increased usage of neighborhood or regional parks or other recreational facilities as a result of the project would be minimal. The project would not result in law enforcement response times being affected so that they exceed adopted response time goals and would not increase the demand for law enforcement services.

Staff concludes the proposed amended CECP would not result in any significant and adverse cumulative impacts on population, housing, schools, parks and recreation, or law enforcement. **Socioeconomics Table 10** shows there is a more than sufficient workforce available for construction of the amended CECP project plus other future planned projects. Operations workforce for the amended CECP would be supplied by the EPS. Therefore, for the reasons discussed above, staff does not expect the construction or operation of the amended CECP to contribute to any significant adverse cumulative socioeconomic impacts.

NOTEWORTHY PUBLIC BENEFITS

For the purpose of this analysis, staff defines noteworthy public benefits to include changes in local economic activity and local tax revenue that would result from project construction and operation. To assess the gross economic value of the proposed project, the petitioner developed an input-output model using proprietary cost data and the IMPLAN Professional 3.0 software package. The petitioner used IMPLAN to estimate the fiscal benefits of the construction activities for Phase II, the demolition activities for Phase IV, and the first year of operation of the amended CECP power plant (Phase II), except for payroll. An estimate of fiscal benefits for the Phase I, Phase III, and site restoration activities associated with Phase IV was not provided.

The IMPLAN assessment used San Diego County as the unit of analysis and the petitioner assumes 90 percent of the construction workforce would reside in San Diego County. Impact estimates reflect two different scenarios representing the demolition and construction phase and the operations phase of the project. For both phases, the petitioner estimated the total direct, indirect, and induced economic effects on employment and labor income. Direct economic effects represent the employment, labor income, and spending associated with demolition, construction, and operation of the project. Indirect economic effects represent expenditures on intermediate goods made by suppliers who provide goods and services to the project. Induced economic effects represent changes in household spending that occur due to the wages, salaries, and proprietor's income generated through direct and indirect economic activity. Operational payroll was not modeled, as the workforce would come from the EPS.

The resulting estimates from the IMPLAN analysis do not represent a precise forecast, but rather an approximate estimate of the overall economic effect. The IMPLAN model is a static model, meaning that it relies on inter-industry relationships and household consumption patterns, as they exist at the time of the analysis. This is important given the duration of construction would be 64-months and is not estimated to begin until the second quarter of 2015 with demolition in Phase I, and would continue until the fourth quarter of 2020 with the demolition and site restoration in Phase IV. The model also assumes that prices remain fixed, regardless of changes in demand, and that industry purchaser-supplier relationships operate in fixed proportions. The model does not account for substitution effects, supply constraints, economies of scale, demographic change, or structural adjustments.

Socioeconomics Table 11 reports the petitioner's estimates of the economic impacts/benefits that would accrue to San Diego County due to project construction and operation (refer to the "Conclusions," subsection below). The petitioner estimates that 90 percent of the construction payroll would stay in the local area. With the 18 operations workforce coming from the existing 50-person EPS workforce, 100 percent of the operations payroll would occur within San Diego County. The petitioner assumes that 100 percent of the annual operations and maintenance expenditures would be made within San Diego County.

Between Phase II and the demolition activities in Phase IV, the amended CECP would generate almost 238 jobs (direct, indirect, and induced) and $153.9 to $164.9 million in labor income (direct, indirect, and induced). The average annual economic impact of project operations would equal roughly 78 jobs (including 51 existing direct jobs,

indirect, and induced) and $9 million in labor income (direct, indirect, and induced). Phase I, Phase III, and the site restoration activities in Phase IV could also add to the estimated fiscal benefits shown in **Socioeconomics Table 11** for the amended CECP.

CONCLUSIONS

Staff concludes that construction (demolition, remediation, construction, decommissioning, and site restoration) and operation of the amended CECP would not cause a significant adverse socioeconomic impact or contribute to any significant cumulative socioeconomic impacts for the following reasons:

1. The project's construction and operation workforces would not directly or indirectly induce a substantial population growth in the project area.

2. The project's construction and operation workforce would not have a significant impact on housing within the project area and would not displace any people or housing, or necessitate construction of replacement housing elsewhere.

3. The project would not result in significant physical impacts associated with the provision of new or physically altered government facilities in order to maintain acceptable service ratios, response times, or other performance objectives with respect to law enforcement service, education, or parks and recreation.

Socioeconomics Table 11
Summary of Socioeconomics Benefits

	LICENSED CECP		AMENDED CECP (Phase II plus demolition in Phase IV)
	2007 Dollars	2014 Dollars	2014 Dollars
Fiscal Benefits			
Estimated annual property taxes	$3,564,610 - $4,583,070 per year	$4.1 - $5.2 million[1]	$6.98 - $9.13 million
State and local sales taxes			
Construction (amended CECP)			$4.46 - $4.53 million
Single-phase construction	$1,468,420	No data	
Project enhancements & refinements	$232,500	No data	
State and local sales taxes: Operation	$348,750 per year	$64,100	$15,000 - $20,000
Gas franchise fees	$2.4 million per year	No data	No data
Non-Fiscal Benefits			
Total capital costs	$350 - $450 million	No data	$650 - $850 million
Construction payroll			
Construction (amended CECP)			$90 - $100 million
Single-phased construction	$54.6 million	$62.2 million	
Project enhancements & refinements	$4.042 million	No data	
Construction materials & supplies			
Construction (amended CECP)			$455 - $595 million
Single-phased construction	$30 million	$279 - $359 million (reflects total budget)	
Project enhancements & refinements	$3 million	No data	
Operation & maintenance budget	$4.5 million per year	$5.1 million	$1.5 - $2 million
Direct, Indirect, and Induced Benefits			
Estimated Direct Employment			
Construction (amended CECP) (average)			120
Single-phased construction (average)	375	Not applicable	
Project enhancements & refinements	132 jobs	Not applicable	
Operation	14 jobs (existing from EPS)	Not applicable	18 jobs (existing from EPS)
Estimated Secondary Employment (indirect & induced combined)			
Construction (amended CECP)			172 jobs
Construction & commissioning	555 jobs	Not applicable	
Project enhancement & refinements	77 jobs	Not applicable	
Operation	21 jobs	Not applicable	Not provided
Estimated Secondary Income (indirect & induced combined)			
Construction (amended CECP)			$8,213,220
Construction; single-phased	$21,039,080	No data	
Project enhancements & refinements	$3,116,340	No data	
Operation	$1,678,250 per year	No data	$478 ,750 - $638,330

	LICENSED CECP		AMENDED CECP (Phase II plus demolition in Phase IV)
	2007 Dollars	2014 Dollars	2014 Dollars

Notes: [1]Assumes that EPS is not demolished and thus includes property tax revenue associated with the land (LL 2014d, pg. 5.10-7). *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. **Sources:** CEC 2012a, pg. 8-3-4; LL 2014d, pgs. 5.10-7 to 5.10-11.

CONDITIONS OF CERTIFICATION

Condition of Certification **SOCIO-1** was included in the 2012 Energy Commission Decision for the licensed CECP (CEC 2102a, pg. 8.3-6). The amended CECP would not affect this condition; however; staff proposes minor edits to the verification for the purpose of clarity. Staff proposes **SOCIO-2** to ensure the amended CECP complies with state LORS that were not applicable to the licensed CECP (Note: New text is **bold and underlined**).

SOCIO-1 The project owner shall pay or reimburse the City of Carlsbad for costs incurred in accordance with actual services performed by the City that the City would normally receive for a power plant or similar industrial development.

Verification: The project owner shall provide **to the compliance project manager (CPM),** proof of payment prior to the start of commercial operation.

SOCIO-2 The project owner shall pay the one-time statutory school facility development fees to the Carlsbad Unified School District as required by Education Code Section 17620.

Verification: At least 30 days prior to the start of project construction, the project owner shall provide to the CPM, proof of payment to the Carlsbad Unified School District of the statutory development fee.

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SOCIOECONOMICS - FIGURE 1

Carlsbad Energy Center Project Amendment - Census 2010 Minority Population by Census Block - Six Mile Radius

SOCIOECONOMICS

CALIFORNIA ENERGY COMMISSION, SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Multinet, Census 2010 - PL94-171, Open Street Map City Data January 2014

SOIL & WATER RESOURCES

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SUMMARY OF CONCLUSIONS

The proposed modified Carlsbad Energy Center Project (amended CECP) and the decommissioning and demolition of the Encina Power Station (EPS) could potentially impact soil and water resources. Staff evaluated the potential impacts related to: accelerated wind or water erosion and sedimentation; flood conditions in the vicinity of the project; local water supplies; wastewater disposal; water quality of surface and groundwater; and compliance with all applicable laws, ordinances, regulations, standards (LORS), and state policies.

Staff's analysis is incomplete because more information is needed about the availability of a reliable recycled and potable water supply and the design of the industrial wastewater disposal system for the amended CECP. The petitioner is still seeking a "will-serve" commitment from the City of Carlsbad for recycled and potable water delivery and industrial wastewater acceptance (LL2014z). The City of Carlsbad expressed willingness to deliver recycled water to the project during a recent data response workshop (September 24, 2014), but indicated that the project's proposed industrial discharge to the sewer would not meet the city's requirements. Staff issued data requests to the petitioner on October 28, 2014, that seek information on the method of industrial wastewater disposal (CEC2014tt). Staff is currently not expecting any significant delay in the response to staff's inquiries from the petitioner. When data responses are provided, staff will complete the analysis for the Final Staff Assessment.

A summary of proposed modifications to the **Soil & Water Resources** Conditions of Certification is shown in **Soil & Water Resources Table 1**.

Soil & Water Resources Table 1
Summary of Proposed Modifications to Conditions of Certification

Condition of Certification	Proposed Modification(s) to Condition
SOIL&WATER-1	TIER 3 CONSTRUCTION SWPPP: Updated reference to general construction storm water permit Order No. 2009-0009-DWQ.
SOIL&WATER-2	NON-POTABLE CONSTRUCTION WATER USE PLAN: Added language.
SOIL&WATER-3	INDUSTRIAL SWPPP: Reference to new industrial storm water permit (Order No. 2014-0057-DWQ).
SOIL&WATER-4	WASTE DISCHARGE REQUIREMENTS: Edited for ocean discharges of EPS wastewater during demolition.
SOIL&WATER-5	POTABLE WATER SUPPLY: Changed to limit potable water use.
SOIL&WATER-6	WATER METERING AND REPORTING: Added language.
SOIL&WATER-7	SANITARY SEWER SYSTEM: Changed to remove requirements for use of the sanitary sewer system to discharge industrial wastewater until the petitioner has responded to staff data requests.
SOIL&WATER-8	RECYCLED WATER PURCHASE AGREEMENT: Deleted. To be revised or a new condition added when necessary information on a reliable and safe supply is provided.
SOIL&WATER-9	DEMOLITION WASTEWATER: New.

INTRODUCTION

On May 31, 2012, the Energy Commission approved the 558-megawatt (MW) combined-cycle Carlsbad Energy Center Project (CECP) for construction and operation. On May 2, 2014, Carlsbad Energy Center LLC (petitioner) filed a petition to amend (PTA) the licensed CECP. The proposed amended CECP contains several modifications, the most notable being the redesign of CECP into a simple-cycle power plant and the shutdown and demolition of the existing Encina Power Station (EPS). All proposed modifications are described in the **PROJECT DESCRIPTION** section of this Preliminary Staff Assessment (PSA).

This analysis addresses potential impacts to soil and water resources through the construction and operation of the amended CECP, including the demolition of EPS. Where impacts are found to be the same or less than impacts of the licensed CECP, staff applied the existing conditions of certification, as contained in the Commission Decision dated May 31, 2012 (CEC2012a), to reduce those impacts to less than significant. Aspects of the modified project that are new or substantially different from the licensed project have been identified and examined for potential impacts.

In this analysis, the term “licensed CECP” refers to the approved project. The proposed modified project is referred to as the “amended CECP.” The amended CECP would involve a schedule that could be described in four phases: (1) tank demolition and remediation; (2) construction, commissioning, and operation of the new power plant; (3) retirement and decommissioning of the EPS facility; and (4) demolition of the EPS facility. For details about the expected time periods of the amended CECP schedule, see Table 1 in the **PROJECT DESCRIPTION** section of this PSA. Demolition activities are analyzed as phases separate from the construction and operation of the amended CECP.

METHODOLOGY AND THRESHOLDS FOR DETERMINING ENVIRONMENTAL CONSEQUENCES

Significance criteria are based on those listed in CEQA Appendix G. Soil and water resources impacts would be significant if the project would:

- violate any water quality standards or waste discharge requirements;
- substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted);
- substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation onsite or offsite;
- substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding onsite or offsite;
- create or contribute runoff water that would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff;
- otherwise substantially degrade surface water or groundwater quality;
- place structures within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map;
- place structures within a 100-year flood hazard area that would impede or redirect flood flows;
- expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam;
- result in substantial soil erosion or the loss of topsoil;
- have impacts that are individually limited, but cumulatively considerable ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects); or
- have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly.

Although the CEQA Guidelines provide a checklist of suggested issues that should be addressed in an environmental document, neither the CEQA statute nor the CEQA guidelines prescribe thresholds of significance or particular methodologies for performing an impact analysis. This is left to lead agency judgment and discretion, based on factual data and guidance from regulatory agencies and other sources where available and applicable. Staff assessed whether the amended CECP would comply with the LORS and policies described in **Soil & Water Resources Table 2** and whether

there would be a significant impact under the CEQA. Where a potentially significant impact was identified, staff modified the existing conditions of certification or proposed new mitigation to ensure the impacts would be less than significant.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

Soil & Water Resources Table 2
Laws, Ordinances, Regulations, and Standards (LORS) and Policies

Applicable LORS	Description
Federal	
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	
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 Sections 10910-10915	Requires public water systems to prepare water supply assessments (WSA) for certain defined development projects subject to the California Environmental Quality Act. Lead agencies determine, based on the WSA, whether protected water supplies will be sufficient to meet project demands along with the region's reasonably foreseeable cumulative demand under average-normal-year, single-dry-year, and multiple-dry-year conditions.
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 State Water Resources Control Board (SWRCB) or 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 projects 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.
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."

Applicable LORS	Description
Local	
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 San Diego Regional Water Quality Control Board (SDRWQCB) Order No. R9-2013-0001, NPDES No. CAS0109266.

PROPOSED MODIFIED PROJECT

Characteristics of the amended CECP that have the potential to impact soil and water resources differently than the licensed CECP are shown in **Soil & Water Resources Table 3**.

Soil & Water Resources Table 3
Licensed vs. Amended CECP Features Impacting Soil and Water Resources

Feature	Licensed CECP (558 MW)	Amended CECP (632 MW)
Power production	Two 1-on-1 combined cycle units	Six simple-cycle combustion turbine units with intercoolers
Annual capacity factor	Up to 47 percent (4,100 of 8,760 possible hours)	Estimated 31 percent (approximately 2,700 operating hours)
Project footprint	Approximately 23 acres	Approximately 30 acres
Water source for operations and wastewater discharge	Reclaimed water (tertiary-treated) with discharge to sewer system; or (if reclaimed water is unavailable) purified ocean water with discharge to existing EPS discharge channel	Reclaimed water (tertiary-treated) with discharge to sewer system
Area of temporary construction laydown	10 acres	19 acres
Site preparation	Demolish above-ground fuel oil storage Tanks 5, 6, and 7	Demolish above-ground fuel oil storage Tanks 1, 2, 4, 5, 6, and 7
Encina Power Station	Retire units 1-3	Retire units 1-5 and demolish all above-ground structures
Length of construction	25 months (from site preparation to CECP plant begin operation)	64 months (from site preparation to EPS plant demolition to ground level)
Off-site linear facilities	The amended project includes a new reclaimed water line approximately 3,700 feet long.	

Source: CEC2012a, LL2014d, LL2014b

Construction of the amended project basically consists of four sequential phases: site preparation and demolition of above-ground fuel oil storage tanks (ASTs), CECP construction and commissioning, EPS shutdown and decommissioning, and EPS demolition and site stabilization. Because the location of the amended CECP is currently occupied by ASTs 4, 5, 6, and 7 (known as the East Tank Farm), the project site must first be cleared, cleaned, and graded in preparation for power plant

construction. After site preparation is complete, 22 months of power plant construction would begin. When the completed power plant is commissioned and operational, the shutdown, decommissioning and eventual demolition of EPS would occur. Therefore, EPS Units 1-5 shutdown and demolition would follow the amended CECP power plant construction, but simultaneously with CECP operations.

Refer to the **PROJECT DESCRIPTION** section of this PSA for more information on major features of the amended CECP. **Project Description Figures 1** and **4** show the location of the amended project with respect to the licensed project. Information relevant to the soil and water resources analysis is summarized below. For a complete detailed description of the proposed modified project, refer to the Petition for Amendment (LL2014d) and the petitioner's related supplemental material.

SETTING AND EXISTING CONDITIONS

The project site is located along the shore of the Pacific Ocean and on the south margin of the Agua Hedionda Lagoon 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 property. The amended CECP site would be approximately 30-acres and would require an additional 19.3-acre portion of the EPS site for temporary parking and laydown areas (LL2014d).

The petitioner proposes to construct and operate the 632-megawatt (MW) amended CECP, which would be an air-cooled, natural gas-fired generating facility operating in simple cycle mode with evaporative air inlet cooling. A more complete description of the amended CECP power plant, including the site layout, linears, and regional maps, can be reviewed in the **PROJECT DESCRIPTION** section of this PSA.

SOILS AND CONTAMINATION

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 (CH2M2007a).

Extensive excavation, grading, and deposition of fill occurred during the various phases of EPS construction and expansion, beginning in the early 1950’s, followed by stages of upgrades and expansions. The East Tank Farm (ASTs 4, 5, 6, and 7), where the amended CECP power block would be located, had been excavated to bedrock during construction of the tank farm and the basin is approximately 25 feet below grade. Geotechnical evaluations within the EPS property confirm the presence of fill to a depth of at least ten feet. This fill is expected to consist of a mixture of coarse textured soils suitable for compaction and power plant bearing loads (CH2M2007a).

Soil below the engineered tank bottoms and areas that may have experienced leaks in the past could have soil contaminated with diesel or heavy fuel oil components. The Commission Decision requires the licensed CECP to comply with Condition of Certification **WASTE-1** that prohibits the start of construction in areas requiring characterization and remediation until all necessary remediation has been

accomplished. The project owner entered into the Voluntary Assistance Program (VAP) with the San Diego County Department of Environmental Health (SDCDEH) for the demolition of ASTs 5, 6, and 7. A Soil Remediation Plan would be developed pursuant to the requirements of the SDCDEH as acting lead agency (CEC2012a §6.6).

For the amended CECP, the project owner would include ASTs 1, 2, and 4 in the VAP application to be filed for ASTs 5, 6, and 7. The SDCDEH does not allow ground disturbance prior to SDCDEH approval and characterization. Therefore, after the ASTs are removed to grade, engineering controls would be deployed to stabilize the area in the interim period between completion of above-grade demolition and below-grade assessment and remediation. The VAP process tailors the site assessment and subsurface characterization based on, in part, the particular future use of the property. Because ASTs 4 – 7 would be replaced with a power plant, the required level of remediation would match this future redevelopment (LL2014y).

ASTs 1 and 2 are located outside the facility boundary of the amended CECP. The redevelopment process to determine future land uses of this area will be determined at a future date as part of the city planning process. Because this city's determination for the type of redevelopment project will influence the site assessment and level of future remediation, this area would remain stabilized and undisturbed. Prior to a subsequent landowner's future demolition of any of the ground level foundations, a subsurface site characterization appropriate for the future redevelopment and land use would be conducted under a separate VAP administered by SDCDEH (LL2014y).

The EPS site is also located outside the facility boundary of the amended CECP. Similarly, this area would remain stabilized and undisturbed after completion of above-grade demolition. The petitioner anticipates a two- to three-year process to achieve SDCDEH-approved closure or certification of the demolished EPS site, which would be addressed under a separate VAP to be filed by the future landowner (LL2014y). For further discussion and recommended mitigation relating to soil contamination, refer to the **WASTE MANAGEMENT** section of this PSA.

GROUNDWATER

The amended CECP site is located within the Agua Hedionda Lagoon basin area. The groundwater beneath the EPS is generally brackish and has been designated as having no beneficial uses. Regionally the groundwater basins discharge to the Pacific Ocean, and groundwater levels fluctuate with seasonal and tidal influences. Historic groundwater levels in monitoring wells on the EPS site have ranged from 14 feet below mean sea level (msl) to ten feet above msl, but actual static groundwater level is likely to be near or above msl. The ground surface elevation across the property varies from mean sea level to 55-feet above msl. The East and West Tank Farms are located on marine terrace bluffs approximately 30- to 50-feet above msl. Measurements taken on February 2014 in monitoring wells located in the central part of the property, in the vicinity of the Carlsbad Seawater Desalination Project, showed groundwater levels between 29.7 and 31.8 feet below ground surface (LL2014kk §3.2). The basements of EPS Units 4 and 5 are more than 16 feet below msl and, as a result, receive seepage from groundwater. To prevent flooding of these basements, sumps were installed to collect the seepage water. The petitioner does not propose to use groundwater for any

phase of the amended CECP, and groundwater would not be encountered during construction of the amended CECP due to its depth (LL2008a).

SURFACE WATER

The amended 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 (SR2008c).

Coastal waters in the vicinity of the amended 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 (SR2008c).

LOCAL WATER SUPPLIES AND WASTEWATER SERVICE

The project site is located within the service area of the Carlsbad Municipal Water District (CMWD) which covers approximately 85 percent of the city, an area of about 32 square miles. CMWD is responsible for delivering potable and recycled water to customers and providing sewer (wastewater) service. Currently, recycled water is not available at the project site, but CMWD has initiated plans to expand the Carlsbad Water Recycling Facility and extend its recycled water system to the project site. CMWD believes recycled water service to the EPS property will be complete before the end of 2017 (LL2014d Appendix 2B).

CECP CONSTRUCTION

Water Use

The amended CECP would use both potable and Title 22 recycled water for construction. The amended CECP proposes to use approximately 142.5 acre-feet of water for construction; 116.3 acre-feet of the total would be potable water and 26.2 acre-feet would be recycled. The petitioner expects the CMWD's recycled water to be available in the spring of 2017. In the 21st month of construction (of the 24-month construction period), the project would transition from potable water to recycled water for construction.

Water Quality

The amended CECP site is located on the existing Encina Power Station within the east tank farm impoundment basins containing ASTs 4, 5, 6, and 7. The existing storm water collection system would be used during development of the amended CECP. The existing storm water system collects runoff and pumps the runoff through existing pipelines for eventual discharge to the Agua Hedionda Lagoon. The petitioner 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 permit requirements.

CECP OPERATION

Water Use

The proposed project would replace the EPS generating system once-through cooling system. Instead of sea water, the amended CECP system would rely on Title 22 recycled water, delivered to the site by the CMWD. As proposed, recycled water would be used for the amended 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 CMWD's line at Avenida Encinas and Cannon Road (LL2014d). The amended CECP would use no more than 215 AFY of recycled water for evaporative cooling make-up, as feed water to the demineralizers that would provide high-purity water for the CTGs and miscellaneous plant uses (LL2014vv). This is a substantial decrease in the water requirement for the licensed CECP, which would have used 517 AFY.

Potable water would be needed for drinking and sanitary uses. This supply would also be provided by CMWD and would not exceed eight AFY. Staff anticipates the eight AFY also includes periodic filling of the water tank for fire suppression. However, the petitioner states the fire suppression system is designed to use either recycled or potable water.

Wastewater Management

The licensed CECP would have discharged its process wastewater to the city's sewer system (when industrial water was supplied by recycled water from CMWD) or to the Pacific Ocean through the existing EPS discharge channel (when industrial water was supplied by desalinated sea water). When recycled water is not supplemented with desalinated sea water, the annual discharge of process wastewater was estimated to be 187 AFY.

The petitioner proposes to use trailer mounted demineralizer units for the amended CECP to internally recycle evaporative cooler blowdown and other plant industrial wastewater for reuse. The trailer mounted demineralizer units, which would also pretreat the recycled water from CMWD, are replaced with a fresh unit when the resin beds within a trailer are exhausted. The depleted unit is transferred to an offsite facility to be regenerated. At peak power output and production from the amended CECP, between two to five trailers a day could be exchanged, depending upon CECP dispatch. This trailer mounted demineralizer system would produce no liquid or solid wastes at the project site (LL2014vv).

Similar to the licensed CECP, industrial contact water (sample cooling, pump leaks, equipment wash-water, etc.) that could contain oil and suspended solids would be treated by an oil and water separator prior to discharge to the city's sewer system. For the amended CECP, this discharge stream would average about eight AFY (LL2014vv). The sanitary wastewater collection system would collect wastewater from sinks, toilets, showers, eye wash stations, and other sanitary facilities, and also discharge to the city's

sewer system. The sanitary discharge stream is expected to roughly equal the amount of potable water supplied for sanitary uses.

AST DEMOLITION

The May 31, 2012 Energy Commission Final Decision (licensed CECP) permitted the removal of three existing aboveground fuel oil storage tanks (ASTs) and two berms in order to create space for the construction and operation of a 540-MW combined-cycle power plant. The three ASTs (5, 6, and 7 as seen in **Project Description Figure 1**) are located within the 23-acre footprint of the licensed CECP. The amended CECP would include the demolition of an additional berm and three additional ASTs (1, 2, and 4) to accommodate the amended CECP power plant's slightly larger 30-acre footprint, and for the eventual shutdown of EPS.

The licensed CECP proposed: demolition and removal of ASTs 5, 6, and 7 with associated piping and equipment; removal of oil-impregnated sand cushion and removal of any associated impacted soil; removal of the two intermediate berms separating ASTs 5, 6, and 7; and backfill of remedial excavations (LL2008a §2.3.3). In addition, temporary use of areas surrounding abandoned ASTs 1 and 2 were proposed for construction laydown[1] (CEC2012a p.6.6-2).

Demolition of AST 4, situated immediately south of ASTs 5 through 7, would be required to accommodate the larger, 30-acre footprint necessary for the amended CECP. ASTs 2 and 4 were most recently in use by EPS for storing backup fuel oil No. 6 under a "dual fuel" requirement, which expired in 2007, for emergency backup in the event of an interruption in natural gas supplies (LL2008a §2.3.3). Because the amended CECP would allow for the shutdown of EPS units, all of the existing AST tanks would no longer be of use.

The amended CECP would not change the demolition activities for ASTs 5, 6, and 7 already permitted and approved for demolition by the licensed CECP. The additional demolition activities it proposes are to demolish and remove ASTs 1, 2, and 4, including associated piping and equipment[2]; and the berm separating ASTs 4 and 5 (LL2014b §1.1). Completion of the amended CECP's AST demolition Phase I is expected to last eight months, and would precede Phase II power plant construction of the amended CECP (LL2014b §1.1).

EPS DEMOLITION

The amended CECP would allow for the permanent shutdown and retirement of EPS Units 1 through 5. Onsite features of the EPS facility to be demolished include: the eight-story power plant enclosure building that houses the five steam turbine Units 1 through 5, associated boilers, turbine lube system, air emissions control devices, 400-foot exhaust stack, pumps, fans, condensers, decommissioned fuel oil lines, sumps, and three control rooms. The power plant building also houses the chemistry laboratory,

[1] The licensed CECP does not include demolition of ASTs 1 and 2. Half an acre of construction laydown area would have been located around each AST within the respective impoundment basin.
[2] The concrete ring foundations of ASTs 1 and 2 would be left in place. AST 4 would be completely removed in the same manner as ASTs 5, 6, and 7.

instrumentation, and control shops. Five oil-filled transformers associated with Units 1 through 5 are located adjacent to the power plant building (LL2014cc §1.1).

Ancillary structures supporting current EPS operations include a 17-megawatt combustion turbine unit, multiple transformers, aboveground ammonia storage tanks, administration building, maintenance shop/warehouse, machine shop, paint shop, guard shacks, discharge basin equipment, chemical storage building, wastewater treatment, and fire water storage tanks. Infrastructure supporting the main power block includes: natural gas pipeline, once-through cooling tunnels, sanitary sewer system, 230- and 138-kV power lines, wastewater system (groundwater seepage discharge), communication lines, and storm water discharge system (LL2014cc §1.1).

Other onsite equipment includes third-party telecommunications equipment (cellular tower and cellular antennas). Additionally, a former subsurface 20-inch-diameter pipeline from an offsite marine oil terminal to the EPS tank farms was cleaned and permanently closed in place in May 2013. A portion of the 20-inch pipeline on the EPS site was removed as part of the ongoing construction of the Carlsbad Seawater Desalination Project (LL2014cc §1.1).

The EPS above-grade demolition (Phase IV of the project) is anticipated to take 22 months, with an additional two months for site stabilization[3]. Pre-demolition activities during the 12-month Phase III EPS shutdown and decommissioning would follow successful commercial operation of the amended CECP power plant. Subsurface remediation of the EPS is not included as part of the amended CECP. The removal of below-grade structures and foundations and subsurface soil and/or groundwater remediation would be conducted as part of a future, joint redevelopment initiative involving NRG Energy and the City of Carlsbad. During Phase I demolition of ASTs 1, 2, and 4, or Phase IV demolition of the above-grade EPS structures, if obvious areas of contamination are found (e.g., stained soil and/or soil with hydrocarbon-like odor), samples would be obtained to assess the potential contamination. If these samples exceed county or state standards, they would be cleaned to an industrial level in accordance with and under the direction of the San Diego County Department of Environmental Health (SDCDEH) as the lead agency for the EPS site under the County's Voluntary Assistance Program (LL2014cc §1.0).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

This section provides an evaluation of the expected direct, indirect, and cumulative impacts to soil and water resources that could be caused by the construction and operation of the amended CECP, including the decommissioning and demolition of EPS. Staff's analysis consists of a description of the potentially significant impacts, gathering data related to construction and operation of the project, then reaching a conclusion to determine whether or not the project presents potentially significant impacts. If staff determines there is a significant impact, then staff evaluates the licensed CECP mitigation contained in the Commission Decision (CEC 2012a) for

[3] Stabilization features would be implemented onsite to stabilize foundations, safety barriers, future assessment areas, stockpiles, parking areas, etc. These features would be considered temporary until final site assessment and development occurs. These features would be engineered to ensure safety and environmental management and require minimal maintenance (LL2014cc §7.1).

sufficiency and staff may or may not recommend additional or entirely different mitigation measures that are potentially more effective than those in the Commission Decision or proposed by the petitioner. Mitigation is designed to reduce the effects of potentially significant impacts to a level that is less than significant.

Potential impacts of the amended CECP include soil erosion, flooding, groundwater supplies, groundwater quality, surface water hydrology, and surface water quality impacts.

CECP CONSTRUCTION

Surface and Groundwater Quality

The amended CECP would include six simple-cycle combustion gas turbines and ancillary facilities on a 30-acre site. In preparation for construction of the amended CECP, tanks 5, 6, and 7 would be demolished and the lateral berms removed before site grading and perimeter berm construction begins. Approximately 49 acres of land would be temporarily disturbed during construction of the amended CECP, consisting of the project site, the various laydown and parking areas, and the linear features. The CECP would be classified as a Tier 3 project (based on City of Carlsbad standards) because the project is within 200 feet of an environmentally sensitive area, the Agua Hedionda Lagoon. 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 City of Carlsbad Storm Water Standards Manual (City of Carlsbad2011). The petitioner has prepared a draft Construction Stormwater Management and Pollution Prevention Plan in accordance with the above referenced standards manual and all federal, state, and municipal storm water discharge requirements promulgated by the Clean Water Act.

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 proper selection and implementation of BMPs would 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 of Carlsbad 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 San Diego Region's municipal permit (Order No. R9-2013-0001, NPDES No. CAS0109266) 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 of Carlsbad's Storm Water Standards Manual, the amended CECP would also meet the requirements of Water Quality Order 2009-0009-DWQ and its updates (SWRCB General Construction Storm Water Permit) and impacts to water quality would be mitigated to a level of less

than significant. The licensed CECP references a now out-of-date permit, Order No. 99-08. **SOIL&WATER-1** for the amended CECP now lists the current Order 2009-0009-DWQ and its updates.

Water Supply

The amended CECP would use both potable and Title 22 recycled water for construction. The amended CECP proposes to use approximately 142.5 acre-feet of water for construction; 116.3 acre-feet of the total would be potable water and 26.2 would be recycled. The site owner expects CMWD's recycled water to be available in the spring of 2017. In the 21st month of construction (of the 24-month construction period), the project would transition from potable water to recycled water for construction.

The use of potable water for construction activities when a water source of lower quality is available is inconsistent with 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." The petitioner's proposal to use potable water is reasonable because it is currently not economically feasible to use recycled water for the entire construction phase. When CMWD makes recycled water available to the project, it will reduce any impacts to the local water supply. Staff has proposed to keep the existing Condition of Certification **SOIL&WATER-2**, as it was written for the licensed CECP, which prohibits the use of potable water for any construction activity that is suitable for non-potable water use, when recycled water is available. When available, recycled water must be used during construction of the CECP.

CECP OPERATION

Operation of the amended 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 CECP, including the petitioner's proposed mitigation measures and staff's proposed mitigation measures, are discussed below.

Soil Erosion Due to Water and Wind

The proposed 30-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 petitioner 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

petitioner 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.

During amended CECP operation, soil impacts and the potential for soil erosion would not be significant. The project owner would need to implement an Industrial Storm Water Pollution Prevention Plan (SWPPP) in accordance with the Clean Water Act and the SWRCB Industrial General Storm Water Permit 2014-0057-DWQ.

Staff has proposed that an Industrial SWPPP be prepared and implemented for 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.

The licensed CECP incorrectly referenced the city's municipal permit (Order R9-2007-0001) and Title 15, Chapter 15.12 of the Municipal Code as the authority requiring an Industrial SWPPP. Staff has changed **SOIL&WATER-3,** to reference the appropriate permitting structure which will ensure compliance with federal NPDES requirements that are outside the Energy Commission's jurisdiction and address any impacts on the city's stormwater management system the plant stormwater discharges may have.

Flooding

The EPS 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 amended CECP site is located in a non-shaded Zone X area (areas determined to be outside the 500-year floodplain).

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 amended CECP site (CH2M2007a).

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. The amended CECP site is not expected to be at risk of suffering damage due to tsunami. For a more detailed discussion of tsunami impacts see the **GEOLOGY & PALEONTOLOGY** section of this analysis.

Seiche

Seiches are standing waves that 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 five to ten feet above the mean water level in the Agua Hedionda Lagoon, well below the amended CECP finished grade of 35 feet above mean sea level (CH2M2007a). For a more detailed discussion of tsunami impacts see the **GEOLOGY & PALEONTOLOGY** section of this analysis.

Water Supply

Potable Water

Just like the licensed CECP, the amended CECP proposes to take delivery of potable water through an existing ten-inch pipeline located adjacent to the west side of the site. The potable water would be supplied by CMWD and would be used for domestic purposes and fire protection. The amended CECP would use a maximum of eight acre-feet per year (AFY) for drinking water and sanitary uses. Staff anticipates the eight AFY also includes periodic filling of the water tank for fire suppression. However, the petitioner states the system is designed to use either recycled or potable water.

In the PTA, Section 2.1.7.4, the petitioner states, “Similar to the licensed CECP, the amended CECP will use potable water as the backup water source for all CECP needs should the reclaimed water or ocean water systems become unavailable or interrupted.” Staff reviewed the Commission Decision for the CECP, dated July 11, 2012 and found that the Decision specifically prohibits use of potable water for operation. **SOIL&WATER-5** states, “Potable water shall not be used for any construction or operation activity that is suitable for non-potable water use.” The Commission Decision for the licensed CECP does not permit the petitioner to use potable water for operations. Staff believes the amended CECP should be no different; however staff does believe that in the event of interruptions in the recycled water supply the petitioner should be permitted to use potable water. It is staff’s experience there are always upsets or outages at wastewater treatment plants that supply recycled water for industrial use and that it is reasonable for short term potable water use be allowed to ensure plant reliability. Staff has modified **SOIL&WATER-5** to allow for short term interruptions that are beyond the control of the petitioner. Staff notes that the supply of tertiary treated recycled water, such as that proposed for this project, is generally a reliable source because of the strict requirements the wastewater treatment plant must comply with for protection of downstream water quality and health and safety for delivery to customers. The CMWD also has a well developed recycled-water program and staff, therefore, expects interruptions or outages to be limited.

Staff has recommended Condition of Certification **SOIL&WATER-5**, that requires the project owner to obtain service from CMWD 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**, that limits the potable water use to drinking and sanitary uses and requires the project owner to install metering devices on all water supply sources (recycled 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.

Recycled Water

The licensed CECP considered three sources of water for industrial supply: recycled water, ocean water, and potable water. The amended CECP initially was considering the use of a desalinated ocean water supply similar to the licensed CECP but recently requested that this alternative supply be removed from consideration (LL2014aa). The amended CECP seeks to use Title 22 recycled water exclusively for industrial purposes and potable water for sanitary uses (LL2014z). Recycled water would be provided by the Carlsbad Water Recycling Facility (CWRF) for CECP industrial processes, evaporative air inlet cooling, equipment wash water, fire water, and landscape irrigation. The proposed use of up to 215 AFY of recycled water is substantially less than the permitted amount approved for the licensed CECP, which is 517 AFY. This is a reduction in proposed water use relative to baseline, equal to 302 AFY. Similar to the licensed CECP, landscaping would require about 11 AFY of recycled water. The maximum expected use of each source is identified in **Soil & Water Resources Table 4** below.

Soil & Water Resources Table 4
Amended CECP Operational Water Use

	Peak Daily Rate (gal/day)	Annual Maximum (acre-feet)
Potable	17,200	8[1]
Recycled	464,400	215

1. Source: LL2014d, Figure 2.1-3a, maximum annual potable use, 2,592,000 gallons.

The existing CMWD pipeline ends at Avenida Encinas, south of Cannon Road. CMWD proposes to construct a 12-inch recycled water pipeline adjacent to the existing rail line that would connect CECP to the recycled water line located at Avenida Encinas and Cannon Road. Recycled water would be stored onsite in a 500,000-gallon raw water storage tank, with a dedicated capacity of 150,000 gallons for the fire water and 350,000 gallons for process water (LL2014vv).

The petitioner submitted a formal request to the city, dated August 2, 2014, requesting service of potable and recycled water amounts equal to the amounts listed in **Soil & Water Resources Table 4** (LL2014z). Based on information provided by the City of Carlsbad staff in the September 24, 2014 workshop, CMWD expects to issue a will-serve notice to the petitioner. Staff issued data requests (CEC2014tt) on October 28, 2014 which included a request for a copy of the city issued will-serve notice demonstrating there will be a reliable supply of recycled water for the life of the project. Staff still has not received any response as of the date of this analysis. When the data responses have been provided, staff can complete an assessment of whether there will be a reliable supply for industrial processes. Depending on what the will-serve letter states staff may revise Condition of Certification **SOIL&WATER-8** or add a new condition to ensure there is a long term contract in place to ensure there is a reliable and safe supply of recycled water. Until it can be determined under what terms recycled water will be supplied, staff has deleted Condition of Certification **SOIL&WATER-8.** Staff plans to complete the analysis for the Final Staff Assessment (FSA).

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.

Depending on the information provided by the petitioner, Condition of Certification **SOIL&WATER-8** would be revised or a new condition would be added to 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 amended CECP, impacts would be less than significant.

Wastewater

On September 24, 2014, staff attended a publicly noticed workshop along with the petitioner and City of Carlsbad staff. In attendance were Terry Smith, an engineer from the City of Carlsbad Utilities Department, and Gary Barberio the City of Carlsbad Assistant City Manager. One of the subjects of discussion was the design of the industrial wastewater discharge system, if reclaimed water were used for industrial purposes. The Reclaimed Water Balance diagram (LL2014d, Figure 2.1-3b) indicates the petitioner's original intent to discharge 262 gallons per minute (peak daily conditions) to the city sewer system. The discharge to the sewer system would flow to the EWPCF where it would be treated to secondary standards. A portion of the secondary effluent from the EWPCF would be sent to the Carlsbad Water Recycling Facility (CWRF) where it would be treated to tertiary standards and delivered throughout the city for authorized reclaimed water uses.

The petitioner submitted a formal request to the city, dated August 2, 2014, requesting their acceptance of the CECP discharge (LL2014z), as proposed in the PTA. The city staff in attendance indicated that the discharge would likely contain high levels of total dissolved solids (TDS) that would be unacceptable by the city and Encina Wastewater Authority (EWA). City staff described how their reclaimed water facility is already receiving the maximum allowable levels of TDS and cannot accept higher levels from the project. For this reason, the petitioner's request for service would likely not be accepted.

In response to the city's request to improve the quality of the industrial discharge, the petitioner subsequently proposes to use trailer-mounted demineralizer units for the amended CECP. These demineralizer units, which would also pretreat the recycled water from CMWD, are replaced with a fresh unit when the resin beds within a trailer are exhausted. The depleted unit is transferred to an offsite facility to be regenerated. At peak power output and production from the amended CECP, between two to five trailers a day could be exchanged, depending upon CECP dispatch. This trailer mounted demineralizer system would produce no liquid or solid wastes at the project site (LL2014vv).

This modification to the amended CECP would leave a very small waste stream for discharge to the city's sewer system, consisting of oily water from onsite drains and sanitary waste. Industrial contact water containing oil and suspended solids would be treated by an oil and water separator prior to discharge to the city's sewer system. For the amended CECP, this discharge stream would average about eight AFY (LL2014vv). The sanitary wastewater collection system would collect wastewater from sinks, toilets, showers, eye wash stations, and other sanitary facilities, and also discharge to the city's sewer system. The sanitary discharge stream is typically estimated to equal the amount of potable water supplies for sanitary uses. The amended CECP is expected to discharge about eight AFY of sanitary wastewater (see **Soil & Water Resources Table 4**). Compared to the licensed CECP's estimated process wastewater discharge of 187 AFY, the amended CECP estimates total wastewater discharge to the city's sewer system at 16 AFY.

For sanitary wastewater discharge to the city's sanitary sewer system, staff has recommended Condition of Certification **SOIL&WATER-7**. Condition of Certification **SOIL&WATER-7** requires the project owner to provide the CPM with a copy of the sewer hookup permit required by city and/or EWA in accordance with the city's Municipal Code, Title 13, Chapters 13.10 and 13.16. This would ensure proper disposal of sanitary wastewater.

AST DEMOLITION

The AST demolition phase would allow a larger footprint needed for the amended CECP and provide additional equipment laydown, construction parking, and staging areas. The demolition of ASTs 1, 2, and 4 would take place in conjunction with the demolition of ASTs 5, 6, and 7, which was approved in the licensed CECP Commission Decision (LL2014b §1.1). This analysis, therefore, reviews the potential environmental impacts that could occur due to the additional demolition activities, specifically removal

of the berm, the three additional ASTs, associated piping and equipment, and oily sands underneath these ASTs.

Soil Erosion Due to Water and Wind

The petitioner states that no additional soils impacts are anticipated as a result of the additional tank demolition beyond those discussed in the licensed CECP Commission Decision. Soils within the demolition areas were analyzed during the licensing process (LL2014b §3.3).

While the proposed additional demolition activities are outside the boundaries of the licensed CECP site, the areas adjacent to ASTs 1 and 2 were identified as construction laydown areas in the licensed CECP. Although demolition of ASTs 1 and 2 were not originally analyzed for the licensed CECP, these activities are similar to the approved demolition of ASTs 5, 6, and 7. Each AST is situated within its own hydraulically isolated basin separated with berms. Additional impacts from the demolition in these areas are expected to be similar considering the previously disturbed nature of the site. Also, ASTs 1, 2, and 4 were constructed below-grade within containment berms, which would effectively prevent water erosion and greatly minimize the chance for wind erosion during demolition activities.

The Commission Decision states that proper selection and implementation of erosion and sediment control best management practices (BMPs)[4], as required in accordance with **SOIL&WATER–1**, would reduce the impact of water and wind erosion to soil resources to a level that is less than significant. The licensed CECP must prepare and implement a Tier 3 Construction Storm Water Pollution Prevention Plan (SWPPP) which includes site-specific BMPs and contains all of the elements required by the General Permit for Construction Activities, the San Diego County Municipal Storm Water Permit, and the City of Carlsbad's Storm Water Standards Manual. Staff believes that requirements of **SOIL&WATER–1** are adequate for the proposed AST demolition phase of the amended CECP.

Flooding

The Commission Decision states that the CECP site is located in an area of limited potential for flooding caused by tsunamis, seiches, or large rain events. The proposed additional demolition activities would be located adjacent to or within areas that were included in the analysis of the licensed CECP. Proposed removal of the berm and AST 4 would occur within the east tank farm, which also includes ASTs 5, 6, and 7. Proposed removal of ASTs 1 and 2 would occur within the construction laydown areas approved for the licensed CECP. For these reasons, staff believes that the amended CECP would also have limited potential for flooding.

[4] Storm water and soil erosion BMPs are methods that have been determined to be the most effective, practical means of preventing or reducing pollution from nonpoint sources. BMPs can be classified as "structural" (i.e., devices installed or constructed on a site) or "non-structural" (procedures, such as modified landscaping practices). There are a variety of BMPs available, depending on pollutant removal capabilities. (See California Stormwater BMP Handbook at www.casqa.org.)

Water Supply

Under **SOIL&WATER-2**, the licensed CECP is prohibited from using potable water for any construction activity that is suitable for non-potable water use if a non-potable water source is available at the project site (CEC2012a §7.2). Additional water would be used for dust suppression for the incremental demolition activities (LL2014b, Table ES-1). Installation of the proposed recycled water pipeline is not expected to occur until Spring 2017, which corresponds with the 21st month of construction (of the 24-month construction period of the power plant), because ASTs currently occupy the location of the amended CECP power plant site, AST demolition would occur prior to this 24-month power plant construction period[5]. Therefore, the petitioner intends to use potable water for AST demolition activities (LL2014bb, §49).

The petitioner states that no additional water resource impacts are anticipated as a result of the additional tank demolition beyond those discussed in the Commission Decision. Although additional water would be used for dust suppression, this would not result in additional impacts (LL2014b, Table ES-1).

Wastewater

Wastewater generated during AST demolition of the amended CECP would result from similar activities as the licensed CECP. Anticipated sources of wastewater would primarily consist of wash water and sanitary wastes. Sanitary waste would be contained in portable facilities and routinely disposed of at an offsite treatment/disposal facility by a sanitary service. Although the amended CECP would require a larger workforce and lengthen the AST demolition phase by about two or three months, staff believes this is adequate to address the additional volumes of sanitary wastewater.

Water Quality of Surface Waters

Under **SOIL&WATER-1**, the licensed CECP is required to prepare and implement a Tier 3 Construction SWPPP to mitigate impacts to the Pacific Ocean and Agua Hedionda Lagoon from construction activities[6] (CEC2012a §7.2). The petitioner submitted a SWPPP that includes site-specific best management practices to control storm water and soil erosion during the AST and berm demolition phase of the amended CECP. The petitioner states that no additional water resource impacts are anticipated as a result of the additional tank demolition beyond those discussed in the Commission Decision (LL2014b, Table ES-1).

The existing topography of the area limits the potential for offsite water contamination. ASTs 1, 2, and 4 were constructed below-grade within containment berms, which would prevent direct discharge to nearby water bodies in the event of an accidental spill of a harmful substance. Also, BMPs implemented for the Construction SWPPP would

[5] The amended CECP would involve a schedule that could be described in four phases: (1) tank demolition and remediation; (2) construction, commissioning, and operation of the new power plant; (3) retirement and decommissioning of the EPS facility; and (4) demolition of the EPS facility. For details the expected time periods of the amended CECP schedule, see Table 1 in the **PROJECT DESCRIPTION** section of this PSA.

[6] For purposes of this PSA, demolition of the ASTs falls under the definition of project construction activities. (See **General Conditions** section of this PSA.)

provide added protection from accidental spills. Staff believes that requirements of **SOIL&WATER–1** are adequate for the amended CECP.

Water Quality of Groundwater

The CECP site is located within the Agua Hedionda groundwater basin. The Commission Decision states that no contact with groundwater is expected and it would not be encountered during construction activities. The elevation of the CECP site is approximately 30 feet above mean sea level, and groundwater has been encountered on the EPS site at depths between 20.8 and 28.9 feet below ground surface. The proposed additional demolition activities would be located adjacent to or within areas that were included in the analysis of the licensed CECP. Additionally, the petitioner does not propose to use groundwater and the groundwater beneath the site is brackish with no beneficial uses. For these reasons, staff believes that the amended CECP would have limited potential for groundwater impacts.

EPS DEMOLITION

The Commission Decision imposed conditions of certification requiring the project owner to develop a Demolition, Removal, and Remediation Plan to be implemented at such a time when the EPS is no longer needed for the reliable operation of the electricity system[7]. Because those conditions would have led to the eventual removal of existing facilities and redevelopment of the EPS, the Commission Decision also discusses the potential impacts of those activities. At the time, it was unknown when the EPS would likely be decommissioned, so no plan was available regarding its demolition and removal. As a result, staff assessed the reasonably foreseeable environmental impact and recommended feasible mitigation measures for the possible demolition of the EPS. The Commission Decision did not include SOIL&WATER-specific conditions of certification for EPS demolition activities, but determined that potential environmental impacts of EPS demolition can be mitigated with measures similar to those imposed upon the licensed CECP (CEC2012a §8.1).

The amended CECP includes demolition of the EPS facility[8]. The EPS shutdown and demolition schedule is anticipated to take 36 months and would begin after the amended CECP facility achieves commercial operation. Subsurface remediation of the EPS is not included in the amended CECP. The petitioner submitted a preliminary demolition plan that provides an overview of how demolition would occur, the sequence it would follow, what equipment and manpower would be required, what material would be brought onto the site, types and volumes of material and waste that would leave the site, and what could be salvaged for resale or recycling (LL2014cc §1.2). Staff analyzed the preliminary demolition plan and related supplemental material submitted by the petitioner for potential impacts to soil and water resources[9].

[7] For background and details on the requirement for the licensed CECP to develop a Demolition, Removal, and Remediation Plan for the EPS, see the discussion pertaining to **LAND-2** and **LAND-3** in the **LAND USE** section of this PSA.
[8] NRG Energy, Inc. is the parent company of both Carlsbad Energy Center LLC (project owner of CECP) and Cabrillo Power West LLC (owner of EPS).
[9] For purposes of this PSA, demolition of the EPS falls under the definition of project construction activities. (See **General Conditions** section of this PSA.)

Soil Erosion Due to Water and Wind

The amended CECP proposes that during demolition of EPS, all foundations at and below plant-grade would be left in place. The intent is to leave in place the base foundation of the respective EPS Units 1–5 power blocks and the cooling water intake canals. Ground disturbance would be mainly due to removal/capping of underground pipes and equipment activity on unpaved/unstabilized surfaces. Related activities include: removal of intake pumps and piping from the ocean intake structure; removal of all utility associated piping and cut and cap lines at grade; and remediation, cleaning, dismantlement and removal of fuel oil lines contained in accessible below-grade trenches. Below grade piping would be identified and sealed pending final below grade demolition.

Upon completion of above-ground demolition of the EPS, stabilization features may be required to stabilize areas onsite, such as foundations, safety barriers, future assessment areas, stockpiles, and parking areas. These features would be considered temporary until final site assessment and development occurs. These stabilization features would need to be designed for long term management of areas and may require significant engineering and construction. The petitioner states that these features would be engineered to ensure safety and environmental management and require minimal maintenance (LL2014cc §7.1).

Demolition projects are required to implement effective Storm Water BMPs to eliminate discharge of pollutants to the storm drain conveyance system and to receiving water bodies. If the demolition involves excavation or grading that results in ground disturbance of one acre or greater, the project is subject to the State Construction General Permit and is required to prepare a Storm Water Pollution Prevention Plan and obtain a Notice of Intent from the State Water Board prior to issuance of a demolition permit. Staff believes that requirements of **SOIL&WATER–1** are adequate for the proposed EPS demolition phase of the amended CECP.

Flooding

Flood hazards include direct flooding due to overtopping of nearby rivers or streams resulting from severe rainstorms. To identify the different types of flood risks for a given location, various flood hazard maps were developed by the Federal Emergency Management Agency (FEMA) from comprehensive studies of statistical data for river flow, storm tides, hydrologic/hydraulic analyses, and rainfall and topographic surveys. Comparing the EPS elevation (26 feet above msl) and EPS site location to these maps, the EPS site is not located within a 100-year floodplain (Zone A) as defined by the FEMA (1997). The general region is flat and there are no significant dams or levees in the project vicinity.

Tsunami

The Pacific Ocean is approximately 300 feet to the west of the EPS western site boundary. 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 three feet, well below EPS elevation of 26 feet amsl. Additionally, the EPS site is located outside the area of expected coastal flooding from tsumanis, as shown by San Diego County's Tsunami Inundation Map (2009).

Seiche

The Agua Hedionda Lagoon, located about 3,000 feet north of EPS, is a coastal estuary extending approximately 1.7 miles inland and up to half a mile wide. 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 which is well below EPS elevation of 26 feet amsl.

For these reasons, staff believes that EPS demolition activities would not have significant impacts pertaining to these identified flood hazards.

Water Supply

Water would be required during demolition activities in and around structures for decontamination and dust control. Based on the CMWD's reclaimed water pipeline installation project schedule, reclaimed water should be available for use during EPS demolition, which is anticipated to start in 2019. In the event reclaimed water cannot or will not be made available, potable water from the public water system would be used. The estimated total water use over the 36-month period is approximately 320 acre-feet (LL2014bb §50).

The Commission Decision states that potable water shall not be used for any construction activity that is suitable for non-potable water use if a non-potable water source is available at the project site, in accordance with **SOIL&WATER–2**. Because the amended CECP includes demolition of above-ground structures located west of the railroad tracks, these areas are all considered included in the overall project site. Therefore, staff recommends that **SOIL&WATER–2** requirements also apply to proposed activities related to EPS demolition. To ensure that recycled water is used during EPS demolition, staff has amended **SOIL&WATER-2** and **SOIL&WATER-6**.

Wastewater

Wastewater generated from municipal water use is disposed of from the site via the sanitary sewer system. The basements of EPS Units 4 and 5 are more than 16 feet below sea level and, as a result, receive seepage from groundwater. To prevent flooding of these basements, sumps were installed to collect the seepage water (which is nonhazardous). Pumps automatically discharge the sump contents directly to the once-through-cooling system. The other types of wastewater at the EPS site historically included Low-Volume Waste, Extended Waste, and Treated Waste (further described below). The EPS industrial wastewater facility, located north of the SDG&E switchyard, includes six aboveground water storage tanks to manage these different types of wastewater (LL2014kk).

Low-Volume Waste is wastewater that does not have the potential to be hazardous but still requires management pursuant to the NPDES permit[10]. The Low Volume Wastewater Treatment Facility treats this wastewater before it is discharged to the facility's once-through cooling water system. The Low Volume Waste Tanks (that discharge via the NPDES permit), are in continuous service for current operations at EPS (LL2014kk).

Extended Waste is wastewater with the potential to be hazardous. Formerly, the burning of fuel oil at EPS generated metal cleaning wastes that required treatment by the Wastewater Treatment System. The Extended Waste Tanks held untreated wastewater, and the Treated Water Tanks held the treated wastewater prior to discharge to EWA. When EPS began operating solely on natural gas in 2009, the need for the wastewater treatment system was eliminated. It was decommissioned then later removed in September 2012 due to construction of the Carlsbad Seawater Desalination Project. The Treated Water Tanks formerly associated with the demolished wastewater treatment system are empty and on standby. The Extended Waste Tanks are currently in service for additional non-hazardous wastewater storage (LL2014kk).

During demolition of EPS, the pumps, tanks, and equipment associated with the existing EPS Extended Waste Tanks and Low Volume Wastewater Management systems would be maintained until the end of demolition to ensure management of wastewater generated. Demolition of these wastewater systems would occur only after demolition of the main EPS facility is complete and post-demolition dewatering and storm water quality is assured (LL2014cc §5.5.4).

While EPS is in lay-up/stabilization phase prior to redevelopment, a modular wastewater management system (temporary, Baker-type tanks) may be used to manage wastewater from the power block areas and other general EPS areas (LL2014cc §5.5.4).

According to the petitioner's Preliminary Demolition Plan, EPS pre-demolition activities would include removal of materials and equipment onsite that have the potential to contain hazardous or objectionable material in addition to abatement activities (LL2014cc §4.0). When water is used to help isolate hazardous material during removal (when allowed), runoff water must be collected and disposed as required in the **WASTE MANAGEMENT** section of this PSA. Assuming that all hazardous substances would be removed prior to demolition, staff agrees that maintaining the existing wastewater systems during nonhazardous demolition activities would sufficiently manage nonhazardous wastewater. However, prior to the demolition of ocean water intake/discharge piping, structures and equipment, discharge from the Low Volume Wastewater Treatment Facility and basement seepage of groundwater must be properly collected and disposed of. Staff recommends **SOIL&WATER-9** requiring the project owner to submit proof of proper wastewater disposal, in accordance with waste discharge requirements of the Clean Water Act (CWA). Adoption of **SOIL&WATER-9** would reduce potential impacts from proposed management and disposal of wastewater during EPS demolition to a less than significant level.

[10] Low-Volume Waste is generated by the following waste streams: evaporator blowdown, sample drains, floor drains, demineralizers, softeners, condenser cleaning, sand filter backwash, potable demineralizer rinse flush, reverse osmosis membrane cleaning, and salt water heat exchanger drains.

Surface Water and Groundwater Quality

Materials and equipment onsite that have the potential to contain hazardous or objectionable material would be surveyed to locate, characterize, and delineate the removal quantities of environmentally hazardous and objectionable materials. Prior to demolition of EPS, abatement activities would be conducted in accordance with applicable conditions of certification and state and federal regulations (LL2014cc §4.0). For further discussion on the characterization and abatement of hazardous materials, see the **WASTE MANAGEMENT** section of this PSA.

During demolition of EPS, all foundations at and below plant-grade would be left in place. Any equipment that can be removed from the EPS basement or vaulted areas would be removed, leaving the basement or vault structures in place. The below-grade structures and onsite canal features may accumulate storm water or groundwater seepage. This wastewater is collected and conveyed to the wastewater facility described above, which is currently regulated under an individual industrial NPDES waste discharge permit. Industrial NPDES discharge permits require monitoring and testing as deemed necessary by the SDRWQCB. During demolition of EPS, the same infrastructure would remain in-place, but a new Report of Waste Discharge would be filed with the SDRWQCB (LL2014y §63, LL2014cc §7.1).

Upon completion of above-ground demolition of the EPS, an updated NPDES permit is anticipated to regulate EPS during its lay-up/stabilization phase. The site would be subject to continued observation, monitoring, and reporting under the updated NPDES permit. In addition, the existing EWA wastewater discharge permit would be maintained or updated as needed to manage wastewater streams from the power block areas and other EPS areas currently serviced by the EWA discharge permit (LL2014cc §7.1).

Staff agrees that an updated NPDES discharge permit to regulate ocean discharges during EPS demolition would reduce impacts to surface water and groundwater quality to less than significant. Staff recommends edits to **SOIL&WATER-4** to ensure compliance with NPDES requirements during demolition activities.

CUMULATIVE IMPACTS

A project may result in a significant adverse cumulative impact where its effects are cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects (California Code Regulations, Title 14, section 15130).

Staff believes that, similar to the licensed CECP, the amended CECP would reduce the potential for significant environmental impacts to local water resources and water quality relative to the licensed CECP. The amended CECP would therefore not contribute to a significant cumulative impact.

WATER SUPPLY AVAILABILITY

The following sections discuss the availability of water sources for the amended CECP.

POTABLE WATER AVAILABILITY

Carlsbad Municipal Water District, City Potable Supplier

The amended CECP is located within the service area of the Carlsbad Municipal Water District (CMWD), which imports water through the San Diego County Water Authority (SDCWA) for their potable water needs. SDCWA is San Diego County's regional water wholesaler supplying the western third of San Diego County, formed in 1944 for the purpose of supplementing local supplies with imported water. Approximately 80 percent of annual water supplies in the SDCWA service area have been imported from the Colorado River and State Water Project[11].

CMWD currently does not use any local groundwater and surface water supplies, although in the past both types of water sources have been used. Potable water is delivered through four separate SDCWA treated water connections that supply CMWD and other neighboring water districts. Water storage for the CMWD is provided by Maerkle Reservoir and ten additional reservoirs within the distribution system. The CMWD water distribution system is flexible in that supply from the four connections can be routed to different parts of the distribution system by making changes to several key valve settings. This allows system operators to balance reservoir levels and correct for discrepancies in the amount of water ordered versus the amount that is delivered through service connections (CMWD2012b §1.1).

The licensed CECP approved 19 AFY of potable water supplied by CMWD for domestic purposes and fire protection, via the existing EPS water supply infrastructure. The amended CECP is expected to use up to 8 AFY of potable water during operations (see **Soil & Water Resources Table 4**). The amended CESP water use compared to the existing EPS, which must be shutdown and demolished, would further reduce the potable water usage at the amended CECP.

Staff expects CMWD to provide the petitioner with a will-serve letter that CMWD can serve the amended CECP with potable water for the life of the project. As discussed in earlier sections of this analysis, the petitioner submitted a request for service to CMWD in August 2014 for recycled water, potable water for sanitary uses, and sewer service for disposal of sanitary and project drain wastewater. Staff expects CMWD to issue a will-serve letter for potable water prior to completion of the FSA.

RECYCLED WATER AVAILABILITY

Carlsbad Municipal Water District, City Recycled Supplier

The licensed CECP was approved to use two sources for its industrial water supply. Tertiary treated recycled water from CMWD was originally proposed as the primary source, but at the time the availability of recycled water was uncertain. As a result, the Commission Final Decision approved desalinated ocean water produced on-site as an alternative source of industrial water should recycled water not be available.

[11] Calculated five year average (2009-2013) from data published in SDCWA Annual Reports.

The amended CECP would use up to 215 AFY of recycled water, compared to the licensed CECP permitted amount of 517 AFY. The amended CECP would not use desalinated ocean water as a water source (LL2014aa). The primary source for industrial supply would be Title 22 tertiary treated water from CMWD. CMWD currently receives recycled water from three water recycling facilities (CMWD2012c §4.3):

1. The Carlsbad Water Recycling Facility (CWRF), owned by CMWD but operated by the Encina Wastewater Authority (EWA), is permitted by SDRWQCB for treatment and reuse of up to 4.0 million gallons per day (mgd).

2. The Meadowlark WRF, owned and operated by the Vallecitos Water District, provides CMWD up to 5.0 mgd of recycled water for purchase and distribution.

3. The Gafner WRP, owned and operated by the Leucadia Wastewater District, provides CMWD up to 2.0 mgd of recycled water for purchase and distribution.

Staff expects CMWD to provide the petitioner with a will-serve letter that CMWD can serve the amended CECP with recycled water for the life of the project. As discussed in earlier sections of this analysis, the petitioner submitted a request for service to CMWD in August 2014 for recycled water, potable water for sanitary uses, and sewer service for disposal of sanitary and project drain wastewater. Staff expects CMWD to issue a will-serve letter for recycled water supply prior to completion of the FSA.

2012 Recycled Water Master Plan

Staff investigated the availability of recycled water by reviewing a number of planning documents that discuss the CMWD recycled water supply. The 2012 Recycled Water Master Plan contains a comprehensive analysis of the CMWD recycled water system, including supply sources, demands, and past and future needs.

CMWD started its recycled water program in 1990, then later expanded recycled water service from 2004 through 2010 in response to increased demand. Demand increased from 1,849 AFY in 2004 to 3,517 AFY in 2010 (CMWD2012a, Table 3.2), with supplies also increasing. The long-term, total potential demand of recycled water for existing and potential customers is estimated to be approximately 9,812 AFY, which includes demand from large potential recycled water customers located outside CMWD's service area in neighboring communities. The potential build out demand calculated for planning purposes ("Ultimate" system demand conditions) is estimated at 9,106 AFY, which subtracts the potential customers located in areas that would require cost-prohibitive infrastructure expansions (CMWD2012a, Table 3.13).

Based on the information provided in the 2012 Recycled Water Master Plan, CMWD average annual supply has been able to meet the recycled water demands of their service area (CMWD2012a, Figure 4.1). During periods of high recycled water demands or recycled water supply outages, CMWD has supplemented its recycled water system with potable water. Because existing recycled water use is for irrigation, demand fluctuates seasonally. Highest demand occurs in the summer months during higher temperatures and less rainfall, resulting in increased irrigation. For 2010, the month of maximum demand occurred in June at 5.8 mgd, compared to the month of minimum demand in February at 0.51 mgd. That year, CMWD added a total of 30 acre-feet of

potable water to the recycled water system[12] when daily demands exceeded the supply capacity, comprising about one percent of the total supply of 2010 (CMWD2012a, Table 4.2).

CMWD is implementing a phased approach to meet its "Ultimate" demand conditions for recycled water with a planning horizon of 2030. **Soil & Water Resources Table 5** summarizes the projected demand conditions and target supply capacity for each phase. The Maximum Month Demand incorporates peaking factors to account for increased demand during summer. The capital improvement projects identified in the Recycled Water Master Plan include: pipeline extension projects to deliver recycled water to potential customers; expansion of the existing treatment capacity at CWRF to increase production of tertiary recycled water; and additional off-peak storage of tertiary treated recycled water to buffer demand fluctuations. These future expansion efforts are expected to increase the availability of the long-term supply.

Soil & Water Resources Table 5
CMWD Projected Recycled Water Demand

	Phase I & II (1993-2010)	Phase III (2011-2020)	Build Out Phase (2021-2030)
Projected Customer Demand			
Average Annual (AFY)	4,100	7,414	9,106
Average Daily (mgd)	3.7	6.6	8.1
Maximum Month (mgd)	6.3	11.0	13.5
Additional Supply Needed			
Average Annual (AFY)	-	3,314	1,692
Maximum Month (mgd)	-	4.7	2.5

Source: CMWD2012a

The 2012 Recycled Water Master Plan indicates that the CMWD was meeting their demand for recycled water at the time of the report. The document lists the "NRG power plant" as a potential customer with future demand of 711 AFY in the Phase III planning period. It is identified as the only industrial supply expected to take recycled water in the future. Phase III was developed assuming that future need by the NRG power plant would be 711 AFY; the amended CECP is currently proposing to use up to 215 AFY recycled water (LL2014vv). These numbers reveal that the amended CECP would create less of a demand on the recycled water system than previously expected.

The Recycled Water Master Plan gives confidence that implementation of Phase III would allow CMWD to meet recycled water needs of the amended CECP in the near term (2010-2020), and in the long term (2021-2030).

[12] Potable makeup water use of 30 AFY in 2010 was comprised of 4.8 AFY in June when demands peaked and 25.7 AFY when Gafner WRP was offline for several months. Total supply to customers in 2010 was 3,466 AFY (including potable makeup water).

IRWM Grant Program

On October 30, 2014, the California Department of Water Resources (DWR) conditionally awarded funding through the Integrated Regional Water Management (IRWM) Grant Program for projects that develop local water supplies. San Diego County Water Authority was awarded $15,075,000 to fund seven projects, including portions of CMWD's Phase III improvements (extension of two pipeline segments and expansion of the existing treatment capacity at CWRF). Completion of these CMWD projects is scheduled for June 2017 (San Diego IRWM2014), which would make additional recycled water supplies available before the end of construction of the amended CECP. This grant gives confidence that Phase III would be implemented; allowing CMWD to increase production of recycled water and meet recycled water needs of the amended CECP.

Recent City Council Approvals

On October 7, 2014, the CMWD adopted Resolution Number 1502, amending an earlier approval for the design of the CMWD Phase III pipeline extension. The purpose of the Resolution is to allow for the design of a 3,700-foot, 12-inch pipeline to connect the amended CECP power plant to the existing CMWD pipeline at the current end point at Cannon Road. The Mitigated Negative Declaration and Mitigation Monitoring and Reporting Program were approved by CMWD through Resolution No. 1455, on November 27, 2012.

On October 21, 2014, the CMWD adopted Resolution Number 1504, amending the Professional Services contract for the CWRF Phase III expansion. This Resolution also approves the use a Design-Build contract for the CWRF expansion, in order to meet DWR grant funding milestone requirements. The expansion project includes additional microfiltration equipment, influent pumps, a chlorine contact tank, and an increase of the treatment capacity of the CWRF to 7.0 mgd (or 7,841 AFY).

The recent grant awards and environmental document approvals give additional confidence that CMWD could meet the amended CECP needs in the near term (2010-2020) and in the long term (2021-2030).

Settlement Agreement

The amended CECP evolved from a series of meetings and discussions which began in late 2013 between the licensed CECP project owner and its parent company (NRG, Inc.), the City of Carlsbad, its water agency (CMWD), and the local investor-owned utility, San Diego Gas and Electric (SDG&E.) These discussions culminated on January 14, 2014, with a signed "Settlement Agreement" signed by all five parties. The agreement contained the blueprint for the project modifications that would result in the amended CECP.

The Agreement states that the City of Carlsbad, CMWD, and CECP will work together to establish services to the CECP including recycled water, potable water supply, and sanitary sewer service. The Agreement also describes the mutual commitment by all parties to help the CECP receive all necessary utility services.

Reliability of Recycled Water versus Potable Water

Annual surface water deliveries in California are often determined based on percent of rainfall relative to normal conditions. This means that in dry years, water rights holders could receive less than 100 percent of their normal water supply. The supply of recycled water may not be subject to the same variability. For instance, the Encina Water Pollution Control Facility (EWPCF) has a secondary treatment capacity of 40.5 mgd and is permitted discharge 45,366 AFY water treated to secondary treatment standards for ocean disposal (San Diego RWQCB, Order No. R9-2011-0019). The CWRF currently has the capacity to treat 4.0 mgd of this secondary effluent to tertiary treatment standards for recycled water customers. This suggests the CMWD has an abundant supply of secondary effluent available from EWPCF to increase the treatment capacity for tertiary treated recycled water.

Also, the volume of water discharged to wastewater treatment plants from toilet, sink, and other sanitary uses generally fluctuate less than the amount of rainfall from year to year. For this reason, CMWD exempts recycled water from its drought watering restrictions for potable water customers.[13] This is why recycled water supplies are often referred to as a drought-proof supply, as supplies are generally constant year round and less affected by droughts.

Recycled Water Accounting

There is a long history of recycled water reuse projects in San Diego County. Currently the only permitted potable reuse projects in California are for 'indirect' projects such as those where purified wastewater is applied to the ground surface for infiltration or injected into groundwater for basin recharge, before it's used to augment drinking water supplies. The state of California does not currently allow 'direct' use of recycled water as a domestic supply, but initial steps have been made toward potentially developing uniform regulatory criteria. Senate Bill 322 was signed in 2013 that directs the Department of Public Health, in consultation with the SWRCB, to investigate the feasibility of developing regulatory criteria for direct potable reuse and to provide a final report. In San Diego County, SDCWA and the City of San Diego have investigated the potential for augmenting surface water reservoirs with highly treated waste water. Although years of research have proven that technology is available to allow direct potable reuse as a safe and reliable treatment option, until recycled water is approved for 'direct use', it cannot currently be considered a potable supply.

The San Diego Integrated Regional Water Management (IRWM) Region states that "any new supplies that are available in the region (such as recycled water) will be used to offset purchase of imported water supplies." This indicates that an increase in recycled water use can, in some cases, reduce the demand on potable water supplies. It is still unclear if this is a net increase or decrease on the water supply system. If recycled water use is equivalent to potable uses, then one gallon of recycled water is equal to one gallon of potable water. If recycled waste water is strictly viewed as an

[13] In August 2014, the CMWD declared a Drought Response Level 2 due to the deterioration of water supply conditions statewide. Mandatory measures include limits to residential and commercial landscape irrigation that restricts the time of day for watering and the length of time per assigned day. Recycled water is exempt from these watering restrictions.

offset, then one gallon of recycled water is equal to a negative one gallon of potable water. The distinction could be important in the context of the Water Code Sections 10910 through 10915, which require the lead agency to determine if a project increases system demands and if the definition of a “Project” is satisfied.

Alternative Water Supplies

The amended CECP would consider the use of potable water for industrial operation if recycled water was not available. Staff’s suggested Condition of Certification **SOIL&WATER-6** states that if the petitioner were to use potable water for full-time operation, a Petition to Amend the project would need to be filed. Though the petitioner formally withdrew the request to use ocean water for industrial operations, ocean water is still a potentially feasible backup water supply for the project. A Petition to Amend would need to be filed if the petitioner were to formally request to use ocean water for power plant operation.

COMPLIANCE WITH LORS AND STATE POLICIES

WATER SUPPLY ASSESSMENT

California Water Code, Sections 10910-10915 (Senate Bill 610)

California Water Code, Sections 10910-10915 are intended to inform CEQA decision makers about project water supplies and their availability. The California Department of Water Resources (DWR) Senate Bill 610 Guidebook provides general guidance about how to interpret Water Code Sections 10910-10915. The central theme of the Guidance is that WSAs are necessary for projects that increase the demand on the local system substantially. The Guidebook also emphasizes that WSAs are necessary in areas with a poorly understood water supply, or in an area where the project would increase area or district demand substantially (DWR, 2003). The project is located in a very well studied service area with many service connections, but above all, the project does not substantially increase the demand for potable water on the system.

Staff asked CMWD to determine if they will be preparing a WSA for the amended CECP. CMWD informed staff that a WSA is not necessary for the amended CECP because it is not a “project” as defined in Section 10912.

Staff has nevertheless included in its analysis a substantial discussion of the local water supplies in the “Water Supply Availability” section above.

CLEAN WATER ACT

Staff has determined that the amended 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 (recycled) 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 and SWRCB, the petitioner would submit a Report of Waste Discharge (ROWD) and/or a National Pollutant Discharge Elimination System (NPDES) permit application to the SDRWQCB or SWRCB for stormwater discharges. The petitioner may also be required to submit a ROWD for discharge of industrial wastewater depending on what method of disposal is proposed. Staff is awaiting information to determine what regulatory framework would be required to ensure potential impacts can be mitigated. When the information has been provided, staff can complete the analysis in the FSA.

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 amended 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 amended CECP, the project owner would be fully compliant with this section of the water code.

TITILE 17 AND TITLE 22 CALIFORNIA CODE OF REGULATIONS

Through compliance with Condition 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 of Carlsbad's Municipal Code, as proposed by the project owner, 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

In prior policy documents (e.g., the *2003 Integrated Energy Policy Report*) the California Energy Commission has stated that it 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 for industrial processes, the amended CECP would comply with this policy provided staff data requests related to the new system design needed for disposal of wastewater from recycled water use can be addressed.

NOTEWORTHY PUBLIC BENEFITS

The amended CECP would use recycled water for project construction and operation and would reduce the impact to the potable water supply for the City of Carlsbad by the elimination of current uses at the EPS.

CONCLUSIONS

Staff's conclusions based on analysis of the information are as follows:

1. Though the petitioner has submitted a Request for Service to CMWD for recycled water, potable water, and sewer service, CMWD has yet to formally respond. Staff will need a formal response from CMWD prior to issuing the FSA.

2. The amended CECP would eliminate the possibility of using ocean water for power plant cooling at this site. This protects the beneficial uses of the Pacific Ocean and is a public benefit.

3. Condition of Certification **SOIL&WATER-1**,updated to reference the most recent general construction storm water permit Order No. 2009-0009-DWQ, would reduce or avoid impacts of soil erosion and storm water runoff to surface water and groundwater quality during CECP construction, AST demolition, and EPS demolition.

4. Condition of Certification **SOIL&WATER-3**,updated to reference the most recent general industrial storm water permit Order No. 2014-0057-DWQ, would reduce or avoid impacts of soil erosion and storm water runoff to surface water and groundwater quality during CECP operations.

5. Condition of Certification **SOIL&WATER-4** was updated to change ocean discharge requirements. The amended CECP no longer proposes desalination, but nonhazardous wastewater discharge is expected to occur during EPS demolition activities.

6. Condition of Certification **SOIL&WATER-5** was edited to limit potable water use to drinking, sanitary, and fire protection uses and allows for emergency backup use in accordance with **SOIL&WATER-6**.

7. Condition of Certification **SOIL&WATER-6** was edited to limit potable water use to drinking and sanitary uses, require recycled water use for industrial processes, and reflect the elimination of ocean water as a potential source of industrial supply water.

8. Condition of Certification **SOIL&WATER-7** was changed to remove the requirement for connection to the sanitary sewer for discharge of high-salinity industrial wastewater.

9. Condition of Certification **SOIL&WATER-8** was deleted because the petitioner has not provided a will-serve letter demonstrating a reliable and safe long-term supply of recycled water is available for industrial process use. Staff would recommend revising the existing condition or adding a new condition depending on the information the petitioner provides staff in response to outstanding data requests.

10. Condition of Certification **SOIL&WATER-9** was added to mitigate for wastewater disposal needs produced during EPS demolition.

    A WSA is not necessary for the amended CECP because it is not a "project" as defined in Section 10912. PROPOSED CONDITIONS OF CERTIFICATION

Staff has proposed modifications to the **Soil & Water Resources** Conditions of Certification as shown below. (**Note:** Deleted text is in ~~strikethrough~~, new text is **bold and double-underlined**)

SOIL&WATER-1: The project owner shall comply with the requirements of the San Diego County Municipal Storm Water Permit (Order **No.** R9-~~2007~~**2013**- 0001, NPDES No. **CAS0109266** ~~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 submitted to the City for review and comment and to the CPM for approval and shall contain all of the elements required by the General Permit for Construction Activities (Order No. ~~99-08~~ **2009-0009**-DWQ and its updates), the Municipal Permit (**Order No. R9-2013- 0001, NPDES No. CAS0109266**~~Order No. 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 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 ten 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**, including EPS demolition activities,** that is suitable for non-potable water use if a non-potable water source is available at the project site. Prior to site mobilization, 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 in construction activities. The plan shall consider the use of ocean water and reclaimed water available at the site. The plan shall specify those construction activities that would use non-potable water and those construction activities that would use potable water.

Verification: Prior to site mobilization, the project owner shall submit to the CPM for review and approval the Non-Potable Construction Water Use Plan. Within the Monthly Compliance Report, the project owner shall report the volume of potable and non-potable water used and the construction activities for which each 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 submitted to the City for review and comment and to the CPM for review and approval and shall be prepared in

accordance with the requirements of the NPDES General Permit for Industrial Activities (~~WQO-97-03-DQM~~ **Order No. 2014-0057-DWQ**) 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~~ **EPS demolition** wastewater to the Pacific Ocean **in accordance with NPDES requirements**. 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~~ **start of EPS demolition activities**, the project owner shall submit to the CPM a copy of the approved WDR Order for the discharge of ~~CECP industrial~~ **EPS demolition** 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, Chapter 14.08 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**, unless needed for emergency backup use or fire protection in accordance with SOIL&WATER-6.**

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: **During normal operation the project shall use a maximum of eight acre-feet per year of potable water for drinking, sanitary, and fire protection purposes. The project shall use recycled water for all industrial and landscape irrigation purposes during operation, unless potable water is needed for emergency backup use. For the purpose of this condition, the term emergency shall mean the inability of the CECP to take, or for the City of Carlsbad to deliver, recycled water to the CECP in a quantity sufficient to meet CECP demand due to Acts of God, natural disaster, and other circumstances beyond the control of the project owner and it is necessary for the CECP to continue to operate to serve a peaking load. If potable water is needed during operation for more than just an emergency use, the owner shall be required to file a formal Request to Amend the project. Recycled water shall also be used for EPS demolition.**

Prior to the use of potable **or** 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**, emergency backup, and** recycled **supplies**~~, 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 **and emergency uses** of potable **and**, 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, Chapters 13.04, 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, Chapters 13.04, 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 ten days of receipt and fully explain the corrective actions taken in the annual compliance report.

SOIL&WATER-8: **DELETED.** ~~If the project owner relies on recycled water for CECP water supply, 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 supply 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 945 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.~~

SOIL&WATER-9: Prior to transport and disposal of any facility construction or demolition-related wastewaters offsite, the project owner shall test and classify the stored wastewater to determine proper management and disposal requirements. The project owner shall provide evidence that wastewater is disposed of at an appropriately licensed facility. The project owner shall ensure that the wastewater is transported and disposed of in accordance with the wastewater's characteristics and classification and all applicable LORS (including any CCR Title 22 Hazardous Waste and Title 23 Waste Discharges to Land requirements).

Where discharge of wastewater must comply with the San Diego Regional Water Quality Control Board (SDRWQCB) and State Water Resources Control Board regulatory requirements, the project owner shall submit a Report of Waste Discharge (ROWD) to the compliance project manager (CPM) and SDRWQCB for determination of which regulatory waiver or permit applies to the proposed discharges. The project owner shall pay all necessary fees for filing and review of the ROWD and all other related fees. Checks for such fees shall be

submitted to the SDRWQCB and shall be payable to the State Water Resources Control Board. The project owner shall ensure compliance with the provisions of the waiver or permit applicable to the discharge. Where the regulatory requirements are not applied pursuant to a National Pollutant Discharge Elimination System permit, it is the Commission's intent that the requirements of the applicable waiver or permit be enforceable by both the Commission and the SDRWQCB. In furtherance of that objective, the Commission hereby delegates the enforcement of the waiver or permit requirements, and associated monitoring, inspection, and annual fee collection authority, to the SDRWQCB. The CPM and SDRWQCB shall confer with each other and coordinate, as needed, in the enforcement of the requirements.

Verification: The project owner shall submit to the CPM copies of all relevant correspondence between the project owner and the SWRCB or SDRWQCB about the EPS demolition wastewater discharge requirements within ten days of its receipt or submittal. This information shall include copies of the Notice of Intent and Notice of Termination for the project. A letter from the SWRCB or SDRWQCB indicating that there is no requirement for the discharge of EPS demolition wastewater would satisfy this condition.

Prior to transport and disposal of any facility construction-related wastewaters offsite, the project owner shall test and classify the stored wastewater to determine proper management and disposal requirements. The project owner shall ensure that the wastewater is transported and disposed of in accordance with the wastewater's characteristics and classification and complies with all applicable LORS (including any CCR Title 22 Hazardous Waste and Title 23 Waste Discharges to Land requirements). The project owner shall provide evidence to the CPM of proper wastewater disposal, via a licensed hauler to an appropriately licensed facility, in the monthly compliance report.

Where a ROWD is submitted to the SDRWQCB to obtain the appropriate waiver or permit, the appropriate waiver or permit must be obtained at least 30 days prior to the discharge.

The project owner shall submit a copy of any correspondence between the project owner and the SDRWQCB regarding the waiver or permit and all related reports to the CPM within ten days of correspondence receipt or submittal.

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TRAFFIC & TRANSPORTATION

Andrea Koch, James Adams, and William Walters

SUMMARY OF CONCLUSIONS

California Energy Commission staff (staff) has analyzed the proposed modifications to the Carlsbad Energy Center Project (licensed CECP) contained in the April 29, 2014 Petition to Remove (PTR) and the May 2, 2014 Petition to Amend (PTA) filed by Carlsbad Energy Center LLC (project owner/petitioner). With this information and information from other sources, staff has determined the potential for the amended Carlsbad Energy Center Project (amended CECP) to cause 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 amended CECP and demolition of the existing Encina Power Station (EPS) would add traffic to local roadways. This increase in traffic could impact existing traffic load and capacity of the street system. In addition, construction/demolition activities could result in impacts to emergency access and parking capacity, encroachment on public transportation and pedestrian facilities, and additional oversize and overweight vehicles on the local street system. However, the amended CECP would generate less peak construction traffic than the licensed CECP, resulting in reduced traffic impacts. Implementation of proposed Condition of Certification **TRANS-1**, which would require preparation and implementation of a traffic control plan, would mitigate these traffic impacts to less than significant. Like the licensed CECP, the amended CECP would generate minor operational traffic that would cause less than significant impacts to traffic levels of service and would require no mitigation.

Like the licensed CECP, the amended CECP would generate gas turbine and air cooler exhaust stack plumes that could pose aviation hazards to low-flying aircraft using McClellan-Palomar Airport. However, compared to the licensed CECP, the amended CECP could result in increased risk to aircraft from gas turbine exhaust stack plumes and decreased risk to aircraft from air cooler exhaust stack plumes. Condition of Certification **TRANS-3** would require notification of pilots and the update of all sectional aeronautical charts that include the CECP site to advise pilots that invisible air plume hazards could exist and that pilots should avoid direct overflight. This would mitigate potential impacts to aircraft from the plumes.

If the Energy Commission approves the amended CECP, staff recommends retaining the eight conditions of certification for the licensed CECP with minor changes as noted under the “Proposed Conditions of Certification” subsection of this analysis. These conditions of certification are recommended to prevent significant adverse traffic and transportation-related impacts caused by amended CECP construction and operation and to ensure that the amended project 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-8,** the amended CECP, like the licensed CECP, would not generate a significant impact under the California Environmental Quality Act (CEQA) Guidelines with respect to CEQA Appendix G issues, “Transportation/Traffic.”

INTRODUCTION

In this **Traffic & Transportation** section of the Preliminary Staff Assessment (PSA), staff addresses the extent to which the amended 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 amended CECP, and demolition of the EPS, would cause traffic and transportation impact(s) under CEQA and whether the project complies with applicable LORS.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Traffic & Transportation Table 1 provides a general description of adopted federal, state, and local LORS pertaining to traffic and transportation and relevant to the proposed project.

Traffic & Transportation Table 1
Laws, Ordinances, Regulations, and Standards

Applicable LORS	Description
Federal	
Title 14, Aeronautics and Space, Code of Federal Regulations, part 77 Objects Affecting Navigable Airspace (14 C.F.R., part 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.
Title 49, Code of Federal Regulations, 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, 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 Highways 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, Section 10.33.030	Requires a permit to transport oversize/overweight loads on city roads.

SETTING

The approximately 30-acre amended CECP site is located at the eastern end of the Encina Power Station at 4600 Carlsbad Boulevard in the city of Carlsbad (CEC2014b). Agua Hedionda Lagoon is located to the north of the site, Interstate 5 (I-5) to the east, San Diego Gas & Electric (SDG&E) property to the south, and the north/south Atchison, Topeka and Santa Fe Railway (AT&SF)/North County Transit District (NCTD) Rail Corridor to the west. The McClellan-Palomar Airport, a general aviation airport, is located approximately 2.5 miles east of the project site.

CRITICAL ROADS AND FREEWAYS

The project site is bordered by Carlsbad Boulevard to the west, Cannon Road to the south and Interstate-5 to the east. 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 (CEC2014oo).

Existing Regional and Local Transportation Facilities

The surrounding regional and local roadway networks are shown in **Traffic & Transportation Figures 1** and **2**, respectively. The following describes the roadways that would be used for the proposed CECP.

Interstate 5

In the vicinity of the project site, I-5 has four lanes in each direction. According to the most recently published traffic counts by the California Department of Transportation (Caltrans) for the I-5 segment near the project site, I-5 carried approximately 198,000 average daily vehicle trips in 2012 (CECP 2014), slightly less than the 206,000 average daily trips carried in 2006 just before application for the licensed project (CECP 2007). Truck traffic accounts for approximately 4.8 percent of all trips on I-5 in the vicinity of Cannon Road (CECP 2014).

Cannon Road

Cannon Road is an east-west roadway that connects the project site to I-5. It is an undivided arterial that has two lanes in each direction and 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, which typically limit access to adjacent properties and enable circulation within the city, as well as provide connection to regional roadways and freeways. The San Diego Northern Railway (SDNR) tracks run north-south through Cannon Road at a point just west of Avenida Encinas at a signalized crossing.

Carlsbad Boulevard

Carlsbad Boulevard is a north-south roadway that connects the project 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. It is part of the regional Coast

Highway 101, or “Historic Route 101”, that begins in San Diego to the south and ends in Oceanside to the north.

RAILWAYS

The San Diego Northern Railway (SDNR), a subsidiary of NCTD, owns the train tracks to the west of the project site that run 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.

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).

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 project site and the overall residential nature of the area, school bus service could have stops along CECP project area streets.

BICYCLES AND PEDESTRIANS

Due to its location near Carlsbad State Beach and residential neighborhoods, the project site is located in a high pedestrian use area, especially in the summer months. Jefferson Elementary School is located approximately one mile away, and its students frequently use public sidewalks in the site vicinity. Additionally, bike lanes and sidewalks exist along both Cannon Road and Carlsbad Boulevard.

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, 2012, the McClellan-Palomar Airport handled approximately 387 operations a day, fewer operations than in 2008 during staff analysis of the licensed project, when the airport handled 554 operations a day (AirNav 2008a, AirNav 2014). 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 EPS 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 EPS and the proposed CECP site (CEC 2008). The recommended pattern altitude for small aircraft is 1,172 feet above ground level (AGL) and 1,672 feet AGL for large aircraft (AirNav 2014). Airspace above the existing EPS 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 EPS and proposed CECP site, small aircraft pulling banner ads along coastline beaches and aircraft patrolling traffic conditions along I-5 regularly fly within the coastline Flyway Zone at altitudes below 1,500 feet AGL and regularly fly directly over the existing EPS and proposed CECP site (Aspen 2008a). See **Traffic & Transportation Figure 3** for the location of the McClellan-Palomar Airport and the VFR Flyway Zone relative to the proposed amended project.

On September 24, 2014, the FAA provided staff a Carlsbad Energy Project Airspace Study (FAA 2014). The study provided flight information within a 3 nautical mile radius of the CECP site using the Performance Data Analysis and Reporting System and air traffic information from the Los Angeles Air Route Traffic Control Center. During August 2014, 6,558 aircraft tracks were detected from surface (ground) to 7,000 feet mean sea level (MSL). The study also included tables showing the departure and arrival airports of the aircraft identified as well as the type of aircraft and the time of day. Key observations from the study are:

- The greatest number of flights was between ground level and 4,000 feet;
- The most frequently used airport was McClellan – Palomar Airport (CRQ) for both departures and arrivals;
- Flights occurred most frequently between 10 am and 4 pm, although they occurred throughout the day as well.

Departures and arrivals from/to CRQ use the VFR Airway discussed earlier that runs from Oceanside to Del Mar and extends up to 6,500 feet. The VFR Airway goes directly over the CECP site at relatively low elevations (surface to 3,000 feet). The FAA study showed that during August 2014, 2,754 tracks were recorded between the surface and 1,000 feet MSL, 4,157 tracks from 1,000 to 2,000 feet MSL, 1,371 tracks from 2,000 to 3,000 feet MSL, and 1,502 from 3,000 to 4,000 feet MSL. This constitutes approximately 90 percent of the air traffic using this VFR corridor. It is important to note that aircraft rose or descended through multiple elevations and were tracked accordingly.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHODOLOGY AND THRESHOLDS FOR DETERMINING ENVIRONMENTAL CONSEQUENCES

Significance criteria used in this document for evaluating environmental impacts are based on the CEQA Guidelines, the CEQA Environmental Checklist for Transportation/Traffic, performance standards or thresholds identified by Energy Commission staff, and applicable LORS used by other governmental agencies. Specifically, staff analyzed whether the proposed project would:

1. cause an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system[1] (i.e., result in a substantial increase in either the number of vehicle trips, the volume-to-capacity ratio on roads, or congestion at intersections);

2. conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit;

3. conflict with an applicable congestion management program, including, but not limited to, level of service (LOS) standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways;

4. substantially increase hazards due to a design feature (e.g., sharp curves, dangerous intersections, or glint and glare) or incompatible uses (e.g., farm equipment);

5. result in inadequate emergency access;

6. conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities;

7. 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;

8. produce a thermal plume in an area where flight paths are expected to occur below 1,000 feet from the ground[2]; or

9. have individual environmental effects that, when considered with other impacts from the same project or in conjunction with impacts from other closely related past,

[1] Because this is a proposed amendment, “existing” is defined as the licensed project. Therefore, amended CECP traffic will be compared to licensed CECP traffic.
[2] The FAA recommends that pilots avoid overflight of plume-generating industrial sites below 1,000 feet AGL (FAA 2006).

present, and reasonably foreseeable future projects, are considerable or compound or increase other environmental impacts.

DIRECT/INDIRECT IMPACTS AND MITIGATION

The amended CECP would involve four phases, as follows:

- Phase I: Tank Demolition and Remediation, lasting six months starting 2nd Quarter 2015 and ending 3rd quarter 2015.
- Phase II: Construction, Commissioning, and Initial Operation of the amended CECP, lasting 24 months starting 4th Quarter 2015 and ending 4th quarter 2017.
- Phase III: Decommissioning of EPS, lasting 12 months starting 4th Quarter 2017 and ending 4th quarter 2018.
- Phase IV: Demolition of EPS and Site Restoration (Grading and Contouring), lasting 22 months starting 4th Quarter 2018 and ending 4th quarter 2020.

The total duration of amended CECP activities would be 64 months, compared to 25 months for the licensed CECP. The phases that would generate the greatest amount of traffic, Phases II (CECP Construction) and IV (EPS Demolition), would not overlap. There would be some limited overlap between Phase III (EPS Decommissioning) and Phases II and IV. Each phase is discussed below.

Roadway and Intersection Levels of Service

Level of Service

Level of Service (LOS) 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 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 LOS 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 impacts during each phase of the amended CECP are discussed below.

Phase I: Tank Demolition and Remediation

Demolition of the above ground storage tanks (ASTs) would take approximately six months and would occur prior to construction of the amended CECP. It is anticipated that the average and peak workforce would be 15 and 20 workers, respectively. The peak workforce of 20 workers would occur during Month 6. Tank demolition is expected to require an average of four truck round trips per day over the entire phase, with an average of ten truck round trips per day during the peak demolition month (LL2014b).

The workforce used would be the same as that used for the demolition of ASTs 5, 6, and 7 approved under the licensed CECP. While demolition of the additional ASTs (ASTs 1, 2, and 4) would not increase the CECP construction workforce, it would likely extend the duration of demolition work, meaning that demolition trips would now occur over a slightly longer period of time. However, with only 20 peak tank demolition workers, the number of additional trips resulting from increased demolition duration would not be substantial and would not cause significant impacts.

The number of truck trips for demolition of tanks 5, 6, and 7 approved under the licensed CECP is unknown. Demolition of additional tanks 1, 2, and 4 as part of the amended CECP would be expected to result in additional truck trips. However, during the peak tank demolition month, there would only be 10 truck roundtrips per day, not enough to create a significant impact.

Phase II: Construction, Commissioning, and Initial Operation of the CECP

Construction, commissioning, and initial operation of the amended CECP would take approximately 24 months. This phase of the project would generate the most construction traffic. As discussed below, staff analyzed traffic impacts during the peak construction period of this phase, which would represent the worst-case traffic scenario for both this phase and for the entire construction and operation period of the amended CECP.

Heavy haul and delivery trucks would primarily access the site via Avenida Encinas, off Cannon Road east of the railroad tracks, where construction of the amended CECP power plant facility would take place. However, some trucks would enter the site via SDG&E's service gate off of Cannon Road west of the railroad tracks, or via the main EPS gate off Carlsbad Boulevard. Most construction workforce traffic would enter the site via the main EPS gate on Carlsbad Boulevard (CECP 2014, CEC2014oo). However, a minority of workforce traffic might use other access points (CEC2014oo).

Staff compared traffic generated by the amended CECP to that of the licensed CECP, using the licensed CECP as the baseline for assessing impacts. Trips generated by the amended CECP and licensed CECP can be directly compared to determine traffic impacts. The city of Carlsbad's Traffic Monitoring Program was used to obtain 2013 traffic levels on roadways and intersections near the project site. Although the exact road segments and intersections included in the city's 2013 Traffic Monitoring Program differ slightly from the roads and intersections used in the analysis for the licensed CECP, there is sufficient overlap to conclude that traffic levels in the area are similar now to the conditions under which the original project was licensed. See **Traffic & Transportation Tables 2** and **3** below for a comparison of existing 2007 and 2013 traffic levels in the vicinity of the CECP on local roadways and intersections.

Traffic & Transportation Table 2
2007 and 2013 Existing Conditions on Project Roadways

Roadway	Segment	2007 Conditions[a]		2013 Conditions[b]	
		ADT	LOS	ADT	LOS
Carlsbad Blvd.	Tamarack Ave. to Tierra del Oro	-		17,319	A
	Cannon Rd. to Cerezo Dr.	-		16,755	A
	CECP Driveway to Cannon Rd.	23,600	C	-	
Cannon Rd.	Paseo Del Norte to Car Country Dr.	-		26,399	A
	I-5 Southbound Ramps to Avenida Encinas	13,600	A	-	
	Avenida Encinas to Carlsbad Blvd.	7,950	A	-	

[a]2007 data from the Final Decision for the licensed CECP.
[b]2013 data from the City of Carlsbad 2013 Traffic Monitoring Program.
Note: A dash denotes a segment where data is not available.

Traffic & Transportation Table 3
2007 and 2013 Existing Conditions on Project Intersections

Intersection	AM Peak Hour				PM Peak Hour			
	2007[a]		2013[b]		2007[a]		2013[b]	
	Delay (Sec.)	LOS	ICU[c] Ratio	LOS	Delay (Sec.)	LOS	ICU[c] Ratio	LOS
Cannon Rd./I-5 Northbound Ramps	10.6	B	0.50	A	11.2	B	0.67	B
Cannon Rd./I-5 Southbound Ramps	16.7	B	0.53	A	13.8	B	0.51	A
Cannon Rd./Avenida Encinas	15.3	B	-		14.7	B	-	
Cannon Rd./Carlsbad Blvd.	16.6	B	0.43	A	27.8	C	0.65	B
Cannon Rd./Paseo Del Norte	-		0.59	A	-		0.56	A

[a]2007 data from the Final Decision for the licensed CECP.
[b]2013 data from the City of Carlsbad 2013 Traffic Monitoring Program.
[c]Intersection capacity utilization
Note: A dash denotes a segment where data is not available.

During an average construction month, the licensed CECP would require 291 daily construction workers and 16 daily truck deliveries (or 32 one-way truck trips). The amended CECP would require fewer construction workers and truck deliveries during an average construction month: 171 daily construction workers and ten daily one-way truck deliveries (LL2014x). The amended CECP, then, would generate lower traffic impacts than the licensed CECP during an average construction month.

However, when comparing trips generated by the amended CECP and the licensed CECP, it is most important to compare trips generated during the period of highest construction activity, called the “peak” construction month. Representing the worst-case traffic scenario, the peak construction month for both the amended and licensed CECP would occur during Month 13. During this peak construction month, the amended CECP would use fewer daily workers (279 workers) than the licensed CECP (357 workers). Peak construction month daily truck trips would be 29 deliveries, or 58 one-way trips for the amended CECP, and nine deliveries, or 18 one-way trips for the licensed CECP.

The overall result, when combining peak construction workforce trips and truck trips[3], is that the amended CECP would generate fewer peak construction trips (645 daily one-way trips) than the licensed CECP (695 daily one-way trips).

During peak construction, the amended CECP would also generate fewer peak hour trips than the licensed CECP. For the amended CECP, 285 one-way peak hour trips would occur during both the morning and evening peak hour. The licensed CECP would have generated more peak construction peak hour trips, with 341 one-way trips during the morning peak hour and 325 one-way trips during the evening peak hour.

See **Traffic & Transportation Table 4** for average daily and peak hour one-way trips for the licensed CECP during peak construction. See **Traffic & Transportation Table 5** for average daily and peak hour one-way trips for the amended CECP during peak construction.

Traffic & Transportation Table 4
Licensed CECP – Estimated Average Daily Trips and Peak Hour Trips during Peak Construction

	Average Daily Trips	A.M. Peak Hour			P.M. Peak Hour		
		In	Out	Total	In	Out	Total
Total Construction Traffic in PCE	**695**	**333**	**8**	**341**	**0**	**325**	**325**

Total Average Daily Trips includes construction-related trips that do not occur during peak hours.
Truck trips were converted to passenger car equivalent units (PCEs) at a ratio of 1.5 passenger cars per truck.

Traffic & Transportation Table 5
Amended CECP – Estimated Average Daily Trips and Peak Hour Trips during Peak Construction

	Average Daily Trips	A.M. Peak Hour			P.M. Peak Hour		
		In	Out	Total	In	Out	Total
Total Construction Traffic in PCE	**645**	**282**	**3**	**285**	**3**	**282**	**285**

Total Average Daily Trips includes construction-related trips that do not occur during peak hours.
Truck trips were converted to passenger car equivalent units (PCEs) at a ratio of 1.5 passenger cars per truck.

In the May 31, 2012 Final Decision for the licensed CECP, the Energy Commission concluded that traffic impacts of the licensed CECP would be less than significant with implementation of the imposed conditions of certification. Because the amended CECP would generate fewer average daily and peak hour trips during peak construction than the licensed CECP as reflected in **Traffic & Transportation Tables 4 and 5**, the amended CECP would cause smaller traffic impacts to LOS than the licensed CECP. The petitioner has agreed to implement all conditions of certification from the 2012 Decision.

Although the amended CECP would generate smaller traffic impacts to LOS than the licensed CECP due to fewer average daily and peak month construction trips, the amended CECP would generate project-related traffic for a slightly longer period of time

[3] To calculate the total number of peak construction trips, truck trips were converted to passenger car equivalent units (PCEs) at a ratio of 1.5 passenger cars for each truck, consistent with the 2010 Highway Capacity Manual guidelines.

than the licensed CECP, 26 months for Phase II construction/commissioning of the amended CECP power plant facility (including pre-construction Phase I tank demolition activities), as compared to 25 months for the construction/commissioning of the licensed CECP.

To ensure that traffic impacts to LOS would remain less than significant, Condition of Certification **TRANS-1** would require the project owner to implement a Traffic Control Plan during construction in order to minimize traffic impacts to LOS.

Traffic impacts during operation of the CECP are discussed later in this section.

Phase III: Decommissioning of EPS

Decommissioning of EPS would take approximately 12 months. The petitioner would use the existing EPS operations staff to perform the majority of work during Phase III decommissioning (LL 2014pp, pg. 7). Retirement and decommissioning of the EPS is anticipated to require an average and peak workforce of 54 and 56 respectively. Traffic is not expected to increase much, if at all, during this phase as compared to normal EPS operation. During this phase, the roadways and intersections would continue to operate at an acceptable LOS. Therefore the Decommissioning Phase would have a less than significant impact on LOS.

Phase IV: Demolition of EPS and Site Restoration

Demolition of EPS and site restoration, which would include grading and contouring, would last approximately 22 months. It is anticipated that the average workforce would be 67 workers. There would be a six-month period where the number of workers would exceed 100 (Months 4 through 9), with a peak of 194 workers during Month 6. EPS demolition is expected to require eight truck round trips per day on average over the entire demolition work phase. Demolition truck trips would peak during Month 13 when 16 truck round trips per day are expected (LL2014uu). Assuming two trips per employee and per truck round trip and a truck PCE of 1.5, demolition of the EPS during Month 6 would result in a maximum of 406 peak daily trips.

Based on staff's traffic analysis provided earlier in this report and results of the Carlsbad 2013 Traffic Monitoring Program, the roadways and intersections would continue to operate at an acceptable LOS during this phase. Therefore, the demolition phases would have a less than significant impact on LOS.

Operation Phase Impacts and Mitigation

The main operations access for the amended CECP would be the same as that for the licensed CECP, which is from Carlsbad Boulevard, through the EPS site and the Poseidon Carlsbad Seawater Desalination Project, and over the NCTD railroad tracks at the existing internal private crossing at the project site.

The amended CECP operations, like operations for the licensed CECP, would require 14 employees, probably drawn from the existing workforce at EPS. Therefore, the amended CECP, like the licensed CECP, would cause negligible traffic impacts from operations employees.

Both the licensed CECP and amended CECP would generate an annual average of one aqueous ammonia truck delivery per month. The licensed CECP would generate an average of 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). The amended CECP would not use desalinated seawater, but it would generate between two to five truck trips per day during peak power output to exchange water demineralizer trailers (LL2014vv). Therefore, the amended project would generate more truck trips than the licensed project. However, the addition of two to five truck trips per day would be a less than significant impact.

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 amended CECP project operations, like licensed CECP operations, would have no impact on study area roadways or intersection LOS. Consequently, no operations-related mitigation measures are required.

Airports

The closest airport to the CECP site is the McClellan-Palomar Airport located approximately 2.5 miles to the southeast. 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 EPS 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 or 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 EPS and proposed CECP site (CEC 2008).

Given the current recommended traffic pattern for arriving and departing aircraft, air traffic will continue to fly directly over the existing EPS and proposed CECP (CEC 2008). In addition, small aircraft, pulling banner ads along coastline beaches and aircraft patrolling road traffic conditions along I-5 regularly fly within the VFR Flyway Zone route, which lies directly over the proposed CECP site, at altitudes below 1,500 feet AGL (Aspen 2008a).

The licensed CECP included combustion turbine stacks with heights of approximately 140 feet. As a result of stack height and proximity of the project to the McClellan-Palomar Airport, the licensed CECP included Condition of Certification **TRANS-2** requiring the project owner to notify the FAA of the stacks by filing FAA Form 7460-1, Notice of Proposed Construction or Alteration. **TRANS-2** also required the project owner to secure a Determination of No Hazard to Navigable Airspace from the FAA as a result of the filing, and to light, mark, and paint the stacks as required by the FAA. The amended CECP stacks have been reduced in height to 90 feet. This is below the approximately 140-foot threshold that staff calculated would require FAA notification per Title 14, Code of Federal Regulations, part 77. However, the amended CECP would use construction cranes exceeding 140-feet in height, especially during demolition of the EPS and installation of transmission poles. To reflect these changes, staff has modified

TRANS-2 to require notification of the FAA for all objects or structures used during construction or operation exceeding 140 feet in height, including construction cranes.

Similar to the licensed CECP, the amended CECP's gas turbine and air cooler 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 amended CECP and compared with the analysis for the licensed CECP. It is presented in detail as **APPENDIX TT-1** of this Preliminary 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 ambient conditions used in the velocity calculations would occur, potentially frequently, during the plant's life when small aircraft could fly above the CECP site. **Traffic & Transportation Table 6** compares the average plume velocity speed in meters per second (m/s) for the licensed and amended CECP gas turbine and air cooler exhaust stack plumes at different heights above ground level (AGL). It should be noted that the plume velocity speed presented is the average speed of the entire plume diameter. Plume velocity speeds would be lower at the plume diameter edge and greater at the plume center point.

Traffic & Transportation Table 6
Plume Average Velocity
Gas Turbine and Air Cooler Predicted Plume Velocities

	Amended CECP Gas Turbine Plume Velocity (m/s)	Licensed CECP Gas Turbine/HRSG Plume Velocity (m/s)	Amended CECP Air Cooler Plume Velocity (m/s)	Licensed CECP Air Cooler Plume Velocity (m/s)
Height (ft) [1]	60.3°F	**61°F**	**60°F**	**86°F**
300	9.91	8.16	5.98	6.49
400	8.41	6.71	5.65	6.29
500	7.56	5.96	5.33	5.97
600	6.99	5.47	5.07	5.67
700	6.56	5.11	4.84	5.41
800	6.22	4.83	4.64	5.18
900	5.94	4.60	4.48	4.99
1,000	5.71	4.42	4.33	4.82
1,100	5.51	4.26	4.20	4.67
1,200	5.34	4.12	4.08	4.54
1,300	5.18	3.99	3.98	4.42
1,400	5.04	3.88	3.89	4.31
1,500	4.92	3.79	3.80	4.22
1,600	4.81	3.70	3.72	4.13
1,700	4.71	3.62	3.65	4.04
1,800	4.61	3.54	3.58	3.97
1,900	4.52	3.47	3.52	3.90
2,000	4.44	3.41	3.46	3.83
2,100	4.37	[2]	3.40	[2]
2,200	4.30	[2]	3.35	[2]
2,300	4.23	[2]	3.30	[2]

Source: APPENDIX TT-1.
Note:
[1] Velocity values are for heights above ground level. The heights above sea level that correspond to the heights listed in this table would be approximately 34.5 feet higher for the amended CECP and 30 feet higher for the licensed CECP.
[2] These values were computed for the Final Staff Assessment (FSA) for the licensed CECP but were not reported because it was not necessary to extend the table to these heights in the FSA.

For the purposes of this analysis, a vertical plume average velocity of 4.3 m/s has been determined as the critical velocity of concern to light aircraft. For the amended CECP gas turbines, the worst-case height at which the plume average velocity drops below 4.3 m/s is calculated to be 2,200 feet, which is much higher than the 1,070 feet calculated for the licensed CECP gas turbine/HRSG design. At this 2,200-foot height, the plume diameter for the amended CECP gas turbines would be approximately 673 feet, which is much greater than the 299-foot plume diameter for the licensed CECP gas turbines/HRSG at 1,070 feet AGL. Therefore, the amended CECP's gas turbine design would increase the potential risk to light aircraft from plume turbulence, which could be moderate to severe.

For the amended CECP's air cooler design, the worst-case height at which the plume average velocity would drop below 4.3 m/s is approximately 1,020 feet AGL. This is somewhat lower than for the licensed CECP's air cooler design, where the plume average velocity would drop below 4.3 m/s at a worst-case height of 1,410 feet AGL. Therefore, the amended CECP's air cooler design would decrease the potential risk to light aircraft from plume turbulence, in contrast to the amended CECP's increased risk from the gas turbine plumes.

As discussed earlier in this Traffic & Transportation section, the McClellan-Palomar Airport's recommended pattern altitudes for small aircraft and large aircraft are 1,172 feet AGL and 1,672 feet AGL, respectively. Therefore, aircraft observing the recommended pattern altitude during airport arrivals and departures could possibly experience impacts from the plumes. Aircraft using the VFR route directly over the site could also possibly experience plume impacts. It should also be noted that highway patrol and beach helicopters constantly fly within close proximity of the CECP for patrolling the state highways and beaches.

Proposed Condition of Certification **TRANS-2** would ensure that the CECP project owner 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 project owner 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. 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

During all phases of demolition and construction at the CECP site, traffic would not be routed through residential areas, minimizing safety impacts to residents. The primary access apron (driveway) for construction workers and operations employees to the CECP would be on Carlsbad Boulevard. The posted speed along this segment of Carlsbad Boulevard is only 35 miles per hour, and the driveway location is not visually

obstructed. On the east side of Carlsbad Boulevard which the project is also located, beach parking is not allowed; therefore conflict with beachgoers should not occur with the roadway parking restriction. Other access points include Avenida Encinas, the primary access for construction trucks, and the SDG&E service gate, both off of Cannon Road. These entrances are also not visually obstructed. However, they are located near the railroad track crossing over Cannon Road. The crossing is signalized, minimizing the likelihood that construction traffic could impact train operations and safety and vice-versa. Hotels and restaurants are located on roadways adjacent to Cannon Road, which are controlled by signalization, therefore patron parking for these facilities or conflicts with construction vehicle activities will not likely occur on Cannon Road.

There is also an internal road on the project site itself that crosses the rail line between the main part of the 90-acre EPS site and the parcel east of the railroad tracks (currently the eastern tank farm w/ AST's 4, 5, 6, and 7), where the 30-acre amended CECP project would be constructed. This private internal crossing is protected by a drop guard and flashing cross buck. Heavy and oversize delivery trucks unloaded at the existing on-site rail spur would have to cross the internal road and rail crossing. Most construction workers would park west of the railroad tracks and would have to cross the tracks to access the project site as well. Operations employees would access the site via Carlsbad Boulevard and would have to cross the tracks to access the site as well. The drop guards and flashing cross buck at the rail crossing 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, demolition/construction workers, and oversize vehicles, staff is proposing Condition of Certification **TRANS-4,** which would require the project owner to develop and implement a crossing safety plan for project demolition and construction to address foot traffic as well as demolition- and construction-related vehicle crossing and the transport of heavy/oversize loads over the internal rail crossing.

Demolition and construction workers could potentially cause traffic hazards with vehicle congestion when entering the project entrances and exiting the project site when their shifts begin and end. Proposed Condition of Certification **TRANS-1**, calling for the preparation of a traffic control plan, would minimize hazards due to possible congestion as workers enter and exit the plant site when their shifts begin and end.

There is also a potential for construction vehicles and equipment to cause damage to roads in the vicinity of the project. Therefore, staff is proposing Condition of Certification **TRANS-5,** which would require that any road damaged by project demolition and construction be repaired to its original condition. This would ensure that any damage to local roadways would not be a safety hazard to motorists.

The use of oversize vehicles during demolition and construction phases could create a hazard to the public by limiting motorists' views of roadways and by obstructing space. Therefore, staff is proposing Condition of Certification **TRANS-6,** which would require that all oversize vehicles used on public roadways during demolition and construction comply with Caltrans' limitations on vehicle sizes and weights, as well as those limitations of other relevant jurisdictions.

Delivery of hazardous materials and removal of wastes could potentially cause traffic hazards. For a discussion of the potential impacts related to the transport of hazardous materials, please see the **HAZARDOUS MATERIALS MANAGEMENT** section in this PSA.

As with the licensed CECP, implementation of the above stated conditions of certification would result in the amended CECP having less than significant impacts as far as creating traffic and transportation hazards that could threaten public safety.

Emergency Access

In the event of an emergency at the CECP site during demolition and 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 traffic control plan which includes the assurance of access and movement of emergency vehicles. Once the plant becomes operational, emergency access to the site would be slightly different for the amended CECP as compared to the licensed CECP. The amended CECP would continue to have both a primary and secondary access route but these would be slightly modified. The project owner and the Carlsbad Fire Department have developed a mutually agreeable, revised, fire access route through the Cabrillo Parcel that is designed to allow access to each of the six units, onsite appurtenances, and support facilities at the amended CECP. For additional discussion of emergency services serving the facility, refer to the **WORKER SAFETY & FIRE PROTECTION** section in this PSA.

Parking

Approximately 19.3 acres of the EPS parcel west of the railroad tracks would be used for a combination of equipment laydown and demolition/construction worker parking. As with the licensed CECP, no offsite demolition/construction worker parking or equipment or material laydown areas would be needed (CECP 2014a). The amended CECP would actually include more acreage of parking and laydown areas than the licensed CECP, which included up to seven acres for construction staging and parking, with up to three acres for construction worker parking west of the railroad tracks (CECP 2007).

However, to ensure that no potential impacts to available public parking supply could occur during demolition and construction, staff is proposing Condition of Certification **TRANS-7,** which would require the development of a parking and staging plan to enforce a policy that all demolition- and construction-related parking occur 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 project owner to comply with Caltrans' and other relevant jurisdictional limitations for any encroachment into public rights-of-way (sewer line) during construction and requires that all necessary encroachment permits be obtained from Caltrans and all relevant jurisdictions. Furthermore, as CECP construction would require demolition/construction vehicle crossing of rail lines with commuter train activity,

staff is proposing Condition of Certification **TRANS-4,** which would require the project owner to develop a crossing safety plan for project demolition and construction to address foot traffic as well as demolition- and 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. With the above conditions of certification, impacts to alternative transportation from the amended CECP would be less than significant, as they were for the licensed CECP.

CUMULATIVE IMPACTS AND MITIGATION

A project may result in a significant adverse cumulative impact where its effects are cumulatively considerable. *Cumulatively considerable* means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects (Cal. Code Regs., tit. 14, § 15130).

The amended CECP would be most likely to combine with other nearby projects to result in cumulative traffic impacts during the demolition and construction phases, which would generate much more traffic than the operations phase, when minimal traffic would be generated. Because of this, staff evaluated cumulative traffic impacts for the time period of demolition of the EPS and construction of the amended CECP.

Based on all current information available at this time, the following information outlines the status of major projects within the CECP site area that could combine with the amended CECP to produce traffic and transportation cumulative impacts. The following projects were evaluated in staff's analysis for the licensed CECP. Project status has been updated for this analysis of the amended CECP.

Floral Trade Center:

The 17.22-acre Floral Trade Center is proposed for location in the city of Carlsbad south of Cannon Road and east of Car Country Drive on a 45.60-acre site. The project consists of development of a new 44,180 square-foot floral trade distribution center and marketplace, 9,900 square-foot micro-brewery and winery building, 1,984 square-foot culinary center, and 896 square-foot farm shed with remaining land dedicated to farm plots, an orchard, hops farm, vineyard and parking. The site is located approximately 0.8 mile southeast of the CECP site.

A Negative Declaration for the project has been adopted. The construction start date is unknown, and no building or grading permits have yet been issued.

I-5 Widening Project:

Caltrans will be widening I-5 in the vicinity of the CECP site. Caltrans signed the Final EIR/EIS for the project in October 2013. The Final EIR identifies as the Preferred Alternative the addition of two express lanes in each direction from La Jolla Village Drive in San Diego to Harbor Drive in Oceanside. The first phase of the project, which will be built from 2015-2020, includes construction of High Occupancy Vehicle (HOV) lanes (carpool lanes) and soundwalls from Manchester Avenue to State Route 78. This is the only construction phase which could overlap with the amended CECP (Phases I-IV). The third phase of the I-5 expansion project, planned for construction between 2031 and 2035, would add a second HOV/Express Lane in each direction. This could occur

during operation of the CECP project. The I-5 Widening Project is located approximately 0.1 mile east of the amended CECP site.

Carlsbad Seawater Desalination Plant Project (Poseidon):

The Carlsbad Seawater Desalination Project (CSDP) is located on the EPS project site west of the railroad tracks where fuel oil tank #3 and the old wastewater treatment facilities were once located. The CSDP will use 304 million gallons-per-day (gpd) of seawater to produce 50 million gpd of potable water for distribution by the San Diego County Water Authority. The project includes pipelines, pumps, and other appurtenant and ancillary water facilities to produce and distribute the potable water. The CSDP is located immediately west of the amended CECP site. Construction began in late 2012. The project is currently 60 percent complete and estimated to begin full operations by November 2015. With the demolition of tanks as part of the amended CECP scheduled to begin in the second quarter of 2015, and construction of the amended CECP scheduled to begin in the fourth quarter of 2015, Poseidon construction would overlap with amended CECP activities.

City of Carlsbad Capital Improvement Program:

As part of the City of Carlsbad Capital Improvement Program, the Vista/Carlsbad Interceptor Agua Hedionda Lift Station will be constructed from early 2015 through 2017. The project involves replacement of the existing sewer lift station and sewer line. The project is located at the south shore of Agua Hedionda Lagoon immediately east of the railroad tracks, next to the amended CECP site.

On Carlsbad Boulevard between Cannon Road and Manzano Drive, road and pedestrian improvements are planned to occur from 2016 to late 2017, approximately 0.7 mile west of the amended CECP site. These pedestrian improvements are part of an overall upgrade to Carlsbad Boulevard that was mitigation for construction and operation of the CSDP.

LOSSAN Double-Tracking Project:

Improvements along the San Diego portion of the Los Angeles-San Diego-San Luis Obispo (LOSSAN) rail corridor include double-tracking of the main line and bridges from Orange County to downtown San Diego. Currently, approximately half of the San Diego corridor has been double-tracked, including the 1.9-mile second main track from Carlsbad Village southward past Cannon Road and a new rail bridge over Agua Hedionda Lagoon completed in early 2012. During the next 20 years, many improvements are planned in the San Diego County section of the LOSSAN corridor, including double-tracking, bridge and track replacement, new stations, grade separations, and other improvements, but to date no definite timeframe for construction of these improvements has been identified. (SANDAG 2014, SANDAG 2014a).

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 is 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 its railroad right-of-way, possibly due to liability and plans to install an additional track. 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. The licensed CECP included provisions for the CRT in Condition of Certification **LAND-1**. As part of the city of Carlsbad's agreement with the project owner ("Settlement Agreement" in Appendix 2A of the PTA), the project owner and the city would coordinate location logistics for the CRT as part of the redevelopment process for the EPS site that would occur following amended CECP construction. The CRT is currently anticipated to be located west of the railroad tracks.

Continued commercial and residential development in the city of Carlsbad and San Diego County has historically contributed to congestion on area roadways that could be used by traffic generated by the amended CECP. Of the major projects identified above, construction and operation of the Floral Trade Center and the widening of I-5 could possibly overlap with Phases I through IV of the amended CECP, resulting in cumulative traffic impacts. Construction of the CSDP would overlap with Phase I and the initial part of Phase II of CECP construction; however, construction of this project next to the amended CECP would be completed well in advance of peak power plant construction, minimizing cumulative traffic impacts. Double-tracking of the railroad tracks near the project site has already occurred, meaning that there would be no cumulative impacts resulting from this project and the amended CECP. Finally, because the CRT would be designed and constructed in the future following amended CECP construction, there would be no cumulative impacts resulting from the combination of the Coastal Rail Trail and amended CECP.

Construction and operation of the Floral Trade Center, the widening of I-5, and development and operation of various minor projects (such as residential and commercial developments) currently proposed in the area could occur simultaneously with amended CECP activities. This could result in cumulative impacts to intersection and street segment LOS, emergency vehicle access, parking, public transportation, pedestrian, bicycle, or rail travel, and 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 demolition/construction are reduced to less-than-significant levels. Therefore, the CECP cumulative contribution to this impact is considered reduced to a less-than-cumulatively considerable level.

Furthermore, it is assumed that all cumulative projects identified above would include mitigation similar to that for the proposed CECP (i.e., implementation of a 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 would reduce cumulative transportation and traffic impacts from these 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 result in 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 EPS, therefore not encroaching on proposed I-5 widening, the proposed Coastal Rail Trail, or on the adjacent railroad that was double-tracked in 2012.

Staff has determined that all significant direct or cumulative impacts specific to traffic and transportation resulting from project demolition, construction or operation would either be less than significant or be reduced to a less-than-significant level. Therefore, the proposed project would not cause significant traffic and transportation impacts to an environmental justice population.

COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Traffic & Transportation Table 7 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.

Traffic & Transportation Table 7
Project Compliance with Adopted Traffic & Transportation Laws, Ordinances, Regulations, and Standards (LORS)

Applicable LORS	LORS Description and Project Compliance Assessment
Federal	
Title 14 Aeronautics and Space, Code of Federal Regulations, part 77 Objects Affecting Navigable Airspace(14 C.F.R., part 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 where applicable that structures and objects exceeding 140 feet in height, such as construction cranes, are not a hazard to the navigable airspace at McClellan-Palomar Airport. **TRANS-2** would also require that all structures and objects exceeding 140 feet in height have all lighting and marking required by the FAA. With the implementation of **TRANS-2**, the project would be consistent with this regulation.
Title 49, Code of Federal Regulations, 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 PSA.
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 demolition and 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 demolition and construction comply with Caltrans' limitations on vehicle sizes and weights.
California Streets and Highways 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 demolition and 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 demolition and construction could create a hazard to the public by limiting motorists' 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 demolition and construction comply with San Diego County limitations on vehicle sizes and weights.
City of Carlsbad Municipal Code Section 10.33.030	Requires a transportation permit for the transportation of oversize and overweight loads through the city of Carlsbad
	The use of oversize vehicles during demolition and construction could create a hazard to the public by limiting motorists' 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 demolition and construction comply with city of Carlsbad limitations on vehicle sizes and weights.

NOTEWORTHY PUBLIC BENEFITS

Neither the applicant nor staff has identified any traffic-related benefits associated with the amended CECP.

CONCLUSIONS

Staff has analyzed the amended CECP's potential construction, demolition, and operations impacts to the regional and local traffic and transportation system and concludes the following:

- The amended CECP would generate less traffic than the licensed CECP. Condition of Certification **TRANS-1** should be implemented to ensure that all construction- and demolition-related traffic and activities would not significantly impact transportation facilities and existing traffic LOS within the project area.
- Operations impacts of the amended CECP are similar to those of the licensed CECP. Both projects would generate the same number of employee trips, although the amended CECP would generate more truck trips. For both projects, 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.
- The amended CECP's exhaust stacks would be shorter than those of the licensed CECP and would not trigger FAA notification requirements. However, other tall objects or structures, such as construction cranes, could trigger notification. Condition of Certification **TRANS-2**, which has been modified for the amended CECP, should be implemented to ensure the project owner submits to the FAA Form 7460-1, Notice of Proposed Construction or Alteration, regarding any structure or object on the site greater than 140 feet in height, and secures a Determination of No

Hazard to Navigable Airspace. This condition would also require the project owner to ensure that all structures or objects exceeding 140 feet in height would have all the lighting and marking required by the FAA so that they would not create a hazard to air navigation.

- Like the licensed CECP, the amended CECP would generate gas turbine and air cooler exhaust stack plumes that could pose aviation hazards to low-flying aircraft using McClellan-Palomar Airport. Compared to the licensed CECP, the amended CECP's gas turbine design would increase the potential risk to light aircraft from plume turbulence, which could be moderate to severe. However, the amended CECP's air cooler design would decrease the potential risk to light aircraft from plume turbulence. Condition of Certification **TRANS-3** would require notification of pilots and an update of all sectional aeronautical charts that include the CECP site to advise pilots that invisible air plume hazards could exist and that pilots should avoid direct overflight. This would mitigate potential impacts to aircraft from the plumes.
- Condition of Certification **TRANS-4** should be implemented to ensure the project owner implements a railroad crossing safety plan during project construction and demolition to address foot traffic as well as construction/demolition 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 and demolition 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 and demolition 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 and demolition to enforce a policy that all project-related parking occur on site or in designated off-site parking areas.
- Condition of Certification **TRANS-8** should be implemented to ensure that the project owner complies with the limitations imposed by Caltrans and other relevant jurisdictions for any encroachment into public rights-of-way during construction of the sewer line. This condition also 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.

Implementation of staff's recommended Conditions of Certification **TRANS-1** through **TRANS-8** would ensure that the project's direct and cumulative 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 approve the Petition to Amend, staff recommends that the Energy Commission adopt the following conditions of certification.

PROPOSED CONDITIONS OF CERTIFICATION

Staff recommends retaining all of the conditions of certification for the licensed CECP. Staff is proposing modifications to Conditions of Certification **TRANS-1**, **TRANS-2**, and **TRANS-5** to reflect the different project design of the amended CECP and the demolition activities. Changes proposed to Conditions of Certification **TRANS-3**, **TRANS-4**, and **TRANS-7** are for clarity. Modifications are shown in ~~strike-through~~ for deletions and **bold underline** for additions.

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**/demolition** traffic control plan**.** ~~and implementation program which~~ **The plan shall be implemented during all phases of construction/demolition and shall** address~~es~~ 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 **tank demolition** ~~site mobilization~~, the ~~applicant or contractor~~ **project owner** shall provide to the CPM **the**~~a copy of the referenced documents~~**traffic control plan for review and approval**.

TRANS-2—The project owner shall submit to the FAA Form 7460-1, Notice of Proposed Construction or Alteration, regarding **any structures or objects exceeding 140 feet in height used during construction or operation of** the Carlsbad Energy Center Project (CECP)**, or during any related activities, such as demolition of the Encina Power Station,** ~~stack~~ and shall secure a Determination of No Hazard to Navigable Airspace **for each structure or object**. The **structures or objects** ~~stacks~~ shall **be marked and lit as** ~~have all lighting and marking~~ required by the FAA so that the**y** ~~stacks~~ do not create a hazard to air navigation.

Verification: At least 30 days prior to the start of **tank demolition**~~construction~~, the ~~Project Owner or contractor~~ **project owner** 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 **lit and marked** ~~the~~ **structures or objects** ~~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~~ **project owner** 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~~ **During project** construction**/demolition** ~~of the plant and all related facilities~~, the project owner shall ~~develop~~ **implement** a **rail** crossing safety plan ~~for all phases of project construction~~ to address foot traffic as well as construction- **and demolition-**related vehicle crossing and the transport of heavy/oversize loads over the internal rail crossing.

Verification: At least 60 days prior to **the** start of **tank demolition,**~~site mobilization,~~ the project owner shall submit the **rail crossing safety** plan to the CPM for review and approval.

TRANS-5—Following completion of project construction **and demolition**, the project owner shall repair any damage to roadways affected by construction**/demolition** activity **to pre-project road conditions or better.** ~~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 **demolition and** construction, the project owner shall photograph, videotape, or digitally record images of the roadways that will be affected by pipeline construction and heavy ~~construction~~ **truck** 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 **demolition and** construction, the project owner shall notify the city about the schedule for project **demolition/**construction. The purpose of this notification is to **allow the city the opportunity to** postpone any planned roadway resurfacing and/or improvement projects until after the project **demolition/**construction has taken place and to coordinate **demolition/**construction-related activities associated with other projects.

Verification: Within 30 days after completion of **all project-related construction and demolition,** ~~the redevelopment project,~~ the project owner shall meet with the CPM and the city of Carlsbad to determine**,** ~~and~~ receive approval for**, and schedule** 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.

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 **project** construction**/demolition,** ~~of the plant and all related facilities~~, the project owner shall ~~develop~~ **implement** a parking and staging plan for ~~all phases of~~ project construction **and demolition** 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 **tank demolition,**~~site mobilization,~~ the project owner shall submit ~~the~~ **a parking and staging** 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.

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 AND CONCLUSIONS

The following provides the assessment of the proposed amended Carlsbad Energy Center Project (CECP) gas turbines and air coolers exhaust stacks plume average 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 and air cooler designs. The results of these new calculations are compared to the results of the thermal plume calculations prepared for the approved CECP design. Due to the change from combined cycle to simple cycle and the proposed layout that has two simple cycle gas turbine stacks being adjacent, the height where vertical plume velocity is less than 4.3 meters/second changes from 1,070 feet (combined cycle) to 2,200 feet (simple cycle), both above local ground level.

PROJECT DESCRIPTION

The proposed amended project would utilize six GE LMS100 simple cycle gas turbines, each with one air cooler (six air coolers total). The licensed CECP would utilize two Siemens Rapid Response SGT6-5000F combined cycle 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 both the approved facility design and the proposed amended design of the CECP facility. 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 (i.e. wind speed = 0) conditions:

(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 average velocity during calm winds was calculated by staff in a simplified fashion, presented in the Best paper as follows:

(5) $V_m = V_{sp} * N^{0.25}$ (proposed two air cooler units combined)

(6) $V_m = V_{sp} * N^{0.33}$ (proposed simple cycle stacks, combined approved and proposed air cooler fans)

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 notes that this simplified multiple stack plume average 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 has allowed staff to determine the exact methodology and duplicate the results shown in the paper. Staff, when using the 0.25 exponent value, has assumed a less than complete conservation of energy due to the geometry of the stacks. Under ideal conditions for adjacent stacks the Best paper proposes the use of a high exponent value ($N^{0.33}$) that represents ideal energy conservation and plume convergence.

For the proposed amended facility design, each air cooler unit is made up a 12 separate fan exhausts that would combine above the unit. The single unit vertical velocities are calculated for each air cooler fan and then the twelve air cooler fan exhausts are merged using a 0.33 exponent value as described above in Equation 6. The proposed amended project layout shows that most of the air cooler units are separated with large gaps, except for two that are about 30 feet apart. Considering the separation between them and the elongated design of these two air coolers, the worst case plume average velocity results for these closely placed amended air coolers assume the merging of two

plumes using a less conservative 0.25 exponent value as described above in Equation 5. The approved facility would have air coolers that are separated by distances too great to allow the plumes to merge until plume average velocities are below a level of concern.

The gas turbines for the amended CECP would be configured in pairs that have two adjacent exhaust stacks. The exhaust plumes for these two stacks would readily merge under most ambient conditions, so the results for the gas turbines are corrected assuming the merging of two stack exhausts with the more conservative 0.33 exponent value as described above in Equation 6. The licensed CECP's gas turbine/HRSG exhausts were not combined, due to the stack separation being too large to allow the plumes to merge until plume average velocities are below a level of concern.

VERTICAL PLUME VELOCITY ANALYSIS

The vertical plume average velocities were calculated for reasonable worst case conditions for the gas turbines and air coolers. The ambient and exhaust conditions for the gas turbines and air coolers, 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
	60.3°F	60.3°F
Stack Height ft (m)	90 (27.43) [a]	14 (4.27) [a]
Stack Diameter ft (m)	13.5 (4.11)	29.1 (8.88) Equivalent diameter each for six fans
Stack Velocity ft/s (m/s)	119.05 (36.29)	13.45 (4.1)
Exhaust Temperature F (K)	781.7 (689.65)	90.9 (306)

Source: Locke Lord LLP 2014a; Locke Lord LLP 2014b, and staff calculations
a – Stack height is adjusted 25.5 feet lower than this value due to the proposed site being in a 25.5 foot deep basin.

Using the Spillane approach, the plume average velocity at different heights above ground was determined. **Plume Velocity Table 2** provides staff's calculated plume average velocity values for the amended project exhaust stacks, as well as the approved CECP project's exhaust stack plume average velocity values for comparison**.**

As explained in the **Traffic & Transportation** section, a vertical velocity of 4.3 m/s (plume average velocity) has been determined as the critical velocity of concern to light aircraft. For the amended gas turbines the worst-case height at which the plume average velocity drops below 4.3 m/s is calculated to be 2,200 feet, which is much higher than the 1,070 feet calculated for the approved gas turbine/HRSG design. At this 2,200 foot height the plume diameter for the amended gas turbines is calculated to be 673 feet which is much greater than the 299 foot diameter of the plume for the approved gas turbines/HRSG at 1,070 feet. Therefore, the amended gas turbine design would increase the potential risk to light aircraft from plume turbulence.

For the amended air cooler design the worst-case height at which the plume average velocity drops below 4.3 m/s is calculated to be 1,020 feet. This is somewhat lower than for the approved air cooler design that had a calculated worst-case height of 1,410 feet with a 4.3 m/s plume average velocity.

WIND SPEED STATISTICS (FROM FSA [CEC 2009])

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.

Plume Average Velocity Table 2
Gas Turbine and Air Cooler Predicted Plume Average Velocities

	Amended CECP Gas Turbine Plume Velocity (m/s)	Licensed CECP Gas Turbine/HRSG Plume Velocity (m/s)	Amended CECP Air Cooler Plume Velocity (m/s)	Licensed CECP Air Cooler Plume Velocity (m/s)
Height (ft) [1]	**60.3°F**	**61°F**	**60°F**	**86°F**
300	9.91	8.16	5.98	6.49
400	8.41	6.71	5.65	6.29
500	7.56	5.96	5.33	5.97
600	6.99	5.47	5.07	5.67
700	6.56	5.11	4.84	5.41
800	6.22	4.83	4.64	5.18
900	5.94	4.60	4.48	4.99
1,000	5.71	4.42	4.33	4.82
1,100	5.51	4.26	4.20	4.67
1,200	5.34	4.12	4.08	4.54
1,300	5.18	3.99	3.98	4.42
1,400	5.04	3.88	3.89	4.31
1,500	4.92	3.79	3.80	4.22
1,600	4.81	3.70	3.72	4.13
1,700	4.71	3.62	3.65	4.04
1,800	4.61	3.54	3.58	3.97
1,900	4.52	3.47	3.52	3.90
2,000	4.44	3.41	3.46	3.83
2,100	4.37	[2]	3.40	[2]
2,200	4.30	[2]	3.35	[2]
2,300	4.23	[2]	3.30	[2]

Source: CEC 2014 Staff calculations.
Note:
[1] Velocity values are above ground level, the heights above sea level that correspond to the heights listed in this table would be approximately and 34.5 feet higher for the amended case and 30 feet higher for the approved case.
[2] These values were computed for the Final Staff Assessment (FSA) for the licensed CECP but were not reported because it was not necessary to extend the table to these heights in the FSA.

CONCLUSIONS

The calculated calm wind condition vertical plume average velocities from the proposed amended CECP gas turbines are predicted to be greater than 4.3 m/s at heights of up to 2,200 feet above ground level, and the air coolers are predicted to be greater than 4.3 m/s at heights of up to 1,020 feet above ground level. Both results are well above 500 feet above ground. The simple cycle gas turbines would have an increased potential to create aviation problems. This results because the potential to create plume average vertical velocities of 4.3 m/s at heights that are well above those predicted for the approved combined cycle project. On the other hand, the air coolers would have less of a potential to create aviation problems because the potential to create plume average velocities of 4.3 m/s is estimated to occur at a lower height than the approved project. 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 gas turbine exhausts. Therefore, the air traffic pattern should be evaluated and a determination should be made to determine if the currently approved mitigation measures for air traffic safety are adequate.

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TRAFFIC AND TRANSPORTATION - FIGURE 1

Carlsbad Energy Center Project Amendment - Regional Transportation

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: CH2MHill, April 2014 - Petition to Amend, Carlsbad Energy Center Project, Figure 5.13

TRAFFIC AND TRANSPORTATION - FIGURE 2

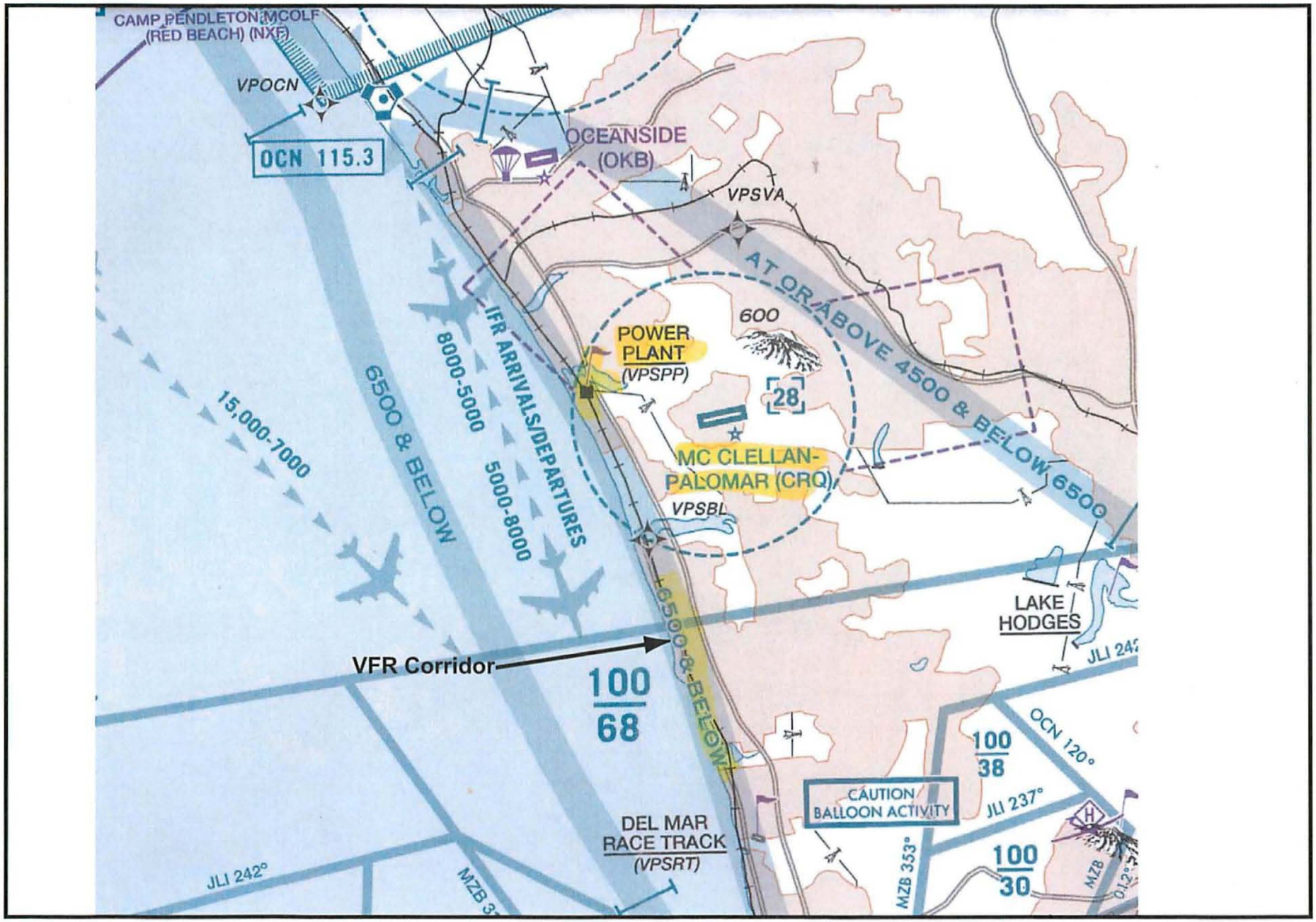
Carlsbad Energy Center Project Amendment - Local Transportation

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: CH2MHill, April 2014 - Petition to Amend, Carlsbad Energy Center Project, Figure 5.13

TRAFFIC AND TRANSPORTATION - FIGURE 3

Carlsbad Energy Center Project Amendment - San Diego Visual Flight Rules (VFR)Terminal Area Chart



TRAFFIC AND TRANSPORTATION

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: San DiegoTactical Area Chart- Effective 6/26/2014 to 12/11/2014
Federal Aivation Administration

TRANSMISSION LINE SAFETY & NUISANCE

Obed Odoemelam, Ph.D.

SUMMARY OF CONCLUSIONS

The petitioner, Carlsbad Energy Center, LLC's amended Carlsbad Energy Center Project (the amended CECP) resulted from a settlement agreement by the petitioner, the city of Carlsbad (city), the Carlsbad Municipal Water District (CMWD), and San Diego Gas and Electric (SDG&E) on specific design and operational modifications to the CECP already licensed by the Energy Commission (licensed CECP). Some of these modifications would relate to the 138-kV and 230-kV transmission lines and related facilities as already approved. In the presently proposed transmission scheme, Units 6, 7, 8, and 9 would be connected to the SDG&E power grid using a new overhead 230-kV line, via the newly expanded 230-kV SDG&E Encina Switchyard. Units 10 and 11 would be connected to the SDG&E 138-kV Encina Switchyard using a new overhead 138-kV transmission line. Since (as with the licensed CECP), the proposed lines 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. As also with the licensed CECP, the proposed lines would be operated in the SDG&E service area and therefore, their design, erection, and maintenance plan would be according to standard SDG&E practices, which conform to applicable laws, ordinances, regulations and standards (LORS). Since the line designs and operations would be the same for both the licensed and amended CECP, staff considers the five conditions of certification for the licensed CECP as adequate to also ensure against significant safety and nuisance impacts for the amended CECP.

INTRODUCTION

The proposed amendment to the licensed CECP resulted from a settlement agreement between the project owner, the city of Carlsbad, SDG&E, and the CMWD on how best to refine the approved design and operational plan to address community concerns while ensuring the best type of facility for SDG&E's power generation needs for the area. Some of the proposed modifications would relate to the transmission lines for transmitting the generated power to the SDG&E grid. Staff analyzed the field and non-field impacts from the design and operational plan for the licensed CECP and concluded that these impacts would be below significance levels with implementation of the five conditions of certification in staff's analysis. The present staff analysis is to determine whether the design and operational plan for the amended CECP would lead to field and non-field impacts that would differ significantly from those identified for the licensed CECP. As with the licensed CECP, this analysis focuses on the following issues taking into account both the physical presence of the transmission lines and the physical interactions of 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 transmission lines. Staff's analysis examines the amended CECP project's compliance with these requirements.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Transmission Line Safety & 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.
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	
Title 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 amended CECP would be larger than for the licensed CECP (as described in the related staff analysis), but the project would be located to still keep it within the portion of the licensed CECP east of the railroad tracks and west of I-5.

In the proposed transmission scheme, Units 6, 7, 8 and 9 would be connected to the SDG&E power grid using a new 4,000-foot-long overhead 230-kV line and via the newly expanded 230-kV SDG&E Encina Switchyard to the south. This line would stretch overhead from these generating units to an overhead/underground transition point at the northeast corner of the Encina Switchyard from which the final connection would be

made using a 576-foot underground line. Units 10 and 11 would be connected to the SDG&E grid using a new 2,200-foot-long overhead line via the SDG&E 138-kV Encina Switchyard. As with the licensed CECP, these lines would be located within CECP and SDG&E property lines away from residential areas.

PROJECT DESCRIPTION

The proposed project's lines would consist of the following segments:

- The 4,000-foot overhead 230-kV transmission line connecting the proposed Units 6, 7, 8, and 9 to the newly expanded 230-kV SDG&E Encina Switchyard to the south;
- The 2,200-foot overhead 138-kV transmission line connecting Units 10 and 11 to the 138-kV SDG&E switchyard to the south;
- The 576-foot underground 230-kV transmission line section of the connection between the amended CECP and the expanded 230-kV SDG&E switchyard; and
- Project-related modifications at SDG&E's 138-kV and 230-kV Encina Switchyards.

As with the licensed CECP, the proposed project transmission lines would be owned, operated, and maintained by the petitioner in keeping with SDG&E guidelines that ensure transmission line safety and efficiency together with reliability and maintainability. The petitioner has provided the design and structural dimensions of the proposed transmission line structures as related to safety, reliability, and field reduction efficiency LL2014d, pp.3-5 through 3-7 and Figures 3.1-5 through 3.1-7). SDG&E built and maintains the new 230-kV switchyard as part of its system improvement program LL2014d, p. 1-1). 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 transmission 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 the California Energy Commission Staff (staff) determines that the project would comply with applicable LORS; staff 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 for the licensed CECP (LL2014d, p.3-5), 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 the runway. For heliports, the restricted space is an area extending 5,000 feet.

As noted by the petitioner, the nearest public airport to the intended project 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 transmission 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 petitioner intends to comply with this height limitation by ensuring a design height of less than 120 feet for the proposed transmission line structures (LL2014d, pp.1-3 and 1-4). There is no heliport located within 5,000 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 transmission line operation and is produced by the physical interactions of transmission 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 transmission line voltage, distance from the transmission line to the receiving device, orientation of the antenna, signal level, transmission 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 transmission line. The potential for such impacts and related complaints is therefore minimized by reducing the line electric fields and locating the transmission 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 transmission line. Only the magnetic field would be encountered above this segment.

The proposed transmission 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 transmission lines of 345 kV and above, and not the 138-kV and 230-kV transmission lines proposed. The proposed low-corona designs are used for all overhead SDG&E transmission lines of similar voltage rating to reduce surface-field strengths and the related potential for corona effects. Moreover, the transmission 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 transmission lines in terms of specific noise limits. As with radio noise, audible noise is not encountered above underground transmission lines and is limited for overhead transmission 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 transmission 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 transmission 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 transmission lines of 345 kV or higher. It is, therefore, not generally expected at significant levels from overhead transmission lines of less than 345-kV as proposed for the amended 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 transmission lines are also aimed at minimizing field strengths, and undergrounding eliminates such noise, staff does not expect the proposed transmission 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 & 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 transmission lines, or that result from direct contact between the transmission 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 transmission lines (LL2014d, pp. 3-6 through 3-8).

The petitioner's compliance with the clearance-related aspects of GO-95 for the overhead transmission lines and GO-128 in the underground section would be an important part of this mitigation approach. The same Condition of Certification **TLSN-3** that was approved for the licensed CECP would be adequate 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 transmission 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 power 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 petitioner's implementation of GO-95-and GO-128-related measures against direct contact with the energized transmission lines (LL2014d pp. 3-5 and 3-6) would serve to minimize the risk of hazardous shocks. Staff's Condition of Certification **TLSN-1** as recommended for the licensed CECP would be adequate to ensure implementation of the necessary mitigation measures for the amended CECP.

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 transmission line. Such electric charges are induced in different ways by the transmission 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 transmission lines would be minimized through standard industry grounding practices (LL2014d, p. 3-5). As with the licensed CECP, staff's recommended Condition of Certification **TLSN-4** would be adequate to ensure such grounding for the amended CECP.

Electric and Magnetic Field Exposure

The possibility of deleterious health effects from electric magnetic field exposure has increased public concern in recent years about living near high-voltage transmission lines. Both electric and magnetic fields occur together whenever electricity flows and exposure to them together is generally referred to as electric and magnetic field 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 transmission 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 electric and magnetic field 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 power 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 electric and magnetic field-reducing measures and incorporate such measures into the designs for all new or upgraded power lines and related facilities within their respective service areas. The CPUC further established specific limits on the resources to be used in each case for field reduction. Such limitations were intended by the CPUC to apply to the cost of any redesign to reduce field strength or relocation to reduce exposure. Publicly owned utilities, which are not within the jurisdiction of the CPUC, voluntarily comply with these CPUC requirements. This CPUC policy resulted from assessments made to implement CPUC Decision 93-11-013.

In keeping with this CPUC policy, staff requires a showing that each proposed overhead or underground transmission line would be designed according to the electric and magnetic field -reducing design guidelines applicable to the utility service area involved. These field-reducing measures can impact transmission 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 the petitioner to ensure that such measures are applied in ways that prevent significant impacts on transmission 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 transmission 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 transmission lines in California are currently required by the CPUC to be designed according to the electric and magnetic field-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 transmission lines in that service area. Designing the proposed project transmission lines according to existing SDG&E field strength-reducing guidelines would constitute compliance with the CPUC requirements for transmission line field management.

The CPUC has recently revisited the electric and magnetic field 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 electric and magnetic field exposures mostly responsible for the health concern of recent years. The only project-related electric and magnetic field 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 electric and magnetic field 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 lack of nearby residences would eliminate 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 proposed 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 transmission 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 electric and magnetic field 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 transmission 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 transmission 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. As with the licensed CECP, 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**.

CONCLUSIONS

Since staff does not expect the transmission lines from the amended CECP to pose an aviation hazard according to current FAA criteria, staff does not consider it necessary to recommend location or other 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 transmission line designs, together with appropriate corona-minimizing construction practices, would minimize the potential for corona noise and its related interference with radio-frequency communication along the route.

Since electric or magnetic field health effects have neither been established nor ruled out for the amended 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 transmission 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 transmission lines given the absence of residences along the proposed route. On-site worker or public exposure would be short term and at levels expected for SDG&E transmission 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, as with the licensed CECP, the proposed project transmission lines would be operated to minimize the health, safety, and nuisance impacts of concern to staff and would be located within the existing plant's and SDG&E'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 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 construction of the transmission lines 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 transmission 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 transmission lines are grounded according to existing industry practices.

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

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VISUAL RESOURCES

William Kanemoto

SUMMARY OF CONCLUSIONS

In 2012 the Energy Commission approved the Carlsbad Energy Center Project (licensed CECP). Petitions to amend that project have been filed that will change the visual profile and impacts of the project. Staff concludes that these visual changes, as mitigated, do not result in a significant adverse visual impact, and that overall impacts by comparison to licensed CECP will be beneficial. In addition, the amended CECP project would comply with applicable laws, ordinances, regulations, and standards (LORS) pertaining to aesthetics or preservation and protection of sensitive visual resources.

As with licensed CECP, a future potentially significant cumulative visual impact may be created as a result of the combination of the amended CECP and the North Coast Interstate 5 HOV/Managed Lanes (I-5 Widening) Project proposed by the California Department of Transportation (Caltrans), The I-5 widening project would border the amended CECP site, and would likely impinge on the power plant site, creating a potential visual impact by removing screening of the site. The timing and final configuration of the I-5 widening is uncertain. This issue is essentially the same one considered in the licensed CECP proceeding. However, any cumulative impact from the combination of I-5 widening and amended CECP will be reduced by the lower visual profile of amended CECP. The cumulative impact is reduced to a level that is less than significant by Condition of Certification **VIS-5,** which is amended to address these potential future cumulative impacts, providing more flexibility for future visual screening mitigation.

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 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, REGULATIONS, AND STANDARDS

Visual Resources Table 1 provides a general description of identified adopted 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	
None	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 California 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, including size, height and location of buildings and the 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 and identifies designated scenic corridors and streets. Carlsbad Boulevard is identified as a Community Theme corridor, and Interstate 5 as a Community Scenic corridor. The Burlington Northern and Santa Fe (BNSF) railroad is also identified as one of four categories of scenic corridor.
City of Carlsbad Specific Plan 144, amended 2014	Provides development standards including landscaping and exterior lighting for the Agua Hedionda Lagoon and the EPS property. The city of Carlsbad repealed SP144(O).

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 of 1976. Although the Implementation Plan was adopted by the city in 1982, authority to issue coastal permits under the plan remains with the Coastal Commission.
Encina Power Station Precise Development Plan (PDP)	Provided specific development standards for the EPS property including architecture, building materials, setback requirements, landscaping treatment and grading. The PDP was recently amended by the city of Carlsbad to bring the proposed amended CECP into conformance with the current general plan and zoning ordinance. Relevant visual requirements of the amended PDP include: Under the amended PDP, parking, loading and refuse collection areas must be visually screened from public view; refuse collection and loading areas visible from public areas should be visually screened, to a height of 10 feet. A landscape plan may be required prior to permitting. Landscaping shall be provided per section 21.36.090 of the Carlsbad Municipal Code. Landscaping adjacent to Carlsbad Boulevard and the North County Transit District (NCTD) railroad right of way shall enhance the visual character of the area. Perimeter landscaping, trees or shrubs that are diseased, dying, or removed shall be replaced with similar plants of equal or better screening ability to the satisfaction of the city planner. Architecture and Building materials The following architectural guidelines apply . . . to the EPS's perimeter, and other publicly visible components of the PDP area. • Future buildings and structures, and additions and alterations to them or to existing buildings and structures, should be sited and designed in a compatible manner with the EPS's surroundings, which include the overall lagoon and ocean environment, views from scenic corridors, public recreation and open space areas, and established residential neighborhoods. • Building materials and finishes should also reflect compatibility with surroundings. • Any mechanical and/or electrical equipment located on the roof of any structure shall be screened in a manner acceptable to the city planner.

PROJECT DESCRIPTION

LICENSED CECP PROJECT

For the purposes of this supplemental analysis of the amended CECP project under CEQA, the environmental baseline is considered to be the previously approved and licensed CECP project (CEC2012a). That is, impacts described in this analysis focus on the differences in impact of the proposed amended project, compared to the previously licensed project. The licensed project was approved based in part on the evidence that the mitigation measures embodied in the visual conditions of certification would adequately reduce potentially significant impacts to a less-than-significant level.

It is therefore necessary to summarize the previously approved project and its visual conditions of certification to provide an understanding of the environmental baseline for the present amended project.

Visual Resources Figure 1 depicts architectural elevations of the licensed CECP, with 139-foot tall exhaust stacks and 88-foot tall heat recovery steam generators (HRSGs) (CEC2009a).

The licensed CECP project included two combined-cycle power generation units, including 88-foot tall HRSG structures and two 139-foot tall exhaust stacks, among other visually prominent features. The two licensed units would have occupied portions of the same site proposed for the amended CECP, the current site of three of four existing unused oil storage tanks (Tanks 5, 6, and 7), sited approximately 24 feet below surrounding grade, in the northeast portion of the EPS site, adjacent to existing U.S. Interstate 5 (I-5). Staff's analysis of the licensed project concluded that because of the existing landscaped berm surrounding the project site, the project would, with rehabilitated and enhanced tree plantings on the berm as called for in Condition of Certification **VIS-2**, provide sufficient screening to keep potential visual impacts of the project to less-than-significant levels as seen by all sensitive viewing groups. The existing earth berm, with its tall tree canopy, provides substantial visual screening of the site, and would continue to provide sufficient screening to strongly filter views of the proposed new units, as seen from nearby sensitive visual receptors.

Staff identified a potentially significant *cumulative* visual impact of the licensed CECP project, when considered together with the adjacent I-5 Widening Project. The Commission agreed with this conclusion in its Final Decision. This impact is discussed in relation to both the licensed and amended CECP in the "Cumulative Impacts" subsection of this analysis.

PROPOSED AMENDED PROJECT

The licensed CECP combined-cycle project was approved for construction and operation on a 23-acre parcel on the northeast corner of the EPS. The current amended 632 megawatt project would be located on a 30-acre parcel, occupying the current site of four below-grade oil storage tanks, rather than three of them, as under the licensed project. The amended project would consist of four actions/phases:

Phase I – Removal of the four below-grade fuel oil storage tanks occupying the proposed CECP site (Tanks 4, 5, 6, and 7). In addition, existing unused above-grade oil storage Tanks 1 and 2, located west of the railroad tracks on the northern edge of the EPS site adjacent to Agua Hedionda Outer Lagoon, would be removed to provide area for construction laydown and parking. (Storage Tank 3 was previously removed to make way for the Poseidon Desalination Plant, under construction.

Phase II – Construction of proposed amended CECP. Construction of six simple-cycle generation units and associated support structures and facilities, on or adjoining the site of Tanks 4, 5, 6, and 7.

Phase III – Decommissioning of the existing EPS (Units 1 through 5) located within the existing EPS generation building.

Phase IV – Demolition of existing EPS and grading of Encina Redevelopment Project site.

Architectural elevations of the proposed Amended CECP were requested of the petitioner, but have not been received at the time of preparing the Preliminary Staff Assessment (PSA). However, **Visual Resources Figure 2** depicts a simulated aerial perspective of the amended project that provides some basis of comparison with the licensed project depicted in **Visual Resources Figure 1**. (Data Response Set 3, Figure DR74-1)(LL2014pp).

Visual Resources Table 2 compares the number and height of major visual features of the licensed and amended CECP projects.

Visual Resources Table 2
Summary of Major Publicly Visible Structures

Proposed New Project Component	Number of Units	Licensed CECP Height	Number of Units	Amended CECP Height
Exhaust Stacks	2	139 feet	6	90 feet
HRSGs	2	88 feet		None
Transmission Poles	9	74-100 feet	9	98-106 feet
Air Cooling Units	2	22 feet	6	14 feet
Gas turbine inlets	2	76 feet	6	47.75 feet
230 kV Switchyard	1	56 feet	1	56 feet
VBV Exhaust Stack	-	NA	-	48 feet
SCR/CORR Ducts	-	NA	-	38.7 feet
Ocean Water Storage Tank (sited at grade)	-		1	34 feet
Warehouse/ Maintenance (sited at grade)			1	30 feet

As shown in **Visual Resources Table 2,** the height of major features of the generation units would be less under the amended project than under the licensed project, but the number would be greater (six generation units rather than two).

Base elevation of the proposed CECP site (existing storage tank site) is roughly 31 feet, approximately 24 feet below the surrounding grade of approximately 55 feet, and up to 39 feet below the top of the existing earth berm (approximately 15 feet tall) adjoining I-5.

A major visual difference of the amended project versus the licensed project is the inclusion of decommissioning and demolition of the existing EPS facility (Generation Units 1 through 5) under the amended CECP. The 200-foot-tall existing EPS building housing Units 1 to 5, including its single 400-foot tall exhaust stack, is the tallest structure in the city of Carlsbad and a singular city landmark, visible from throughout the surrounding area. The removal of the EPS, in itself, would constitute a major beneficial change in the visual setting of the surrounding area, eliminating this dominant industrial feature from the coastal landscape.

Transmission Lines – Under the licensed CECP, nine new single-pole transmission towers, ranging in height from 74 to 100 feet would be added on the western edge of the CECP site near the edge of the railroad right-of-way, and on the EPS site leading to the SDG&E switchyard. Under the amended project, nine new single-pole towers of up to106 feet in height would be added, with four of the poles near the CECP/I-5 boundary. Three would take the east-west leg of the line to the SDG&E switchyard, with an overall transmission length of 4,000 feet.

New 230 kV Switchyard – Under the licensed CECP, a new 230 kV switchyard with A-frames of up to 56 feet in height was to be constructed directly south of the proposed CECP on the existing SDG&E Cannon substation property, in a visually exposed position adjacent to the southbound Cannon Road off-ramp of I-5.

Under the amended CECP, a new 230 kV switchyard expansion would be constructed directly south of the existing SDG&E 138 kV switchyard, directly east of the existing EPS generating building in a more visually isolated and buffered location at the center of the EPS site.

Construction Staging Area – Under the licensed CECP, slightly less than 10 acres of the EPS property, including the area surrounding EPS Tanks 1 and 2, were proposed for construction laydown and parking. Under the amended CECP, 19.3 acres at various locations throughout the existing EPS site are proposed for laydown and parking, including the northeast corner of the EPS site adjoining I-5; the site of existing storage tanks 1 and 2; the area south of the Poseidon Desalination plant, the area adjoining the existing EPS seawater intake on the shore of Agua Hedionda Middle Lagoon; and other sites internal to the EPS site Petition to Amend ((PTA) Figure 2.0-2).

SETTING

The amended CECP would be built within the incorporated city of Carlsbad, California. The project site is situated within the 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. The beach and a narrow coastal plain give way to rolling low-elevation hills to the east, 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 designated city scenic corridor, 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 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 2 provides an aerial view of the proposed CECP site (all figures referred to in the text may be found at the end of this section).

The amended CECP site comprises the northeastern portion of the present 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 I-5.

The amended CECP would occupy the current site 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 ten 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 the east. 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 generally 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 wide 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 two remaining unused fuel oil storage tanks (EPS west tank farm, Tanks 1 and 2) located northeast of the EPS generation building; and, directly south of these, the Poseidon Desalination facility, currently under construction on what was previously the third of the unused fuel storage tanks. 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.

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.

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 CEQA Guidelines (Cal. Code Regs., tit. 14, § 15000 et. seq), Appendix G Environmental Checklist. The checklist questions pertaining to “Aesthetics” are as follows:

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. Generally, 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 likely to experience significant 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 method and criteria.

Visual Resources Figure 3 shows the locations of 11 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 I-5 at Agua Hedionda Lagoon;
- KOP 7 – view from northbound I-5 north of Cannon Road;

The following KOPs support discussions of cumulative impacts. Simulations from these KOPs were included in the Final Staff Assessment (FSA) for the licensed CECP, but were not considered necessary to complete the current analysis of the amended CECP:

- KOP 8 – view from Carlsbad Blvd. looking east from the EPS outfall;
- KOP 9 – view from the BNSF rail corridor looking east;
- KOP 10 – view from EPS site toward CECP
- KOP 11 – view from railroad corridor, looking south to CECP site.

The KOPs may be grouped into the following broad categories of sensitive viewers with visual exposure to the proposed project:

- Carlsbad Beach/Carlsbad Boulevard - Viewers to the west of the site, in the corridor defined by adjoining portions of Carlsbad State Beach and adjacent Carlsbad Boulevard. These viewers include high numbers of visitors to the state beach, and motorists on Carlsbad Boulevard, a locally designated scenic roadway (**KOPs 1 and 8**);
- Agua Hedionda Lagoon and Residences - Viewers to the east, including recreational viewers in and around Agua Hedionda Lagoon, and large numbers of residents in the viewshed north and east of the lagoon. These KOPs are designated scenic vista points in the Agua Hedionda Local Coastal Program, Land Use Implementation Plan (**KOPs 2, 3, 4, 5**).
- Interstate 5 - Large numbers of viewers on I-5, though less visually sensitive than the two groups just described above, would have views directly to the adjacent project site (**KOPs 6 and 7**).
- Railroad Passengers - Viewers from the Amtrak and Coaster passenger trains would be exposed to views of the project from within the railroad right-of-way. The BNSF rail line has been identified as a "Scenic Corridor" by the city of Carlsbad (**KOPs 9 and 11**).
- Future Encina Site - Foreseeable future viewers within the proposed Encina Redevelopment Project area, comprising the current site of the existing EPS, would also have views of the amended project (**KOP 10**).

Staff's analysis of the project's effect on each KOP is presented under "Operation Impacts and Mitigation," below.

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.

I-5, Carlsbad Boulevard, and the BNSF rail line -- all located in the immediate site visual foreground -- are city- designated scenic routes or corridors. These are analyzed in this study as KOPs 1, 6, 7, 8, 9 and 11.

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 damage 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 damaged by the proposed project. No other notable scenic resources were identified within the project viewshed.

Interstate 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 BNSF rail line has also been identified as a "Scenic Corridor" by the city of Carlsbad.

While viewers within these two corridors would be affected, as described below, the resources themselves would not be damaged.

C. Visual Character 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 19.3 acres of the EPS property would be used as laydown and parking areas for construction of the power plant and switchyard. Most of the proposed staging and parking areas are at least partially screened from public view, either by location and intervening site features, or by existing tree plantings and landscaping.

However, as depicted in Figure 2.0-2 of the PTA, a large laydown site in the northeast corner of the EPS site directly north of CECP Units 6 and 7 and adjoining (to the east of) the City of Carlsbad Sewer Lift Station site (under construction), could encroach into the area currently occupied by the raised landscaped berm surrounding the CECP site. The city Lift Station project has already resulted in the removal of trees comprising a portion of that landscaped berm, causing loss of previously existing tree canopy and associated screening. If the proposed staging area were to encroach further into the

landscaped berm, further loss of tree canopy and site screening could occur. This is of particular concern because the same area of the site is also the proposed location of a new warehouse/maintenance building (75' x 116' x 30' height), and a planned wastewater treatment facility, where no structures were previously proposed under the licensed CECP. The amended proposed laydown area in this northeast location is larger than the area proposed under the licensed project. If this expansion of the laydown area were to result in loss of existing tree canopy or earth berm in this area, a principal visual buffer for the amended CECP site as seen from Agua Hedionda Lagoon could be removed or impaired. The loss of prominent tree canopy and the resulting increased exposure of proposed project facilities could represent a substantial adverse long-term impact. The portion of the site potentially affected by this laydown area may be seen in KOPs 5 and 6, **Visual Resources Figures 9a – 9d and 10a – 10d**.

Above-ground storage tanks (ASTs)s 1 and 2, located immediately north of the Poseidon Desalination plant, would also be removed to serve as a laydown and parking area. This site is currently partially screened by existing landscaping that serves to blend with the natural lagoon setting and to filter views of the storage tanks as seen from Carlsbad Boulevard. If these plantings remain undisturbed, they would also serve to filter and partially screen views of staging activities and equipment as seen from Carlsbad Boulevard and Carlsbad State Beach. Consequently, the use of this site for staging is not expected to result in visual impacts. The removal of the tanks themselves would represent a substantial beneficial visual impact.

A third proposed laydown area, immediately south of the existing EPS generation building and SDG&E switchyards, would potentially be visible in the foreground from Carlsbad Boulevard. This area, currently largely vacant, is screened from view by low, opaque chain-link fencing that encircles the entire frontage of the EPS site on Carlsbad Boulevard. This perimeter fencing, located at the property line a few feet from the roadway, serves to impose a moderate degree of visual unity on what would otherwise be a cluttered view of parking and miscellaneous industrial equipment along the entire EPS frontage. Assuming that the fence were to remain in place as is the use of this site for staging would not be expected to have substantial visual impacts. Ultimately, after Phase IV, this laydown site would be a part of the Encina Redevelopment Area.

Other proposed laydown sites would be largely screened to public view by location and intervening site features, or by existing tree plantings and landscaping. Some of these would be visible to train passengers from the railroad right-of-way. However, considering the moderate existing visual quality of this railroad track segment, the very fleeting nature of views within it, 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: To address the potential adverse impacts of construction and construction staging, staff recommends modified Condition of Certification **VIS-3** which would include the following:

- Petitioner shall provide a detailed plan of the northeast laydown area for review and approval

- o The footprint of the proposed laydown site in the northeast portion of the project site shall be modified as needed to avoid berm or tree removal
- o Supplemental perimeter tree planting shall be installed during and/or prior to the construction Phase II period to improve screening wherever needed due to preparation and use of laydown sites
- o Maintain opaque fencing along Carlsbad Boulevard

Summary of Construction Impacts by Project Phase

Phase I

If the staging area just described in the northeast corner of the EPS site were to cause loss of the existing earth berm or associated trees, a substantial component of site screening as seen from Agua Hedionda Lagoon and adjoining areas to the north of the site could be lost. This could, without appropriate mitigation, result in substantial long-term visual impacts. The contrast with existing views of the northeast portion of the site as seen from the lagoon and adjacent residential areas would be moderately high due to the loss of the substantial tree canopy that currently dominates these views. The precise level of impact would depend on the extent of tree loss resulting from laydown area preparation. It is unclear whether this specific staging site would be a part of Phase I or of subsequent project phases, but is discussed here as part of Phase I.

To address potential impacts caused by removal of existing screening vegetation at the perimeter of proposed laydown areas, particularly in the northeast corner of the EPS, staff recommends Condition of Certification **VIS-3**, as modified.

As discussed, removal of ASTs 1 and 2 and use of their footprint for Phase II construction laydown and parking would not be expected to result in adverse impacts if existing perimeter screening vegetation is not removed or damaged. Recommended Condition **VIS-3** however includes provisions for supplemental or replacement screening at this and other laydown sites if such removal or damage is not avoidable.

Phase II

During Phase II, the contrast/impact of tree removal for laydown in the northeast area of the site would be exacerbated by the introduction of the new generation units, and the greater visual exposure to their mechanical, industrial character, as well as introduction of the new warehouse/maintenance building and associated parking. The latter could be fully exposed to public view by tree removal for laydown, depending upon the extent of tree removal in that area.

Phase III

Phase III would comprise decommissioning of the existing EPS facility, removal and recycling of EPS equipment, and mandatory, pre-demolition removal and abatement of Hazardous Building Materials like asbestos. It is not expected to include any large, conspicuously visible activities or changes. However, as was the case during asbestos removal activities at the South Bay Power Plant, all EPS facilities will be tented and sealed in order to contain and preclude any off-site migration of air-born toxins to

surrounding neighborhoods. Thus, apart from the temporary tenting, adverse visual impacts from Phase III are not anticipated.

Phase IV

Phase IV, comprising the demolition of the EPS, could have temporary adverse visual effects from a more chaotic appearance of the facility during different phases of its demolition. Large volumes of debris (tons of concrete, steel, piping and other miscellaneous building materials from demolition will accumulate on-site at various designated staging areas for testing and eventual disposal and movement off-site. These piles would be at least partially screened by existing perimeter landscape screening. The effects of demolition however would be temporary and relatively short-term. During the period of disturbance they would not substantially interfere with adjacent recreational activities at either the lagoon or state beach. For these reasons these temporary effects are considered less than significant. Staff-recommended Condition of Certification **VIS-3**, as modified, includes maintenance of existing opaque perimeter fencing through this phase of EPS demolition, in order to maintain screening of both laydown and demolition as seen from Carlsbad Boulevard and Carlsbad State Beach.

OPERATION IMPACTS AND MITIGATION

As described above, Operation Impacts are discussed in relation to various 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.

The analysis of impacts is grouped by category of sensitive viewers in the principal affected portions of the project viewshed, as described previously.

CARLSBAD BEACH/CARLSBAD BOULEVARD (KOPS 1, 8)

KOP 1 – View from Carlsbad Boulevard Looking Southeast

Visual Resources Figures 4a through and 4d depict existing and simulated views from Carlsbad Boulevard, looking southeast towards the project site (FSA VR Figures 4a and 4b; PTA Figures 5.13-2B, -2C)(CEC2009a; LL2014d). 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 east of Carlsbad Boulevard, and southbound motorists on Carlsbad Boulevard.

Visual Sensitivity

Visual Quality: Motorists on Carlsbad Boulevard have spectacular views of the ocean and lagoon. Existing visual quality in the vicinity, characterized by highly scenic views of both the ocean and lagoon, is high.

Viewer Concern: Carlsbad State Beach is a very heavily used public beach located west of the project site. Given the high recreational value and use of this area, viewer

concern is considered 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.

Viewer Exposure: 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 CECP 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, also drawing motorists’ attention toward the site.

Views of the CECP site from the beach tend to be blocked by Carlsbad Boulevard, which lies at a higher elevation than the beach. 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.

Overall Visual Sensitivity: Overall, sensitivity of the Carlsbad Boulevard/Carlsbad Beach viewshed is thus considered high.

Visual Change

Licensed Project

Visual Resources Figure 4b presents a visual simulation of the licensed project as viewed from KOP 1.

Overall Visual Change: As described in detail in the November 2009 Final Staff Assessment, and May 31, 2012, Final Decision, due to a moderate level of contrast, subordinate visual dominance, and weak view blockage, overall visual change due to the licensed CECP was considered low to moderate as seen from KOP 1.

Impact Significance: In the context of the setting’s high visual sensitivity, the low to moderate level of project visual change was considered a less-than-significant visual impact as seen from Carlsbad Boulevard and Carlsbad State Beach.

Amended Project

Visual Resources Figure 4c depicts a simulation of the amended project from the same viewpoint through Phase III, and **Figure 4d** through Phase IV.

Visual Contrast: As suggested in Figure 4C, visual contrast of the amended project generation units is less than that of the licensed project units. Color and form contrast of Units 6 and 7 are evident and moderate. Units 8 through 11 are largely screened to view from Carlsbad Boulevard by intervening existing trees along the railroad right-of-way within the EPS site. In this depiction of the site condition after Phase IV, the removal of the EPS is a substantial beneficial change to the view. In effect, the contrast of the overall EPS/CECP generation facilities with their scenic setting would greatly decrease.

Project Dominance: Dominance of the new structures would be moderately low. After Phase IV, the overall dominance of the EPS/CECP facilities as a whole would decrease substantially, a beneficial effect.

View Blockage: Through Phase III, view blockage of the sky by new 90 ft. amended CECP exhaust stacks (65 ft. above grade) would be moderately low. View blockage of the sky by the very tall EPS building and exhaust stack would be eliminated after Phase IV, greatly reducing overall view blockage of the EPS/CECP facilities.

Overall Visual Change: Overall visual change from the addition of the proposed Units 6 through 11 during Phase II would thus be moderately low as seen from Carlsbad Boulevard and Carlsbad State Beach. The level of visual change after Phase IV would be great, but beneficial.

Impact Significance: In the context of the setting's high visual sensitivity, the moderately low level of project visual change under Phase II is considered a less-than-significant visual impact. The ultimate visual change after Phase IV would be beneficial, improving the visual quality of the setting compared to the existing condition by greatly reducing the presence of the overall EPS/amended CECP facility.

This analysis and comparison of licensed and amended CECP as seen from Carlsbad Boulevard would apply generally to all viewpoints within this portion of the project viewshed (Carlsbad Boulevard and Carlsbad State Beach). Therefore, the analysis would also apply to **KOP 8** (Carlsbad Boulevard west of the EPS), also located in this portion of the viewshed, and will not be repeated.

AGUA HEDIONDA LAGOON AND RESIDENCES (KOPS 2, 3, 3A, 4, 5)

KOPs 2 through 5 are designated 'special vista points' in the Agua Hedionda Lagoon Local Coastal Program and Agua Hedionda Land Use Plan (CAR 1982). They represent the range of views in and around the lagoon as experienced by recreational and residential viewers, outdoor boating enthusiasts enjoying the lagoon from the southeast to northwest. KOPs 3 through 5 particularly represent recreational views from the north shore of the inner lagoon.

KOP 2 – View from Pannonia Trail at Capri Park

Visual Resources Figures 5a, 5b, 5c and 5d depict existing and simulated views from Pannonia Trail at Capri Park at approximately ¾-mile distance due northeast from the project site (FSA VR Figures 5a and 5b; PTA Figures 5.13-3B, -3C). This view is typical of elevated views from residences on the east and north side of the lagoon who enjoy unobstructed views from the slopes facing the outer lagoon, project site and Pacific Ocean beyond.

Visual Sensitivity

Visual Quality: Visual quality in the areas surrounding Agua Hedionda Lagoon is high with various and differing perspectives depending upon location. In addition to vivid, highly intact views of the lagoon; elevated viewpoints such as KOP 2 also provides views of the ocean and horizon. Particularly because of the mature tree canopy on the eastern and northern perimeters of the EPS property , its industrial features are highly

filtered to views such as KOP 2, enhancing the unity and intactness of these views, a point of civic pride for the city. The contribution to visual quality of the existing tree canopy on the EPS site is substantial and an important component of the overall lagoon visual character. Views eastward toward the ocean from throughout the lagoon viewshed are defined to a great extent by this canopy, which adds an element of vividness and intactness that enhances visual quality, helping to off-set the effect of the EPS generation building. The canopy screens existing oil storage tanks, the Poseidon Desalination plant, and other industrial features.

Viewer Concern: Residents in general are considered to have potentially high levels of viewer concern due to the long periods of viewing time, and typically high levels of concern for their residences. Likewise, recreational viewers, such as hiking and outdoor enthusiasts to Capri Park and Pannonia Trail, are also considered to have high levels of concern for existing and future scenic quality, which is a primary focus of their activity. And often a central reason for their love of the area and decision to retire or relocate to this coastal San Diego community.

Viewer Exposure: Those residents most likely to experience visual impact would be a number of viewers north and east of the lagoon whose views of the EPS/CECP sites are not obstructed by other homes, terrain, or landscaping. 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 distance from the project site and, particularly, existing screening at the eastern site perimeter.

Overall Visual Sensitivity: Overall visual sensitivity of this KOP is thus moderately high.

Visual Change

Visual Resources Figure 5b depicts a simulation of the licensed CECP { from KOP 2. In the CECP FSA, staff concluded that with implementation of Conditions of Certification VIS-1 and VIS-2,which require alternative paint color treatment and supplemental perimeter landscape screening on the existing berm, potential impacts from KOP 2 could be reduced to an acceptable, less-than-significant level in the long term (with maturity of supplemental, fast-growing tree screening). Figure 5b depicts the unmitigated condition (without application of these required conditions).

LicensedCECP

Overall Visual Change: As described in detail in the 2009 FSA and 2012 Final Decision, due to a moderate levels of contrast, dominance, and view (sky and horizon) blockage, overall visual change due to the licensed CECP was considered moderate as seen from KOP 2.

Impact Significance: In the context of the setting's moderately high visual sensitivity, the moderate level of project visual change was considered a potentially significant visual impact as seen from KOP 2.

Residual Impact Significance After Mitigation with Staff-Recommended Measures: With implementation of Conditions **VIS-1** and **VIS-2,** lowered color contrast and improved

tree screening over time could lower project contrast to a low-to-moderate level, particularly with fast-growing species, within a few years. With those measures, impacts could be reduced to an adverse but less than significant level, within a few years.

Amended CECP

Visual Resources Figure 5C depicts the proposed amended CECP from KOP 2 through Phase III, and **Figure 5d**, through Phase IV.

Visual Contrast: As suggested in Figure 5C, visual contrast of the amended CECP generation units and exhaust stack is much less than that of the licensed CECP units. However, color and form contrast of the large mechanical electrical generating components remains evident. Light-colored (ivory to off-white), painted metal enclosure case finishes contrast starkly with the green colors of tree canopy and blue ocean vistas beyond, and vertical and rectilinear forms of the exhaust stacks and generation units contrast with tree canopy and ocean horizon. Contrast under Phase II would thus remain moderate. In the depiction of the site condition after Phase IV, removal of the large EPS enclosure building and 400 ft. tall exhaust stack is a substantial beneficial change to the over-all view of Agua Hedionda Lagoon and the Carlsbad State Beach vicinity. In effect, the contrast of the overall EPS/amended CECP generation facilities, with their scenic setting, would greatly decrease.

Project Dominance: During Phase II decommissioning, the dominance of the new generation structures and transmission poles would be relatively moderate. Their distinctly industrial character would be evident and co-dominant in defining the character of views to the lagoon and ocean. After completion of Phase IV and its seven individual tasks, the overall dominance of the EPS/amended CECP facilities as a whole would decrease substantially, a beneficial effect of the view shed.

View Blockage: During Phase II power plant construction, view blockage from intrusion of the new exhaust stacks into the tree canopy and ocean horizon would be evident, but to a moderately low degree. View blockage of the sky and horizon by the very tall EPS building and exhaust stack would be removed after Phase IV, greatly reducing overall view blockage of the EPS/amended CECP facilities.

Overall Visual Change: Overall, visual change from the addition of the proposed amended CECP Units 6 through 11 under Phase II would thus be moderate. Overall visual change after Phase IV EPS demolition would be great, but beneficial.

Impact Significance: In the context of the setting's high visual sensitivity, the moderate level of project visual change under Phase II through IV is considered a potentially significant visual impact. The ultimate visual change after Phase IV however would be beneficial, improving the visual quality of the setting compared to the existing condition by greatly reducing the presence of the overall EPS/amended CECP facility.

Staff-Recommended Mitigation: In order to minimize potential impacts both during and after project Phases II and III, staff recommends Condition of Certification **VIS-1**, as modified, stipulating 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 generation structures, and light-blue-colored stacks to reduce contrast against the ocean and sky. Staff also recommends Condition of Certification **VIS-2**, which provides supplemental perimeter landscape screening, and ongoing replacement planting, as necessary, to maintain and enhance existing screening of exhaust stacks, transmission poles, and generation units in both the short and long term.

Residual Impact Significance after Mitigation with Staff-Recommended Measures: With staff-recommended conditions of certification, overall contrast during project Phases II and III would be reduced to a moderately low level, a less than significant impact. In the long term the recommended conditions of certification would substantially enhance the final project visual condition as seen by viewers in and around the lagoon.

The remaining KOPs within the eastern, lagoon/residential viewshed are presented and discussed below as a group. In general, impacts would be similar to KOP 2, with differences as noted.

KOP 3 – View from end of Cove Drive

Visual Resources Figures 6a, 6b, 6c and 6d represent the view from the end of Cove Drive (FSA VR Figures 6a and 6b; PTA Figures 5.13-4B, -4C). This view, from a public access area on the northern shore of the inner lagoon just west of Bristol Cove approximately 0.6 mile directly across the lagoon from the project site is representative of recreational viewers, YMCA camp attendees during summer months, as well as some condominium owners who own residences along the northern shoreline of the inner lagoon.

KOP 3A – View from Adams Street

Visual Resources Figures 7a, 7b, 7c presents views of the licensed CECP and amended CECP with and without EPS, seen from the end of Adams Street (PTA Figures 5.13-5A, -5B, -5C)(Existing view was not available). This view, from a public access area on the northern shore of the inner lagoon just west of Bristol Cove approximately 0.5 mile from the site, is representative of recreational viewers along the northern shoreline of the inner lagoon.

KOP 4 – View from end of Hoover Street

Visual Resources Figures 8a, 8b, 8c, and 8d present the view from the end of Hoover Street (FSA VR Figures 7A, -7B; PTA Figures 5.13-6B, -6C). This view is a readily accessible public access point near the shoreline recreation trail on the lagoon shore, approximately 0.4 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.

KOP 5 – View from end of Harbor Drive

Visual Resources Figure 9a and 9b presents a view from the end of Harbor Drive, looking south from a distance of approximately 0.3-mile (FSA VR Figures 8A, -8B; PTA Figures 5.13-7B, -7C). 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, and a frequent walking and dog path used by local residents in search of a brisk daily walk. The middle lagoon is the only area in which swimming is permitted from the shore, as

provided by maintenance and management activities funded by NRG. The opposite (south) shore or the inner lagoon is managed by the California Department of Fish & Wildlife (CDFW) for its breeding and nesting habitat for several popular and listed bird species. There also exists a small visitor and youth educational center managed by CDFW staff that educates hundreds of local school children each year through organized field trips. The North Coast YMCA Aquatic Park can be seen in the foreground to the right.

VISUAL SENSITIVITY (KOPS 3, 3A, 4, 5)

Visual sensitivity of all viewpoints in the lagoon viewshed would be as described under KOP 2, except that viewer concern at KOPs 3 through 5, the closest KOPS to the project site. Visual quality, viewer concern and viewer exposure are all considered high.

Overall Visual Sensitivity: Overall visual sensitivity of these KOPs is thus high.

Visual Change

Licensed CECP

Overall Visual Change: Similar to the discussion under KOP 2, due to a moderate level of contrast, dominance, and view (sky and horizon) blockage, overall visual change due to the licensed CECP was considered moderate as seen from KOPs 3 and 3A. From viewpoints farther west such as KOPs 4 and 5, visual change would be lower due to tall, dense perimeter tree screening in the northern portion of the EPS site, which provides more complete screening from these viewpoints. For KOPs 3 and 3A, moderate visual change from introduction of the new generation units during Phases II and III could represent a significant impact in the context of high viewer sensitivity. As in the case of KOP 2, however, potential impacts from KOP 3 and 3A would be mitigated to less-than-significant levels by staff-recommended Conditions of Certification **VIS-1** and **VIS-2**. The moderately low level of effects from KOPs 4 and 5 would be less-than-significant.

Amended CECP

Overall Visual Change (KOPs 3 and 3A): Effects on viewers at the other KOPs within the lagoon viewshed (KOPs 2 through 5) would be essentially similar to those described under KOP 2, varying slightly in degree of impact depending on specific angle of view. Thus, impacts from KOP 3 (Cove Drive) and KOP 3A (Adams Street), though at a lower elevation on the lagoon shore and nearer to the proposed project, would be essentially similar to those summarized under KOP 2, and the conclusions and recommended conditions of certification would be the same. Overall visual change during Phases II through IV would be moderate. Visual change from KOP 3A would be substantially the same as from KOP 3. The ultimate visual change after Phase IV would be beneficial, improving the visual quality of the setting compared to the existing condition by greatly reducing the presence of the overall EPS/CECP facility.

Impact Significance: In the context of high viewer sensitivity, this moderate level of impact, continuing into Phase IV, would be potentially significant.

Staff-Recommended Mitigation: In order to minimize impacts both during and after project Phases II and III, staff recommends Condition of Certification **VIS-1**, painting of

all project structures to ensure the lowest feasible color contrast in the short term; and Condition of Certification **VIS-2**, which provides supplemental perimeter landscape screening, and replacement planting to enhance screening of exhaust stacks, transmission poles, and generation units in both the short and long term.

Residual Impact Significance After Mitigation with Staff-Recommended Measures: With staff-recommended Conditions of Certification **VIS-1** and **VIS-2,** impacts represented in KOPs 3 and 3A could be reduced to a moderately low, less-than-significant level within the time frame of Phases II through IV. With completion of Phase IV, the ultimate visual change would be beneficial. However, in the long term the recommended conditions of certification would not only reduce impacts of Phases II and III in the short term, but would also substantially enhance the final project visual condition as seen by viewers in and around the lagoon over the long term, by providing adequate screening of the new generation units and enhancing the tree canopy on the eastern boundary of the EPS site.

Overall Visual Change (KOPs 4 and 5): As depicted in **Visual Resources Figures 8a – 8d and Figures 9a – 9d**, visual change from KOPs 4 and 5, representing more westward areas of the lagoon viewshed, would be low. Contrast, dominance and view blockage would all be low. As under the licensed project, EPS perimeter screening at the north project boundary as seen from these westward portions of the lagoon would reduce visibility of the new generation units and exhaust stacks to low levels. No substantial adverse impacts are thus anticipated in this portion of the lagoon viewshed.

Impact Significance: In the context of high viewer sensitivity, this level of impact would be less-than-significant.

Staff-Recommended Mitigation: None needed for viewpoints in this portion of the viewshed.

PTA Figure 2.0-2, depicting proposed construction laydown and parking areas under the PTA, suggest that some of the substantial existing perimeter landscape screening on the north boundary of the EPS site, which appears prominently in the foreground of KOPs 4 and 5 (**Visual Resources Figures 8a – d and Figures 9a – d**), could potentially be negatively affected. The exact effect on existing tree plantings of the proposed laydown areas is not yet known. If these portions of existing perimeter tree plantings were to be affected, this could potentially also affect the impact conclusions summarized here for KOPs 2 through 5. For purposes of the present analysis, it has been assumed that existing landscaping would not be affected by proposed laydown, as depicted in the PTA simulations. Additional information has been requested of the Petitioner.

Views of 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.

VIEWS FROM INTERSTATE 5 (KOPS 6, 6A, 7 AND 7A)

KOP 6 – Southbound view of motorists/passengers from Interstate 5 at Agua Hedionda Lagoon (northern CECP approach)

Visual Resources Figures 10a, 10b, 10c and 10d, represent a view from southbound I-5 at Agua Hedionda Lagoon (FSA VR Figures 9a, -9b; PTA Figures 5.13-8B, -8C). KOP 6 is very similar in most respects to KOP 5, but is representative of views of southbound motorists on I-5 at a foreground distance from the project site as they approach the site from across the lagoon.

Visual Sensitivity

Visual Quality: The I-5 bridge is separated into a southbound and northbound lane and also serves to separate 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 amended CECP site, and its tall Eucalyptus trees, are prominently featured, as depicted in **Visual Resources Figure 10a**. The prominent tree canopy not only provides screening of the EPS/amended CECP site, but contributes a prominent vivid element that enhances unity and intactness of the lagoon setting. Existing visual quality for southbound motorists approaching the project site is thus moderately high.

Viewer Exposure: The estimated number of average daily vehicle trips on I-5 by the EPS property is 206,000 (CEC 2009a). 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 the substantial screening of the earth berm and tall Eucalyptus trees adjoining the highway, is considered moderate. The EPS is not prominent from this KOP, but becomes more visible as motorists move south.

Viewer Concern: 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 has been designated a "Community Scenic Corridor" in the City of Carlsbad General Plan Circulation Element. These policies demonstrate recognition of special scenic value accorded these views by the county and city. These segments are therefore considered to have a moderately high viewer concern.

Overall Visual Sensitivity: Overall viewer sensitivity for southbound motorists on I-5 from KOP 6 is thus considered to be moderately high.

Visual Change

Licensed CECP

Overall Visual Change: As described in detail in the November 2009 FSA and May 2012 Final Decision, due to a low level of contrast, visual dominance, and view blockage, overall visual change due to the licensed CECP was considered low as seen from KOP 6.

Impact Significance: In the context of the setting's moderately high visual sensitivity, the low level of project visual change was considered a negligible, less-than-significant visual impact as seen from KOP 6.

Amended CECP

As depicted in **Visual Resources Figure 10b**, from this viewing angle the existing berm and trees would almost completely screen the project. The generation units and stacks would not be visible from this location. As shown, the proposed maintenance and warehouse building would be largely screened by the existing perimeter tree canopy.

Visual Contrast: As depicted, form and color contrast of the maintenance and warehouse building would be moderately low. Other project structures would not be seen.

Project Dominance: Due primarily to abundant existing perimeter screening, visual dominance of the maintenance/warehouse building would be very subordinate and low. The structure would be largely screened from view by the large existing perimeter trees. *View Blockage:* The project would not block or intrude into scenic views from this KOP.

Overall Visual Change: Overall visual change would thus be low.

Impact Significance: Given the low level of visual change from this viewpoint, anticipated impacts would be negligible.

Recommended Mitigation - None needed.

As noted under KOPs 4 and 5, above, if perimeter landscape screening on the north boundary of the CECP site is affected by construction laydown, this could potentially also affect the impact conclusions summarized here for KOP 6. Trees along this boundary are a primary source of visual screening for both the existing EPS and proposed amended CECP. For purposes of the present analysis, it has been assumed that existing landscaping would not be affected by proposed laydown, as depicted in the PTA simulations of KOP 6. Additional information to clarify these impacts has been requested of the Petitioner.

KOP 6A – Southbound view of motorists from I-5 adjoining CECP site

Visual Resources Figure 10e depicts a second simulated view of the amended CECP as seen by southbound motorists on I-5, adjacent to the amended CECP site (the existing view is not shown)(DR POV 5-2, LL2014t). KOP 6A was added to the analysis in response to data requests by intervenor Power of Vision, and helps provide a fuller understanding of the project as it would be seen by I-5 motorists.

Visual Sensitivity

Visual Quality: In contrast to KOP 6, existing visual quality for motorists in the segment of I-5 directly adjoining the CECP site is moderate due to an absence of the dramatic ocean and lagoon views that distinguish the view of motorists from KOP 6. The landscaped earth berms, high tree canopy and tall shrub plantings west of the highway contribute an attractive natural element that enhances visual quality while filtering views

of the EPS, switchyard, existing storage tanks and other industrial features on the EPS and CECP sites.

Viewer Exposure: As noted under KOP 6, viewer numbers are very high. However, along the I-5 frontage, visibility of the CECP site is intermittent and varies greatly, from low where ample landscape screening is present, to moderately high where such screening is absent. Overall, viewer exposure is considered moderate.

Viewer Concern: Viewer concern is considered moderately high due to special local scenic designations of the highway.

Overall Visual Sensitivity: Overall viewer sensitivity for motorists at KOP 6A and on CECP site's I-5 frontage generally is considered moderate.

Site changes since licensed CECP proceedings: Since completion of the FSA analysis in 2009, staff observed that there has been some degree of tree mortality or removal on the eastern I-5 frontage of the CECP site. Thus, exposure of the CECP site to viewers on I-5 and elsewhere to the east appears greater than when previously analyzed for the licensed CECP. In addition, it should also be noted that a considerable portion of the remaining existing landscape screening on the I-5 frontage of the CECP site lies not within the CECP site, but within the Caltrans right-of-way. This important portion of existing screening is thus outside of Petitioner's control.

Visual Change

Licensed CECP

KOP 6A was not included in the analysis of the licensed CECP. However, views such as KOP6A were addressed in the FSA analysis of KOP 7, which addressed views from the highway in the segment adjacent to the CECP. At that time, visual change due to the licensed project was considered to be moderate overall, due particularly to partial screening by the landscaped berm and trees.

Impact Significance: In the context of moderate overall visual sensitivity, project impacts were considered adverse but less-than-significant for motorists in the foreground vicinity of the I-5/CECP site frontage.

Amended CECP

As depicted in **Visual Resources Figure 10e**, from this viewing angle the existing berm and perimeter trees would largely screen the project features. The generation units and exhaust stacks are not visible in this view, but would be visible to varying degrees above and between the landscape screening along the I-5 frontage. Four new transmission poles up to 106 feet in height would also be located on the I-5 frontage within a few feet of the highway, which were not a part of the licensed project. These four poles appear in **Figure 10e**. It should be noted that the precise siting of these poles has subsequently been modified from this depiction by the petitioner. As modified, the two nearest poles would be moved westward away from the highway and into the sub-grade power plant area. The poles would thus appear farther from the viewer, and 25 to 30 feet lower in apparent height.

Visual Contrast: Form and color contrast of the new generation units, exhaust stacks, transmission poles and other visible features would vary depending upon the condition of the perimeter landscaping. In some portions of the frontage, screening would be high, but in others where tree and shrub removal has occurred, screening would be nonexistent and contrast high. Overall, contrast in this section is considered moderate.

Project Dominance: Due primarily to existing perimeter screening, visual dominance of the CECP structures from I-5 would be moderate overall. The existing perimeter earth berm on the CECP site would largely block views of most of the sub-grade generation facilities. The taller structures such as the six new exhaust stacks, which would extend roughly 60 to 65 feet above grade, and to a lesser extent the new transmission poles, have the potential to be visually dominant viewed at such close distances. They thus could intermittently appear visually dominant to passing motorists where loss of screening due to tree mortality has occurred. The visibility and prominence of three of the proposed transmission poles has been reduced from the configuration depicted in the simulation. The simulation depicts the two nearest poles sited at grade very near the site boundary. These two poles and a third new pole are now proposed to be relocated below grade near the generation units, moving them farther from the roadway and reducing their above grade height by 25 – 30 feet, from 100+ feet to 70 - 75 feet. The two southernmost poles would remain at grade. The bottom portions of these two poles would be screened by the existing earth berm and landscaping, while the upper portions would remain visible above the tree and shrub canopies. All of the proposed poles are located roughly 120 feet or more from the nearest travel way behind the elevated earth berm, moderating their potential visual dominance somewhat.

View Blockage: The project would not block or intrude into scenic views from this KOP. Taller project features would intrude into views of the sky to a moderate degree.

Overall Visual Change: Overall visual change from KOP 6A and the CECP I-5 frontage generally would thus be moderate.

Impact Significance: Given the moderate level of visual sensitivity and visual change from this viewpoint, anticipated impacts would be moderate and less-than-significant.

Recommended Mitigation: To address the very uneven existing screening on the I-5 frontage, enhance the perimeter screening generally, and provide on-site screening to address any potential future losses of existing landscaping within the Caltrans right-of-way, staff recommends adoption of Condition of Certification VIS-2. To reduce project contrast to the lowest feasible degree in the short term during growth of landscaping under VIS-2, staff also recommends Condition of Certification **VIS-1**, including painting of all publicly visible project structures.

KOP 7 – View from northbound U.S. I-5 north of Cannon Road (CECP I-5 frontage)

Visual Resources Figures 11a through 11d represent a view from northbound I-5 north of Cannon Road (FSA VR Figures 10a, -10b; PTA Figures 5.13-9B, -9C). Like KOP 6A above, this view is representative of motorists' views along the CECP/ I-5 frontage generally. The existing transmission lines are the most visually dominant feature in this section, their large presence above I-5 lowering the visual quality of the

area. North of this point, visual intrusions from the industrial features of the EPS become less evident, and potential visual prominence of the amended CECP increases.

Visual Sensitivity

Visual Quality: Existing visual quality for motorists along the CECP/I-5 frontage is moderate due to an absence of the ocean views that distinguish the view from KOP 6, as well as the intrusion of existing SDG&E 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 tree canopy west of the highway, which also screen much of the industrial EPS features.

Viewer Concern: As discussed under KOP 6, viewer concern is considered moderately high due to special local scenic designations of the highway.

Viewer Exposure: In general, visual exposure to the CECP would be moderate, with some portions of the I-5 frontage well-screened by tree canopy, and other portions not currently screened, as discussed under KOP 6A. Northbound views of the CECP site are moderated by the greater distance to the site compared to southbound views, as well as by the center-median landscaping on I-5.

Overall Visual Sensitivity: Overall viewer sensitivity for motorists along the CECP/I-5 frontage in this segment is thus considered to be moderate.

Visual Change

Licensed CECP

Overall Visual Change: As described in detail in the November 2009 FSA and May 2012 Final Decision, due to a moderate level of contrast, visual dominance, and view blockage, overall visual change due to the licensed CECP was considered moderate as seen from KOP 7 and the I-5 frontage.

Impact Significance: In the context of the viewpoint's moderate visual sensitivity, the moderate level of project visual change was considered a moderate, less-than-significant visual impact as seen from KOP 7.

Amended CECP

Visual Contrast: As depicted in **Visual Resources Figure 11c**, the amended CECP would be less visually prominent than the licensed CECP. However, approximately 50 vertical feet of the new exhaust stacks and the tops of the generation units would remain visible in foreground views from I-5, and present a moderate level of form, line, and color contrast to passing motorists.

Project Dominance: The proposed new exhaust stacks, generation units, and five new transmission towers on the I-5 frontage would be visually co-dominant with the existing SDG&E transmission towers, extending an industrial character along much of the remainder of the amended CECP/EPS frontage with I-5. As discussed under KOP 6A, their visibility and dominance is intermittent and variable depending on the condition of the perimeter screening.

View Blockage: The new project features would intrude into views of the sky to a moderate degree.

Overall Visual Change: Overall visual change of the amended CECP would thus be moderate from KOP 7 and the I-5 frontage.

Impact Significance – In the context of the viewpoint's moderate visual sensitivity, the moderate level of project visual change would be a moderate, less-than-significant visual impact as seen from KOP 7.

Staff-Recommended Mitigation: None required at this KOP. However, staff recommends Condition of Certification **VIS-1**, including painting of all publicly visible 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 medium to long term. In this segment of I-5, supplemental tall tree screening, extending farther south on the eastern berm along the highway, would be important in achieving more effective long-term screening of the project.

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 moderately low level, particularly in the long term. With those measures, impacts could be neutral or beneficial in the long term. Removal of the above ground EPS buildings and facilities west of the railroad track after Phase IV would of course be a beneficial impact.

KOP 7A – Northbound view of motorists from I-5 adjoining CECP site

Visual Resources Figure 11e depicts a second simulated view of the amended CECP as seen by northbound motorists on I-5, adjacent to the amended CECP site (the existing view is not shown)(DR POV 5-3, LL2014t). KOP 7A was added to the analysis in response to data requests by intervenor Power of Vision, and helps provide a fuller understanding of the project as it would be seen by I-5 motorists. KOP 7A is located roughly 1,000 feet north of KOP 7 (or approximately ten seconds of travel later, at 70 mph).

Visual Sensitivity

Visual sensitivity for KOP 7A is as described for KOPs 6A and 7. Overall sensitivity is moderate. ***Visual Change***

Licensed CECP

KOP 7A was not included in the analysis of the licensed CECP but visual change would be the same as KOP 7, moderate overall.

Impact Significance: As KOP 7, in the context of moderate overall visual sensitivity, project impacts would be adverse but less-than-significant.

Amended CECP

As depicted in **Visual Resources Figure 11e**, from this viewing angle the taller project features would be intermittently visible, where screening by tall tree canopy is absent. As with KOP 6A, the proposal has been changed so that the two transmission poles seen in the simulation would be roughly 25 percent to 30 percent shorter than depicted due to their relocation to the sub-grade portion of the site. Because the vertical visual angle of project features is less from southbound lanes due to greater distance, they would tend to be less visually prominent than as seen from northbound lanes. However, overall visual change would be as described for KOP 7, moderate.

Impact Significance: As for KOP 7, in the context of moderate overall visual sensitivity, project impacts would thus be considered adverse but less-than-significant.

KOP 8 – Carlsbad Boulevard looking east from Encina Power Station outfall

The analysis and comparison of licensed and amended projects as seen from Carlsbad Boulevard is described under KOP 1 and would apply generally to all viewpoints within this portion of the project viewshed (Carlsbad Boulevard and Carlsbad State Beach). Therefore, the analysis and conclusions of KOP 1 would also apply to **KOP 8** (Carlsbad Boulevard west of the EPS), and are not repeated here.

Under amended CECP Phase IV, the removal of the EPS building would expose views of the switchyard directly to its east. However, these views would continue to be screened by fencing on the Carlsbad Boulevard frontage in the short term, and by development of the EPS site over the long term. .

VIEWS FROM RAIL CORRIDOR (KOPS 9, 11)

KOP 9 – View from BNSF/NCTD Rail Corridor looking east

KOP 11 – View from BNSF/NCTD Rail Corridor looking southeast

Visual Resources Figures 12 (KOP9) and 13 (KOP 11) represent the views from the NCTD rail corridor adjacent to the CECP site, looking east (KOP 9) and southeast (KOP 11) respectively (LL2014)(Project Owner Response to Data Request Set 2 No. 58).

Visual Sensitivity / Visual Quality: This specific segment of the double-track North County Transit District (NCTD) rail corridor, which bisects the larger 95-acre EPS parcel and adjoins the amended CECP to the east and the EPS to the west. The visual quality is moderate at best: it consists of a foreground mainly comprised of raised earthen berms, with scattered trees screening filtered views of the adjoining industrial facilities, particularly on the west side of the tracks but also open views of industrial equipment intermittently on both sides, and a general absence of any visible scenic features. Views of the lagoon and ocean are not visible from this rail segment.

Viewer Concern: A portion of the NCTD rail corridor directly abuts the CECP site to the west, separating the site from the remaining EPS. 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, which

averages approximately 20 trains per day (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.

The NCTD right-of-way abutting the CECP western boundary is also part of an approved regional, multi-jurisdictional Coastal Rail Trail (CRT) alignment, which has not yet been completed, pending construction through the EPS property in the CECP project vicinity. The precise location of the CRT in this segment has not been designed. Potential effects on the CRT are discussed below in the "Cumulative Impacts" subsection of this analysis. Please also review the **LAND USE** section of this staff assessment for further analysis.

Viewer Exposure: Viewer exposure is currently moderately low. 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.

Overall Visual Sensitivity: Overall viewer sensitivity of the rail corridor is thus considered to be moderate, reflecting the compromised existing visual quality and very brief viewer exposure.

Visual Change

Licensed CECP

Overall Visual Change: As described in detail in the FSA and Final Decision, due to a strong level of contrast, moderate visual dominance, and low view blockage, overall visual change due to the licensed CECP was considered moderate as seen from KOPs 9,11, and the adjoining NCTD rail corridor.

Impact Significance: In the context of the viewpoint's moderate visual sensitivity, the moderate level of project visual change was considered a moderate, less-than-significant visual impact as seen from KOPs 9 and 11.

Amended CECP

Visual Contrast: As seen from KOPs 9, 11, and the rail corridor generally, the amended CECP would be less visually prominent than the licensed CECP. However, approximately 60 to 65 vertical feet of the new exhaust stacks and the tops of the generation units would remain above grade and potentially visible in brief foreground views from the rail corridor, and present a moderate level of form, line, and color contrast to passing train passengers.

Project Dominance: For passengers with views eastward, the amended CECP would be dominant in view, but for only a few seconds. Overall, dominance is thus considered moderate.

View Blockage: The new project features would intrude into views of the sky to a moderate degree, and would not block any scenic views. After completion of Phase IV, the removal of the EPS would greatly lower existing blockage of views toward the ocean.

Overall Visual Change: Overall visual change of the amended CECP would thus be moderate from KOPs 9 and 11 through the completion of Phase IV. After its completion removal of existing view blockage of the EPS building would be a substantial benefit.

Impact Significance: In the context of the viewpoint's moderate visual sensitivity, the moderate level of project visual change would be a moderate, less-than-significant visual impact through project Phase IV. After completion of Phase IV, removal of existing view blockage of the EPS would be a substantial beneficial impact.

Staff-Recommended Mitigation: Although impacts from this KOP would be less than significant, staff recommends Condition of Certification **VIS-1**, which would require painting all project structures to ensure the lowest feasible color contrast achievable in the short term. Staff also recommends Condition of Certification **VIS-2**, to include supplemental landscape screening on the western amended CECP boundary adjoining the railroad track, 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 and enhance visual quality for future viewers using the Coastal Rail Trail.

OVERALL PROJECT OPERATION IMPACTS ON EXISTING VISUAL CHARACTER OR QUALITY

Project operation impacts from all identified KOPs on the existing visual character and quality of the setting would be less-than-significant with staff-recommended color mitigation (Condition of Certification **VIS-1)**, staff-recommended perimeter landscape screening (Condition of Certification **VIS-2),** staff-recommended screening of laydown sites (Condition of Certification **VIS-3**), and staff-recommended lighting mitigation (Condition of Certification **VIS-4**). With these measures, the impacts from the operation of the amended CECCP 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.

LINEARS

Overhead Transmission Lines: Eight new single-pole transmission towers up to 106 feet in height, and associated power lines, are proposed under the amended CECP, including five towers and lines extending roughly 1,400 feet along the eastern edge of the project site, paralleling I-5. The original project described in the PTA has since been modified so that three of these five towers on the eastern site boundary are relocated farther from I-5 and 25 to 30 feet lower, in the sub-grade portion of the site near the generation units. The absolute above-grade height of those poles would thus be 70 to 75 feet rather than 100 feet+. Three additional poles would carry lines roughly 1,000 feet due west to the SDGE switchyard. A small portion of these east-west lines would be briefly visible to NCTD passengers; the rest would be visually very subordinate from public viewpoints. Please refer to KOPs 6 and 7 for discussion of visual effects of the proposed transmission lines, or the **PROJECT DESCRIPTION** and **TRANSMISSION SYSTEM ENGINEERING** sections of this PSA for more details.

VISIBLE WATER VAPOR PLUMES

The proposed project would be cooled by use of (evaporative) air-cooled condensers. Staff found that operational exhaust temperatures would prevent water vapor condensation, and that there would be no plume opacity from pollutants under normal operation. Therefore, no visible water vapor plumes would be emitted from the plant or plant cooling system.

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, as well as to illuminate the night time sky. If bright exterior lights are not properly hooded or directed, onsite lighting could introduce a significant light or glare distraction to the project vicinity.

Necessary project construction lighting could occur between 7:00 PM and 7:00 AM throughout the four phase, 64 month amended CECP schedule. Some construction activities may take place 24 hours a day, 7 days a week.

Currently, night lighting on the EPS property occurs primarily at the existing generation building and 400 ft. exhaust stack, and pole-mounted area lighting.

Under staff-recommended Condition of Certification **VIS-4**, temporary and permanent project lighting would require 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) lighting complies with local policies and ordinances. 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. 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. FAA aviation strobe lighting could be required on the taller project structures.

With implementation of Condition of Certification **VIS-4**, the project's construction and operation-related lighting impacts in the context of the existing lighting are anticipated to be less-than-significant.

CUMULATIVE IMPACTS AND MITIGATION

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 (Poseidon) Project

The Carlsbad Seawater Desalination Project (CSDP) is a large-scale industrial facility currently under construction by Poseidon Resources, Inc., and is located just west across the railroad tracks from the amended CECP site. It is visible from Carlsbad Boulevard and Carlsbad State Beach viewshed west of the EPS site, yet its 30-foot profile and exterior features and design were chosen to complement the visual aesthetics of the site, as it has been designed to resemble a Class A office building, as required by the city. According to the project EIR for the desalination project, various visual mitigation measures, including replacement planting for trees removed for project construction, screening of exterior mechanical equipment, retention and protection of existing landscape screening, and city approval of building design would minimize visual impacts and allow the project to conform to City of Carlsbad Scenic Corridor Guidelines (CAR 2005). The project would appear in the visual foreground of the amended CECP, but would appear visually subordinate to viewers on Carlsbad Boulevard due to substantial existing landscape screening. With the removal of ASTs 1 and 2 to the north of the desalination plant during CECP Phase I, the overall industrial character of the EPS site in the area of the desalination plant would be greatly reduced, a beneficial visual effect. This improvement in the appearance of the EPS site would of course increase greatly during Phase IV with the removal of the EPS generation building. Assuming the CSDP EIR measures are implemented, the incremental contribution of the amended CECP to visual impacts would be minor, and no cumulative impact would be anticipated.

Future Non-Industrial Uses of a Decommissioned EPS Site

The site of the decommissioned EPS west of the railroad tracks will be transferred to the city for joint non-power redevelopment in a manner that has yet to be determined but is presumed to include a combination of visitor-serving commercial mixed use and open space. This foreseeable future use, referred to in the City of Carlsbad Draft General Plan as the Carlsbad Boulevard/Agua Hedionda Center, would represent a potential future key viewpoint of the amended CECP. In the FSA and Final Decision, potential future visual impacts to the anticipated future use of this site from the licensed CECP were considered and it was determined that ample opportunities for mitigation of views to the CECP through landscape screening exist on the proposed Agua Hedionda Center site. Because this remains true, no cumulative impacts are anticipated.

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. Until such time, specific effects on trail users cannot be identified with certainty. Please see the **LAND USE** section of this staff assessment for more specific analysis on the CRT.

In the FSA for the licensed CECP, staff determined that with 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.

Under the amended CECP, staff-recommended Condition of Certification **VIS-2** would allow the project during Phases I through IV to conform with city scenic corridor policies and objectives and reduce potential impacts of the amended CECP. Supplemental landscape planting along the western CECP perimeter under this condition would improve the visual quality of the CECP site as seen by future CRT viewers. Views from the CRT would also be enhanced in the long term by the removal of the EPS generation building. Under a Precise Development Plan Amendment 00-02(b), the project petitioner is required to dedicate an easement for the CRT that is acceptable to the city (CAR 2006). This is also a requirement of Condition of Certification **LAND-1**. Given this city authority to review and approve the CRT alignment, with implementation of Condition of Certification **VIS-2** any potential future impacts to CRT viewers are expected to be less-than-significant.

North Coast Corridor Interstate 5 HOV/Managed Lanes Project

Caltrans' North Coast Interstate 5 HOV/Managed Lanes Project (I-5 Widening Project) has been under active development and study since 2001, when the agency began coordinating city discussions for those communities along the proposed widened freeway facilitated by the San Diego Association of Governments.

Staff had the opportunity to meet and confer with Caltrans staff throughout the course of the original licensed CECP proceeding. However at that time, the I-5 Widening EIR/EIS had not been published. The Final Environmental Impact Statement / Environmental Impact Report (FEIR/EIS) published in 2013 describes a preferred 8+4 w/ Barrier Alternative for the 28-mile section of I-5 that runs from La Jolla Village Drive north to Harbor Drive and Highway 76 in Oceanside. While no definitive time period for project completion is yet available, Caltrans has indicated that construction of this portion of the widening project will not occur for more than ten or even 20 years.

Caltrans analyzed four alternatives for the I-5 widening project and provided layout information for these four in the immediate project site vicinity (CALTRANS 2013; CEC 2009a; CALTRANS 2014). Although a Preferred Alternative is identified in the EIS, the final design of the alternative to be constructed adjacent to the CECP site is not known with certainty, and may not be known for some time. As described in the FEIS, construction of this segment of the I-5 project is not anticipated until approximately 2035.

Energy Commission staff reviewed the four alternatives for the I-5 widening project and concluded the following:

- Under both the licensed and amended CECP, the four I-5 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.
- Under both the licensed and amended CECP, removal of the earthen berm and landscaping along the EPS property would completely eliminate all visual screening of the CECP site from I-5, and from sensitive viewpoints to the east of the project site, including viewpoints within and north of the inner Agua Hedionda Lagoon.

- The tallest features of the amended CECP, the proposed exhaust stacks, would be approximately 65 feet in height above the surrounding grade, visible at close proximity to passing motorists and to viewers throughout the middle-ground viewshed to the east of the EPS. The remaining Encina Power Station property, which in addition to the generation building and stack, includes other industrial features such as switchyard, transmission poles, and other features, would become visible within the KOP 2, 3, 4, 6, and 7 viewsheds. After completion of CECP Phase IV, the retired EPS generation building and stack would be permanently removed, but the CECP and SDG&E features would remain.
- 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 both the licensed and amended CECP as seen by motorists on I-5 and by recreationists and residents in and east of the lagoon, is considered to be potentially substantial. Although possible elevated lanes at the center median of I-5 could partially screen views of the CECP as seen from the lagoon and vicinity, this structure, if included in the project, would not be as effective as the existing visual screening on the CECP site's eastern boundary, 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 landscaping.

The cumulative visual effect introduced by either the licensed or amended 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 in-fill landscape planting under Condition of Certification VIS-2. Absent adequate 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. This was also the conclusion of the Commission in the Final Decision with regard to the licensed CECP.

The ultimate removal of the existing EPS facility under Phase IV of the amended CECP would greatly improve visual quality for the viewers described. However, removal of the CECP berm and tree screening along the eastern edge of the project site could impose a substantial adverse visual impact , by removing the existing attractive and prominent landscape features of the CECP perimeter tree canopy, and replacing it with fully exposed views of the taller features of the six generation units, including exhaust stacks, the upper portions of the generation units, VBV stacks, SCR ducts, and other features. Affected viewer groups would include I-5 motorists, recreational lagoon visitors, and residential viewers to the east. The eastern CECP boundary would be altered from a site visually dominated by tree canopy to one dominated by the highly industrial character of the generation units. This could represent a moderately high level of adverse visual change and, in the context of moderately high viewer sensitivity, would constitute a significant adverse impact.

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 project owner shall be required to maintain a buffer zone immediately west of I-5, between the existing NRG fence line and storage tank perimeter road, in order to maintain existing visual screening of berm and trees; 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.

During preparation of the licensed CECP FSA, staff determined that a buffer zone capable of accommodating a replacement earth berm and landscaping would exist on the CECP site after proposed I-5 widening. However, because the vertical profile and potential visual prominence of the amended CECP would be much less than the licensed CECP, staff also concludes that adequate replacement visual screening of the amended CECP at the eastern CECP boundary could be achieved by tall tree planting alone, without the additional height of a replacement earth berm. The specific requirements and layout of such screening, however, are not and cannot be known at the present time, without further study and further detailed project design and right-of-way information for the I-5 project.

Condition of Certification **VIS-5** has thus been modified to focus on stipulation of a landscape screening buffer zone to be maintained, sufficient to provide adequate replacement tree screening of the amended CECP in the event of removal of existing screening due to condemnation by the future I-5 Widening project.

Staff also concludes that a sufficient buffer area does exist at the CECP eastern boundary for an adequate visual screening solution to be devised in that future eventuality. However, what particular site modifications or measures would be required to achieve the stipulated level of visual screening is not known at the present time. The ultimate solution, however, shall include replacement tree canopy of sufficient height and density to provide substantial visual screening of the tall amended CECP features, including exhaust stacks and transmission poles; and to substantially replace any existing tree canopy on the eastern CECP boundary lost to highway expansion. The solution developed under Condition of Certification **VIS-5** shall not preclude relocation or undergrounding of transmission poles or other features, if necessary to provide the stipulated visual buffer.

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 Carlsbad 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 site 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 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 approved 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 approved 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 a portion of the CECP's western boundary. It is unclear to staff at this time to what extent this encroachment would interfere with or preclude adequate perimeter vegetative screening.

From a purely visual perspective, reduction or elimination of vegetative screening 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 adverse visual effect on those passengers. However, as discussed elsewhere in this PSA, 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 adjacent, 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 of lowered viewer exposure and sensitivity, adverse impacts to rail viewers due to reduction in landscaping are considered to be less-than-significant. Nevertheless, staff recommends adoption of Condition of Certification **VIS-2,** including replacement and supplemental tree and shrub planting on the western boundary of the CECP, in order to minimize these potential impacts to rail passengers, and to fully conform with City of Carlsbad Scenic Corridor policies and guidelines pertaining to the city-designated scenic rail corridor. This measure would also have long-term beneficial effects in relation to the future CRT project described previously.

As depicted in city plans, the proposed lift station could also conflict with some landscape screening measures described in Condition of Certification **VIS-2**, and result in removal of some existing tree screening. However, 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 itself could 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 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 on the CECP site due to that project, as feasible.

Los Angeles to San Diego (LOSSAN) Double Tracking and Bridge Replacement

The LOSSAN (San Diego – Los Angeles – San Luis Obispo) rail corridor improvements project in the vicinity of the CECP site entailed double-tracking of the rail line and replacement of the Agua Hedionda rail bridge and was completed in 2012. Train ridership on these rail lines has thus increased, but the project has had minimal long-term 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. (VIS-1 through VIS-4) The CECP project would be consistent with this policy.	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 could 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. 4. The provision of public and/or private usable open space and/or pathways designated in the Open Space and Parks and Recreation Elements.	Consistent, as conditioned. (VIS-1 through VIS-4)	The proposed CECP would be generally consistent with this policy, based primarily on the effectiveness of existing and staff-proposed 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**		
	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 Policies C.2 , C.6, C.9	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.2 – Consistent, as conditioned (VIS-1 through VIS-4) Policy C. 6 – Consistent, as conditioned (VIS-1 through VIS-4)	C.2 With staff-recommended Conditions of Certification **VIS-1** and **VIS-2**, the project would preserve and in some cases enhance the setting along the scenic routes. C.6 With staff-recommended Conditions of Certification **VIS-1** and **VIS-2**, 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's scenic corridor program in the PSA analysis and resulting recommended conditions of certification. With recommended conditions the project would conform with those objectives.
	SP 144(O) previously included architectural review and height requirements potentially conflicting with the CECP proposal.		The city of Carlsbad repealed SP

LORS		Consistency Determination	Basis for Consistency
Source	**Policy and Strategy Descriptions**		
City of Carlsbad Specific Plan 144 (SP 144), as amended 2014	Provided specific development standards for the Encina Power Station property including architecture, building materials, landscaping and grading.	Not applicable	144(O).
Encina Power Station Precise Development (PDP 00-02) Amended 2014	Relevant visual requirements of the amended (2014)PDP include: Under the amended PDP, parking, loading and refuse collection areas must be visually screened from public view; refuse collection and loading areas visible from public areas should be visually screened, to a height of 10 feet. A landscape plan may be required prior to permitting. Landscaping shall be provided per Section 21.36.090 of the Carlsbad Municipal Code. Landscaping adjacent to Carlsbad Boulevard and the NCTD railroad right of way shall enhance the visual character of the area. Perimeter landscaping, trees or shrubs that are diseased, dying, or removed shall be replaced with similar plants of equal or better screening ability to the satisfaction of the city planner. Architecture and Building materials The following architectural guidelines apply . . . to the EPS's perimeter, and other publicly visible components of the PDP area. • Future buildings and structures, and additions and alterations to them or to existing buildings and structures, should be sited and designed in a compatible manner with the EPS's surroundings, which include the overall lagoon and ocean environment, views from	Consistent. Consistent, as conditioned. (VIS-1 through VIS-4)	The PDP was amended by the city of Carlsbad in 2014 to bring the proposed amended CECP into conformance with the current general plan and zoning ordinance. The requirements listed have been addressed through staff-recommended conditions of certification.

LORS		Consistency Determination	Basis for Consistency
Source	**Policy and Strategy Descriptions**		
	scenic corridors, public recreation and open space areas, and established residential neighborhoods. • Building materials and finishes should also reflect compatibility with surroundings. • Any mechanical and/or electrical equipment located on the roof of any structure shall be screened in a manner acceptable to the city planner.		
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. Under the LCP Land Use Plan, a 35-foot height limit is set for the CECP site.	Inconsistent with LCP 35-foot height limitation.	Because the Energy Commission retains authority for power plant siting, no coastal permit is required. However, the Commission would need to override the LCP 35-foot height limit, as was done for the licensed CECP.

CONCLUSIONS

Staff concludes that with all proposed and recommended conditions of certification, potential project-specific visual impacts of the amended 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.

The amended CECP would not conform with the 35-foot height limit established under the Agua Hedionda Local Coastal Program. Staff concludes that the CECP would conform with all other applicable aesthetics-related LORS.

Although no project-specific long-term significant impacts are anticipated, staff is concerned that without appropriate coordination with the city of Carlsbad, Coastal Commission and Caltrans, and collaboration and multi-agency approaches implementation strategies for 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. Caltrans must work with NRG and the City, as well as interested agencies such as the California Coastal Commission, to mitigate the impacts of its project. The conditions of certification proposed here accommodate that effort. 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 Widening Project, available on-site buffer zone area, and area required to provide adequate visual screening of the CECP, implementation of this condition would mitigate potential cumulative impacts to less-than-significant levels.

PROPOSED CONDITIONS OF CERTIFICATION

Staff recommends retaining all of the conditions of certification for the licensed CECP. Staff is proposing modifications to Conditions of Certification **VIS-3** and **VIS-5** to reflect changes in project design and changed circumstances. Minor edits are proposed to Conditions of Certification **VIS-1**, **VIS-2** and **VIS-4**. Modifications are shown in ~~strikethrough~~ for deletions and **<u>bold underline</u>** for additions.

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 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~~ **3** 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 **perimeter** 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 order to compensate for recent tree losses in the berm along the I-5 frontage and enhance perimeter screening in the earliest feasible time-frame, implementation of VIS-2 shall begin at the earliest feasible time, in conjunction with Phase I construction.

In addition, the project owner shall, in coordination with the City of Carlsbad, prepare 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 a detailed plan of the northeast laydown area for review and approval. The project owner shall modify the footprint of the proposed northeast laydown site as needed to avoid perimeter berm or tree removal.** The project owner shall provide **supplemental** landscaping **during or prior to the construction phase** that reduces the visibility of construction staging activities, equipment and materials, **as needed.** ~~at proposed Staging Sites ‘D’ and ‘E’ of the EPS site (near fuel tanks #1 and #2) as seen from Carlsbad Boulevard and other public viewpoints, and that complies with local policies and ordinances~~. **Where supplemental or replacement planting is needed to provide screening of staging activities, t**~~T~~rees and other vegetation consisting of informal groupings of fast-growing evergreens shall be strategically placed along the northern, **eastern** and western boundaries of the staging sites, as

appropriate, of sufficient density and height to 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. **Existing opaque fencing shall be maintained along the Carlsbad Boulevard frontage of the EPS for the duration of construction and demolition.**

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. **The intent of the plan shall be to minimize loss of existing perimeter tree and shrub screening, particularly at the northeast laydown site; and to provide supplemental and replacement plantings as needed to screen staging sites.**

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~~ **landscape condition** at **start of construction and at** five years ~~and twenty years~~ after planting, as viewed from Key Observation Point ~~1~~ **6** (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~~ **start of construction.**

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~~ **lighting** 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; and

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.

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 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~~ **project owner** 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~~ **project owner** 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.

The ultimate solution, however, shall include replacement tree canopy of sufficient height and density to provide substantial visual screening of the tall amended CECP features, including exhaust stacks and transmission poles; and to substantially replace any existing tree canopy on the eastern CECP boundary lost to highway expansion. The solution developed under Condition of Certification VIS-5 shall not preclude relocation or undergrounding of transmission poles or other features, if necessary to provide the stipulated visual buffer.

~~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.

d) a proposed construction schedule.

Verification: At the earliest feasible time, ~~applicant~~ **the project owner** shall coordinate with Caltrans to discuss specific hazard and visual mitigation strategies. ~~Following publication of the I-5 Widening DEIS, applicant~~ **The project owner** 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.

REFERENCES

CCC (California Coastal Commission), 2008. Coastal Act.

Caltrans (California Department of Transportation), 2006. Scenic Highway Master Plan.

Caltrans, 2008. CAD files of I-5 Widening Layouts North of Cannon Road. 6/5/2008.

Caltrans, 2013. Interstate 5 North Coast Corridor Project FEIR/FEIS

Caltrans, 2014. Map exhibits of I-5 Widening right-of-way and grading adjacent to CECP site, depicting 8+4 Buffer Alternative.

CAR 1994 (as amended). General Plan.

CAR 1982 Agua Hedionda Local Coastal Program Land Use Plan.

CAR 2005. Precise Development Plan and Desalination Project EIR.

CAR 2006 Specific Plan 144 Amendment H, PDP Amendment 00-02(b), (Planning Commission Resolution 6632).

CAR 2014. CECP Amendment GPA 14-01/PDP 00-02(F)/SP144(O),

CEC2009a – California Energy Commission (TN54068). Carlsbad Energy Center Project, Final Staff Assessment, dated November 12, 2009. Submitted 11/12/2009.

CEC2012a – California Energy Commission (TN66185). Commission Decision on the Carlsbad Energy Center Project Application for Certification, dated June 1, 2012. Submitted July 11, 2012.

LL2014d – Locke Lord LLP (TN202287-2). Petition to Amend Carlsbad Energy Center Project. Submitted 05/02/2014.

LL2014e – Locke Lord LLP (TN202287-3). Petition to Amend Carlsbad Energy Center Project, Part Two, Appendix 2A-5.11A. Submitted 05/02/2014.

LL2014pp – Locke Lord LLP (TN203300). Project Owner Responses to Data Request Set 3 (Nos. 67-84), dated October 31, 2014. Submitted 10/31/2014.

Smardon, R. and J. Palmer, J. Felleman, 1986. Foundations of Visual Project Analysis.

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*.

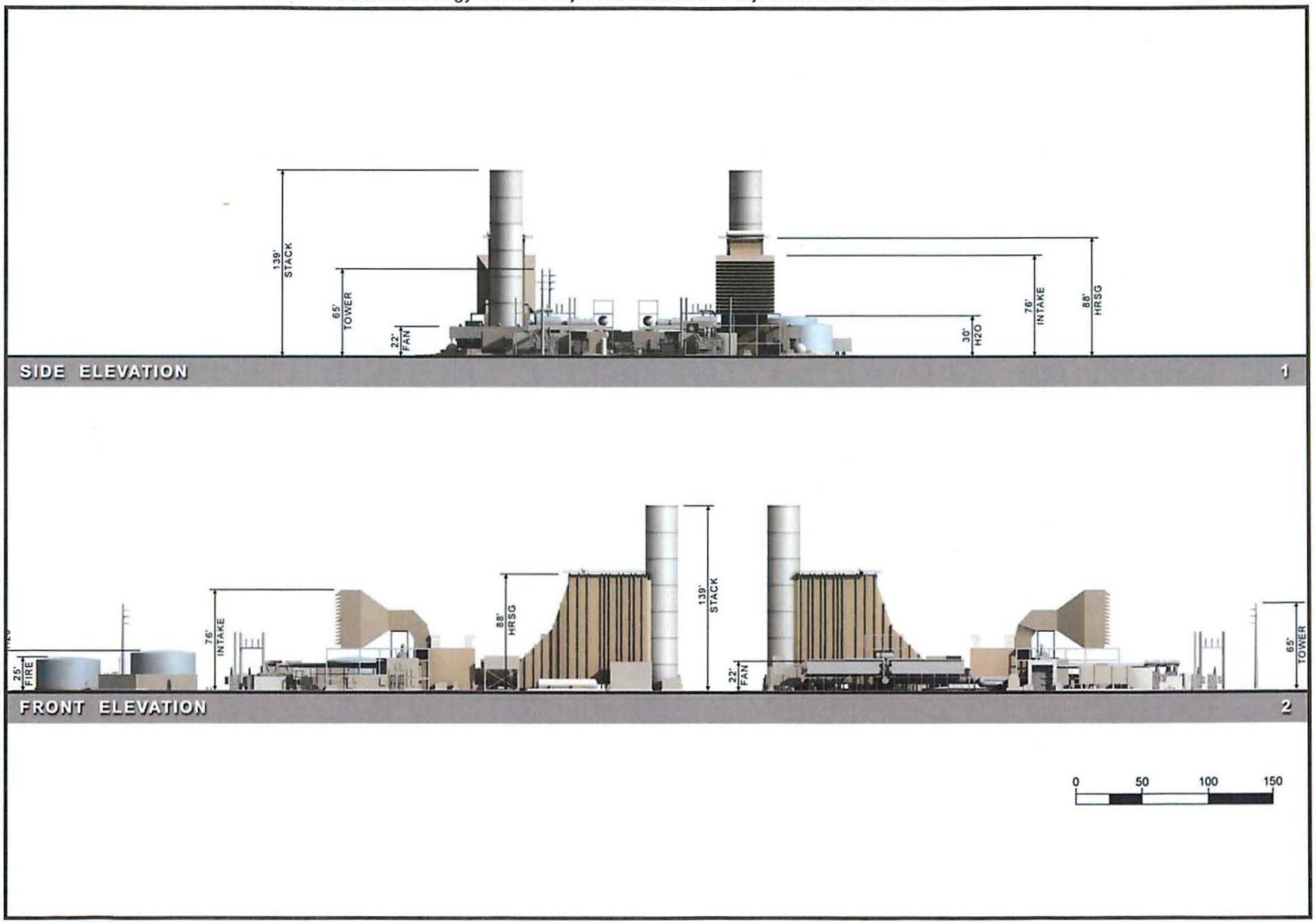
Visual Change

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 - FIGURE 1

Carlsbad Energy Center Project Amendment - Project Architectural Elevations



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: CEC2012a

VISUAL RESOURCES - FIGURE 2

Carlsbad Energy Center Project Amendment - Aerial Conceptual Simulation of Amended CECP

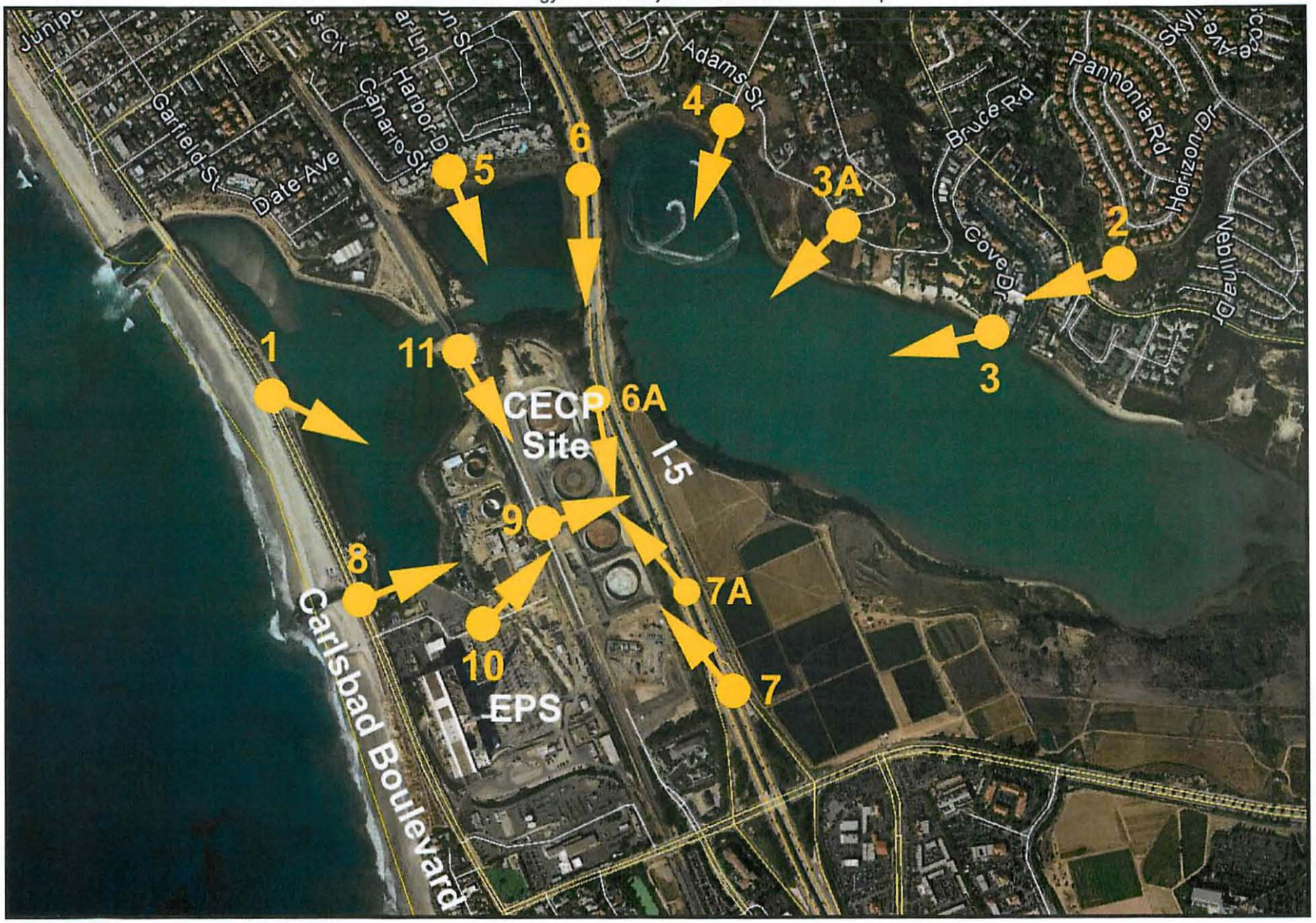
VISUAL RESOURCES

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: LL2014pp - DR74-1

VISUAL RESOURCES - FIGURE 3

Carlsbad Energy Center Project Amendment - KOP Map



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: William Kanemoto & Associates

VISUAL RESOURCES - FIGURE 4a and 4b

Carlsbad Energy Center Project Amendment - KOP 1 - Existing View and Licensed CECP from Carlsbad

KOP 1- Existing View from Carlsbad Boulevard at Agua Hedionda Lagoon looking southeast

KOP 1 - Visual Simulation, Licensed CECP

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SOURCE: CEC2012a

VISUAL RESOURCES - FIGURE 4c and 4d
Carlsbad Energy Center Project Amendment - KOP 1, Amended CECP from Carlsbad Boulevard

4c - Amended CECP from Carlsbad Boulevard (Phase III)

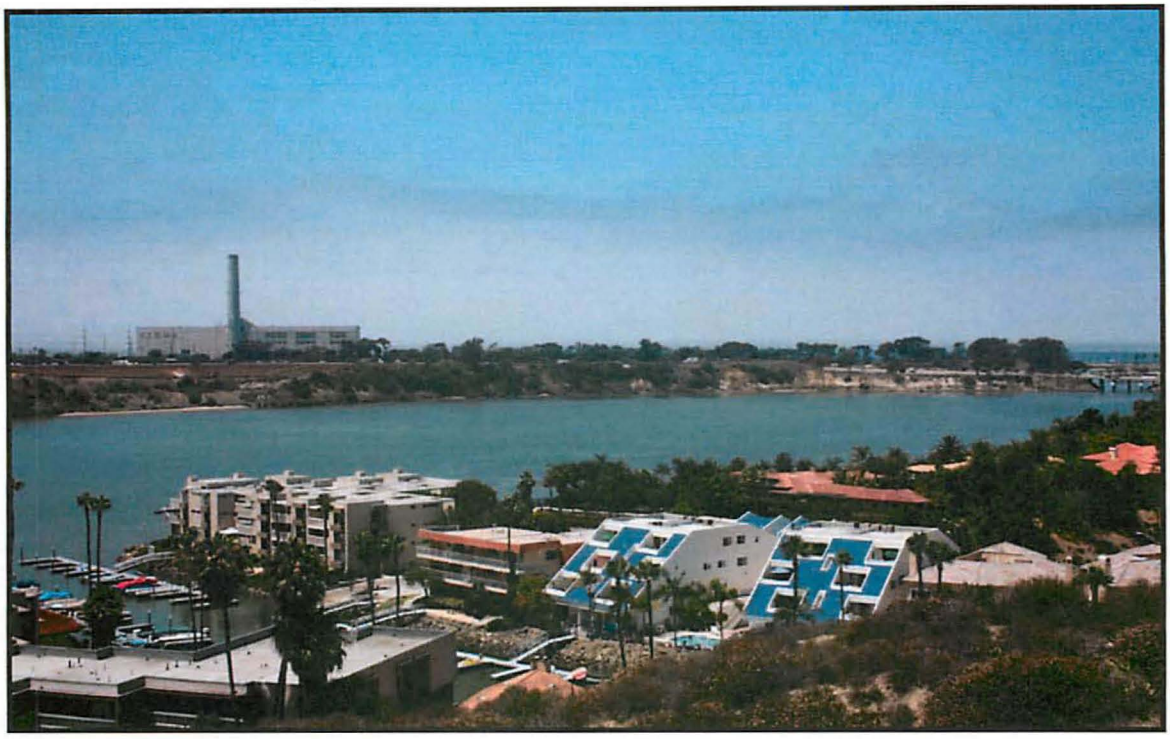
4d - Amended CECP from Carlsbad Boulevard (Phase IV)

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMETAL PROTECTION DIVISION
SOURCE: LL2014d

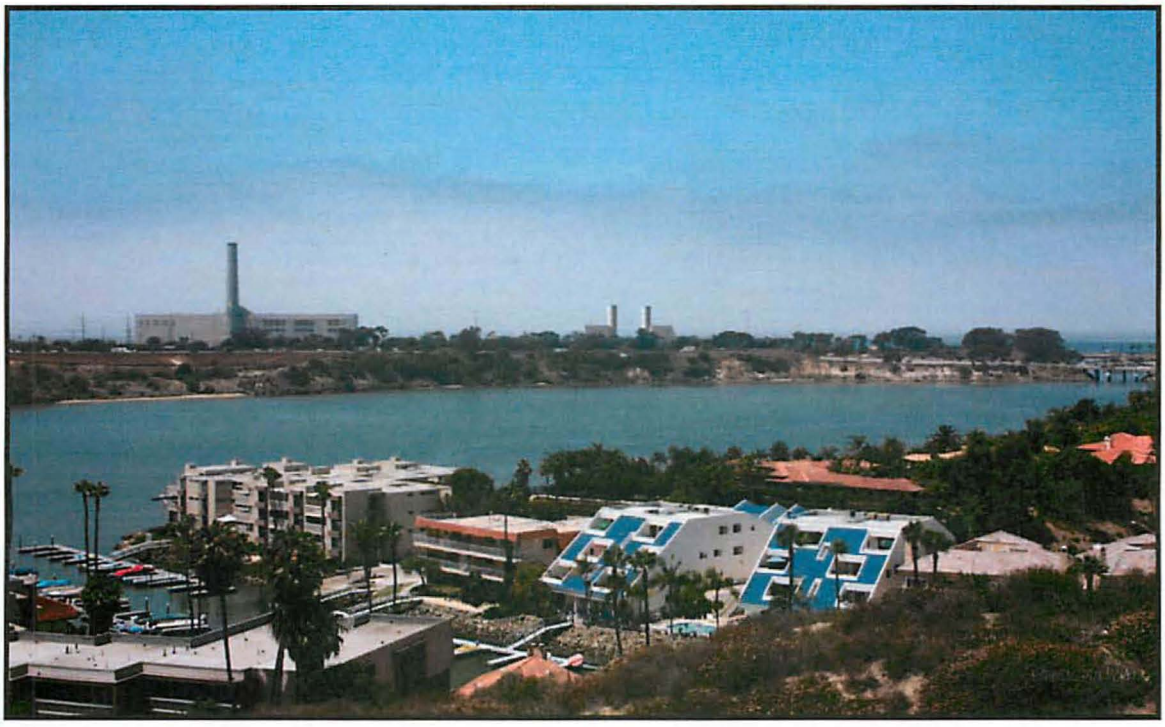
VISUAL RESOURCES - FIGURE 5a and 5b

Carlsbad Energy Center Project Amendment - KOP2 - Existing View and Licensed CECP from Pannonia Trail

KOP 2 - Existing View from Pannonia Trail at Capri Park looking southwest



KOP 2- Visual Simulation, Licensed CECP

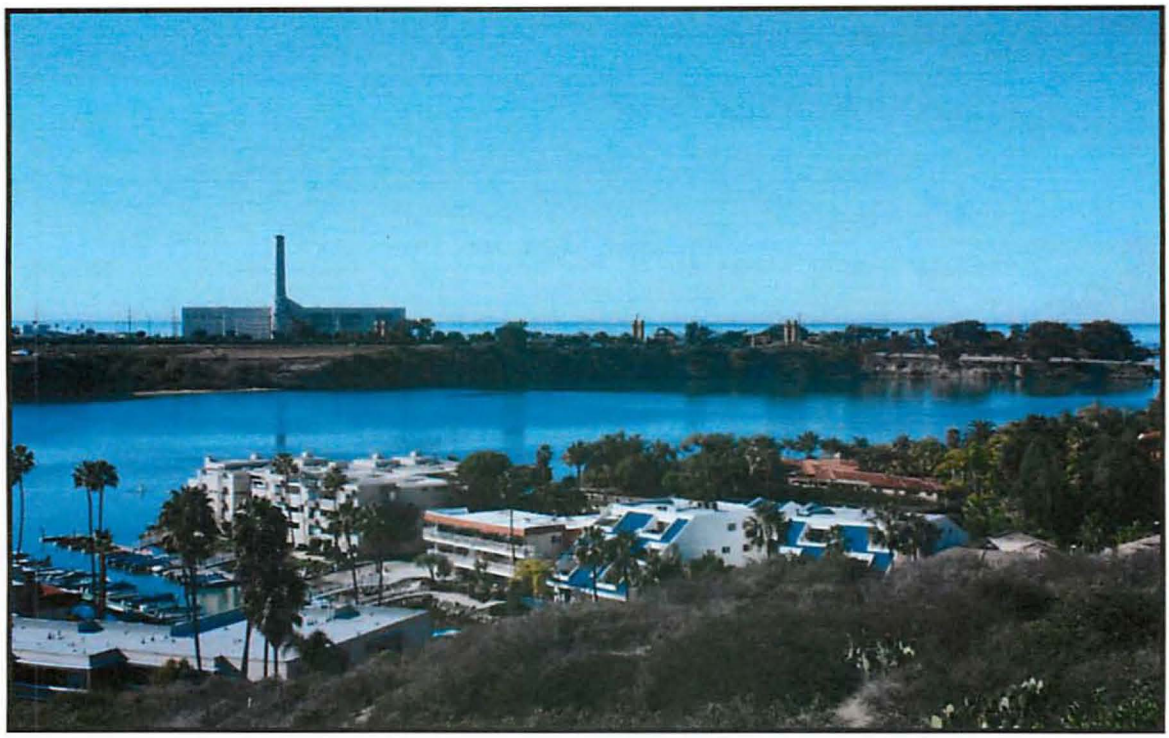


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMETAL PROTECTION DIVISION

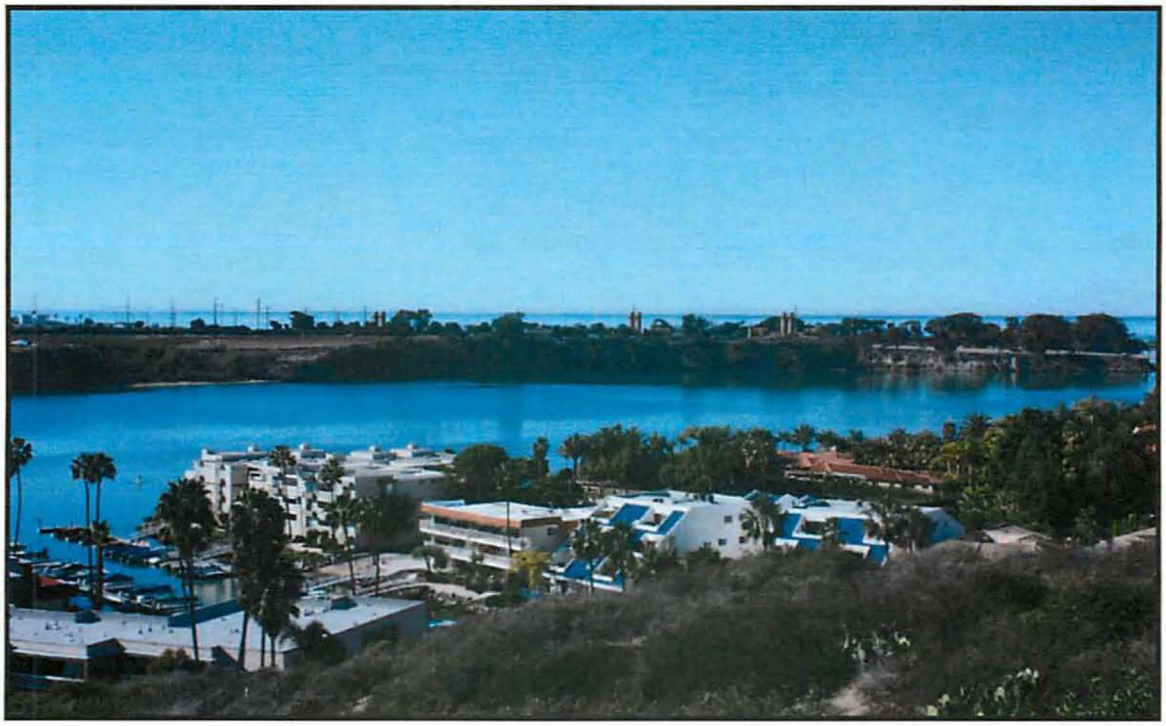
SOURCE: CEC2012a

VISUAL RESOURCES - FIGURE 5c and 5d
Carlsbad Energy Center Project Amendment - KOP 2 Amended CECP from Pannonia Trail

5c - Amended CECP from Pannonia Trail (Phase III)



5d - Amended CECP from Pannonia Trail (Phase IV)

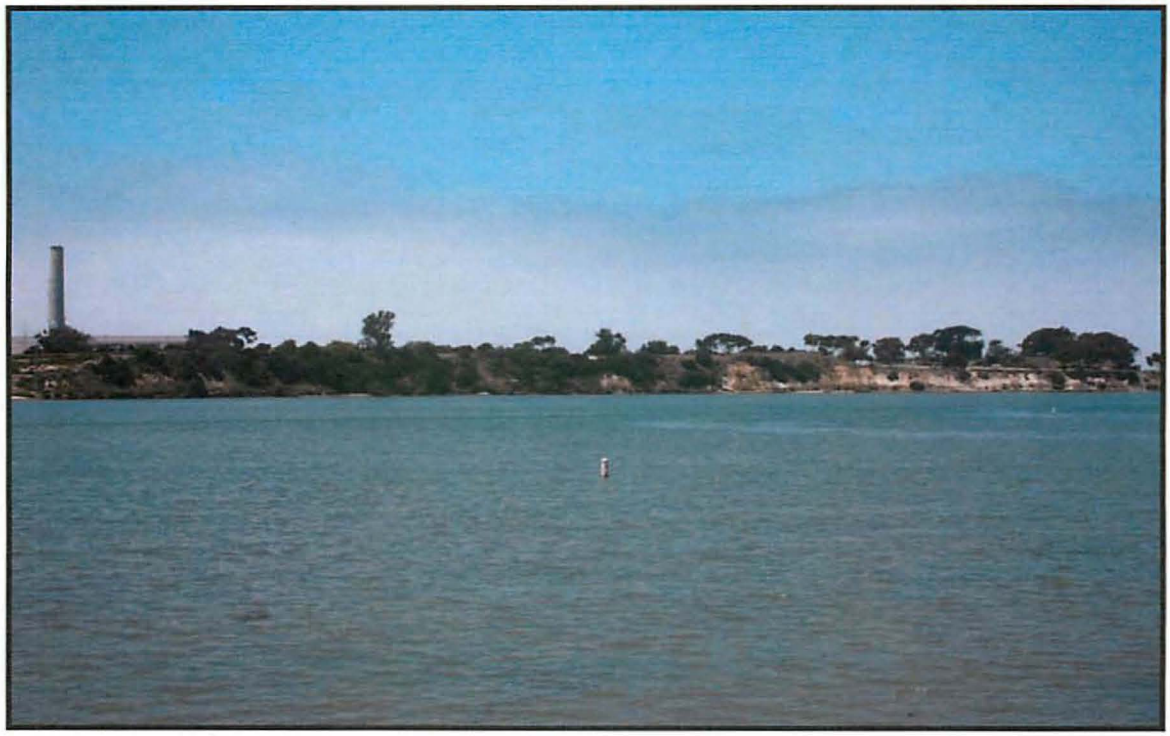


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMETAL PROTECTION DIVISION
SOURCE: LL2014d

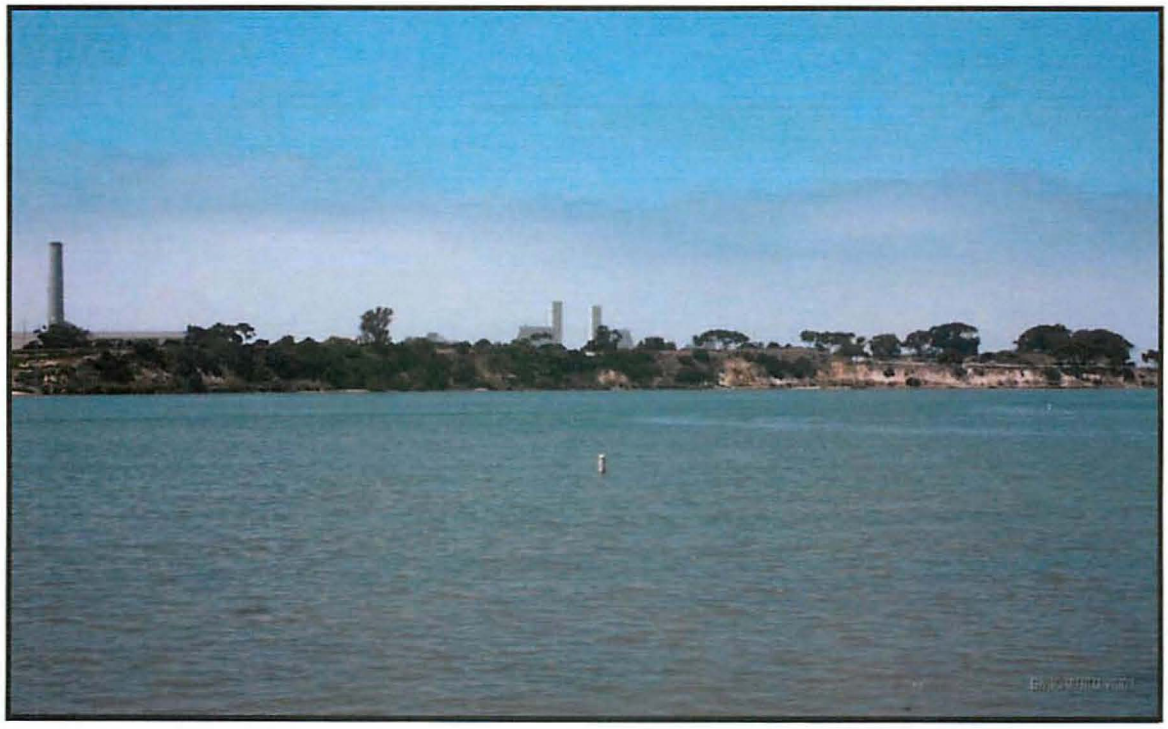
VISUAL RESOURCES - FIGURE 6a and 6b

Carlsbad Energy Center Project Amendment - KOP 3 - Existing View and Licensed CECP from Cove Drive

KOP 3- Existing View from end of Cove Drive looking southwest



KOP 3- Visual Simulation, Licensed CECP

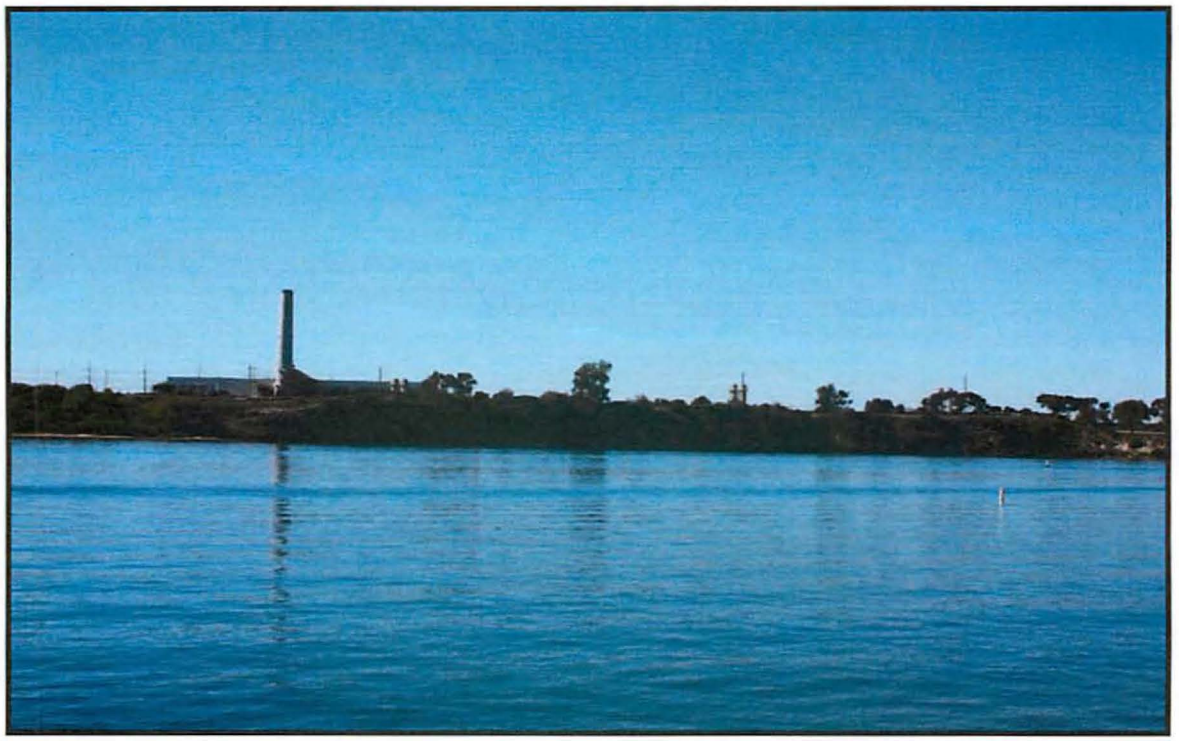


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMETAL PROTECTION DIVISION

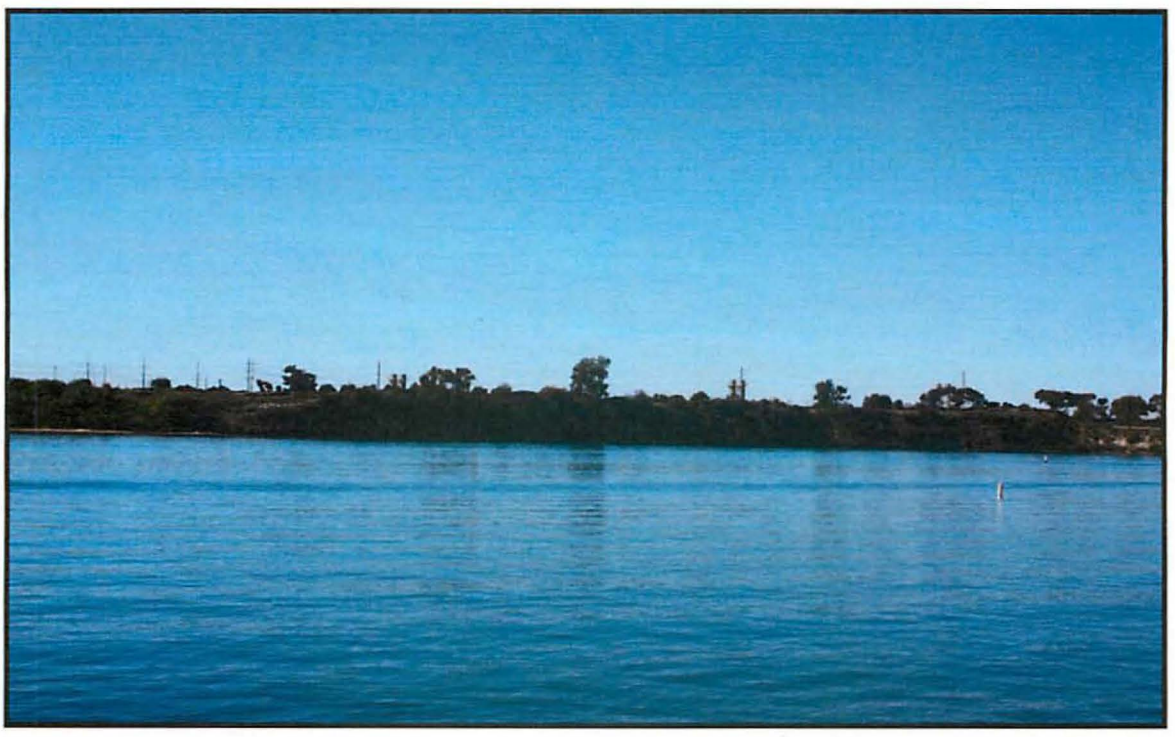
SOURCE: CEC2012a

VISUAL RESOURCES - FIGURE 6c and 6d
Carlsbad Energy Center Project Amendment - KOP 3 – Amended CECP from Cove Drive

6c - KOP 3, (Phase III)



6d - KOP 3 (Phase IV)

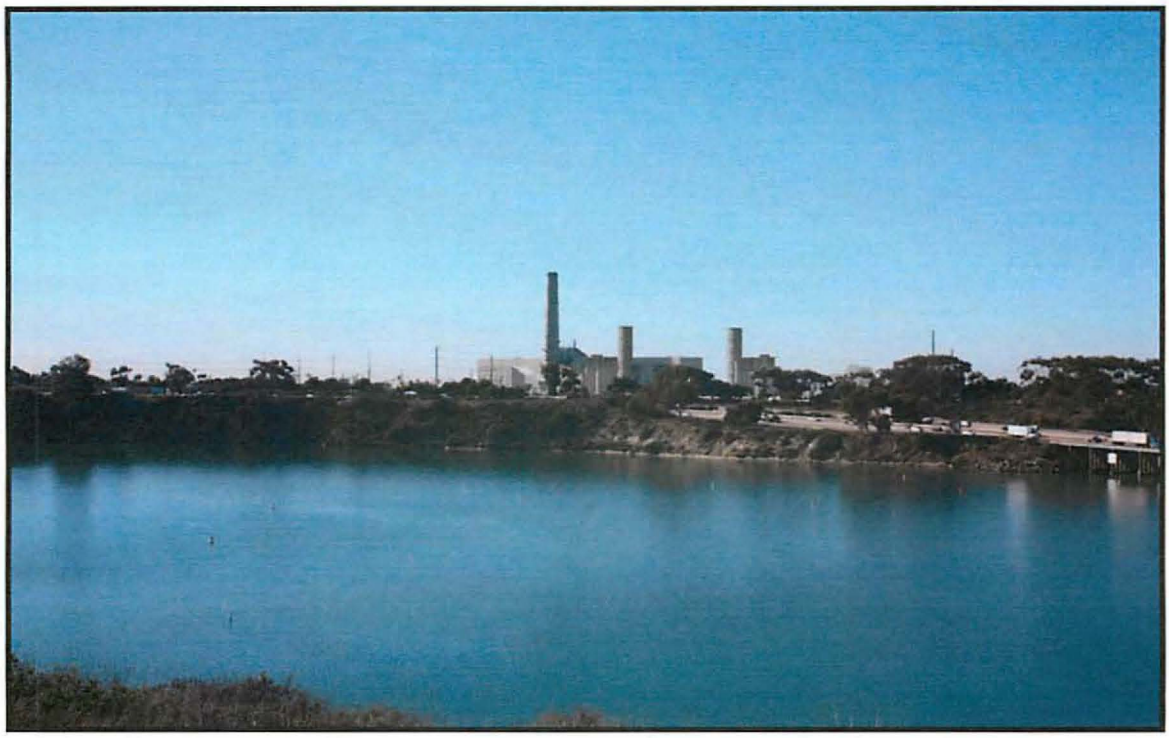


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMETAL PROTECTION DIVISION
SOURCE: LL2014d

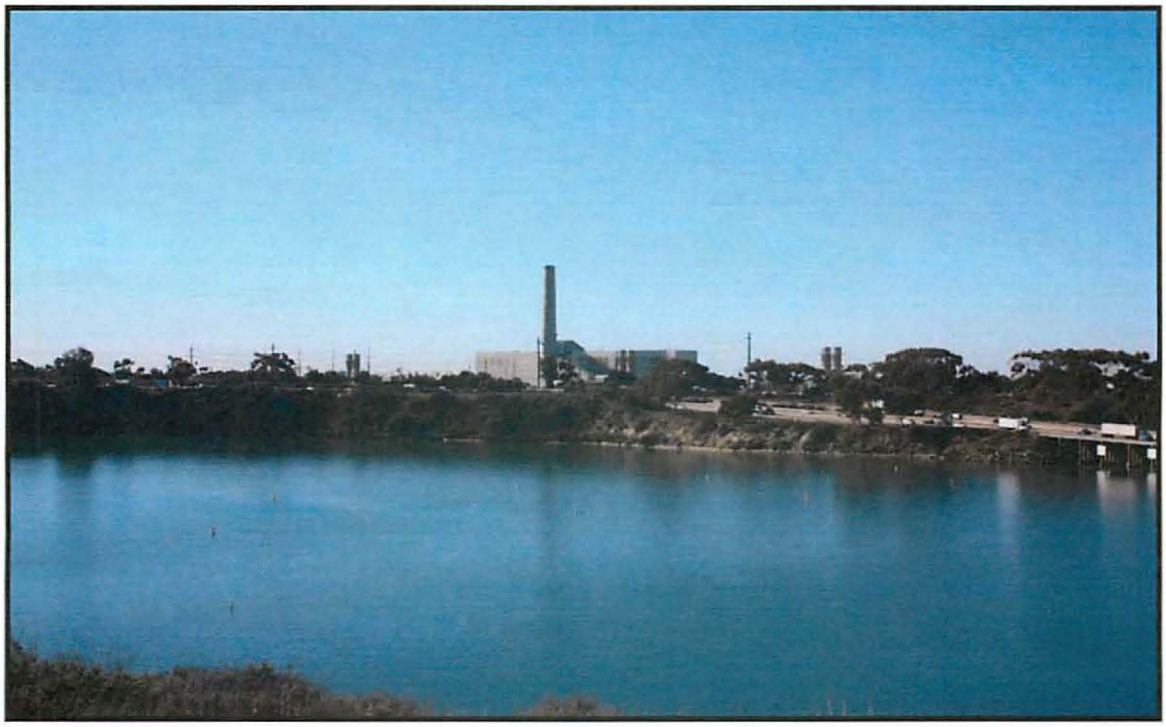
VISUAL RESOURCES - FIGURE 7a and 7b

Carlsbad Energy Center Project Amendment- KOP 3A - Licensed CECP and Amended CECP from Adams Street

7a - Licensed CECP



7b - Amended CECP (Phase III)

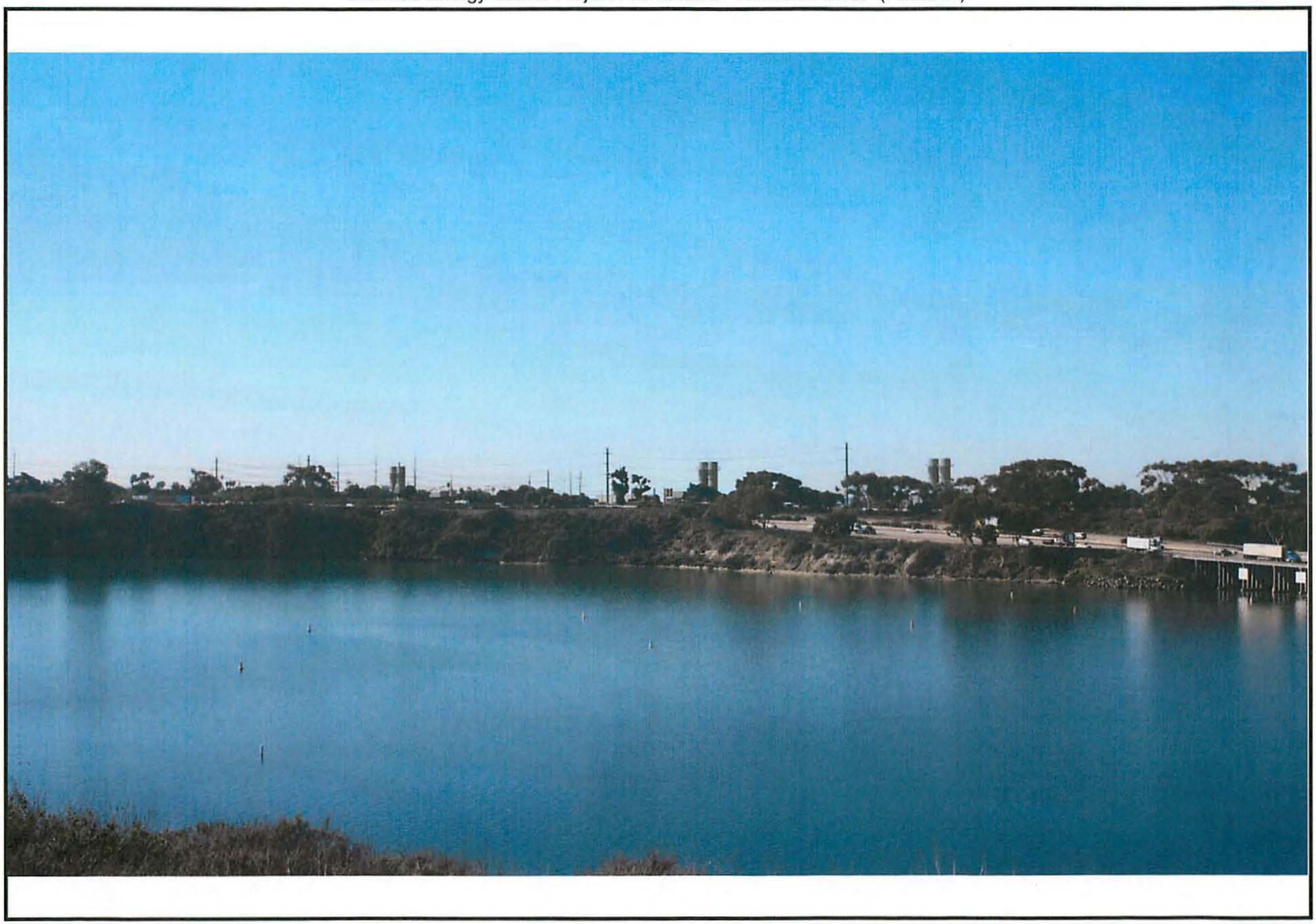


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMETAL PROTECTION DIVISION

SOURCE: CEC2012a; LL2014d

VISUAL RESOURCES - FIGURE 7c

Carlsbad Energy Center Project Amendment - Amended CECP (Phase IV)



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: LL2014d

VISUAL RESOURCES - FIGURE 8a and 8b

Carlsbad Energy Center Project Amendment - KOP 4 - Existing View and Licensed CECP from Hoover Street

KOP 4- Existing View from end of Hoover Street looking southwest

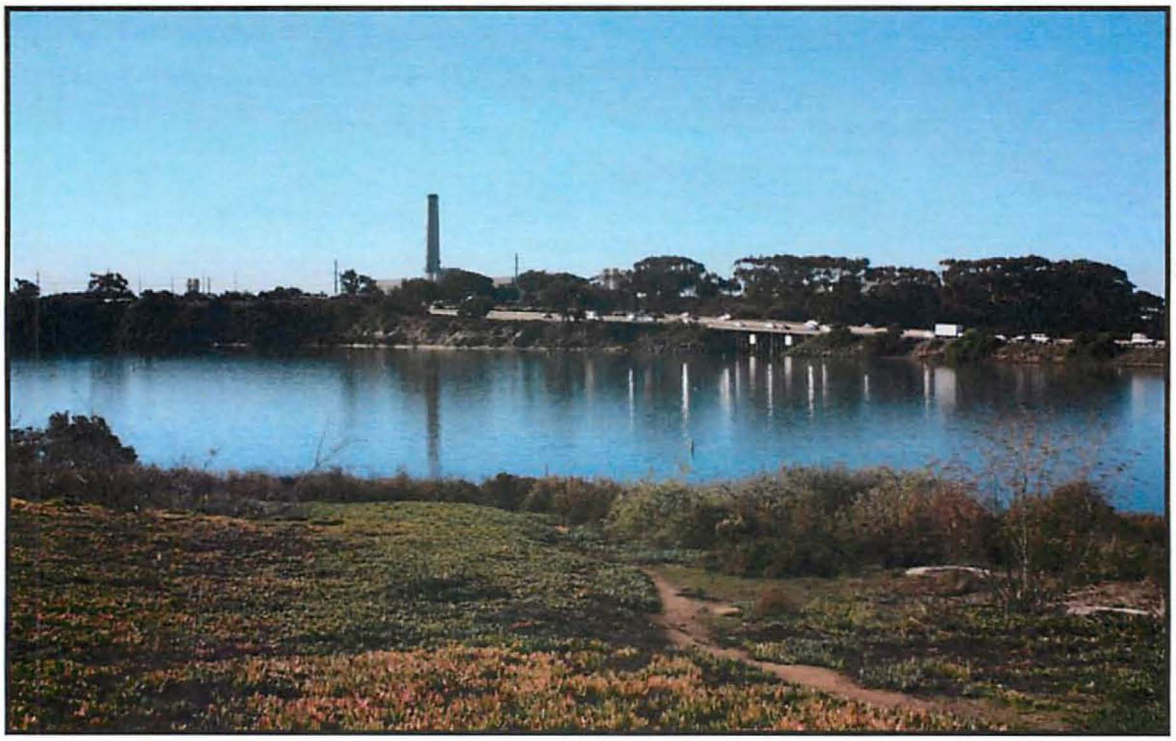
KOP 4- Visual Simulation, Licensed CECP

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMETAL PROTECTION DIVISION

SOURCE: CEC2012a

VISUAL RESOURCES - FIGURE 8c and 8d
Carlsbad Energy Center Project - KOP 4 – Amended CECP from Hoover Street

8c - Amended CECP (Phase III)



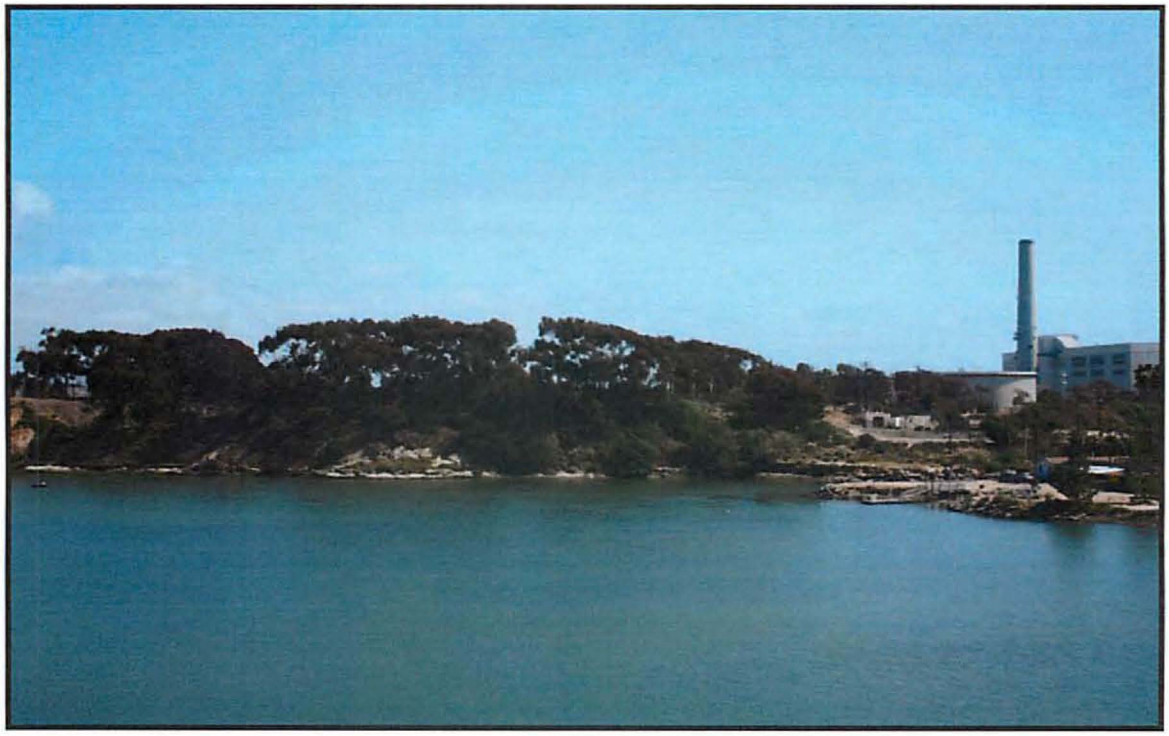
8d - Amended CECP (Phase IV)

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMETAL PROTECTION DIVISION
SOURCE: LL2014d

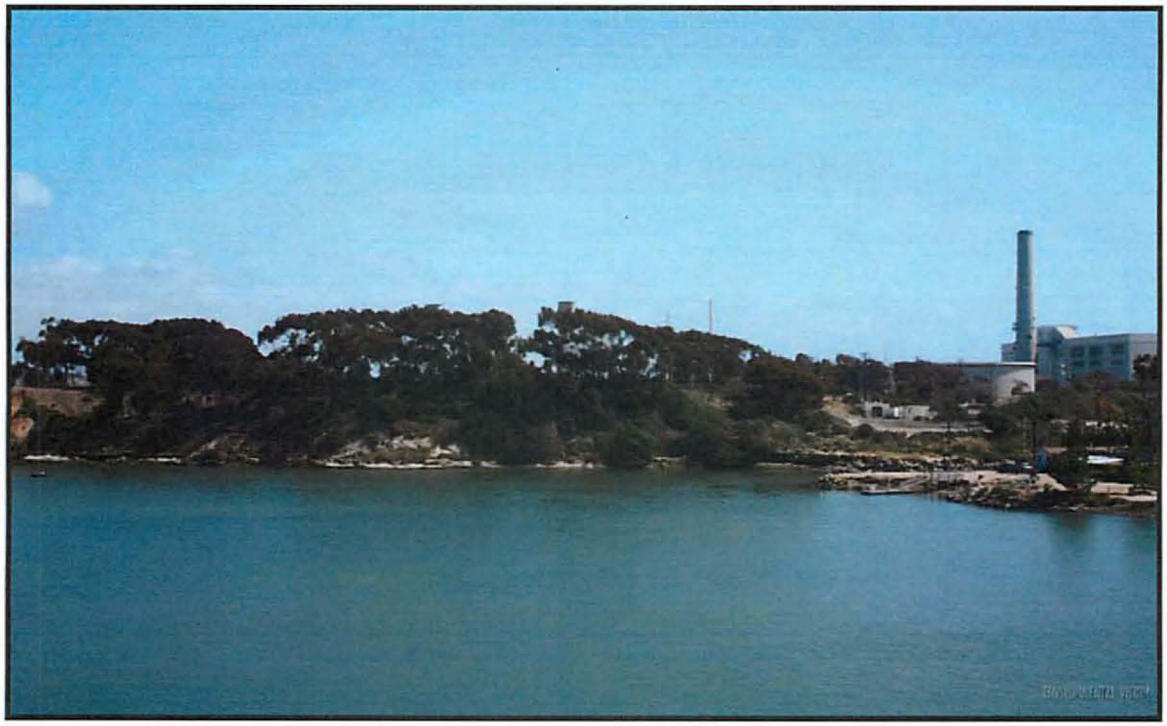
VISUAL RESOURCES - FIGURE 9a and 9b

Carlsbad Energy Center Project Amendment - KOP 5 - Existing View and Licensed CECP from Harbor Drive

KOP 5- Existing View from Harbor Drive looking south



KOP 5- Visual Simulation, Licensed CECP

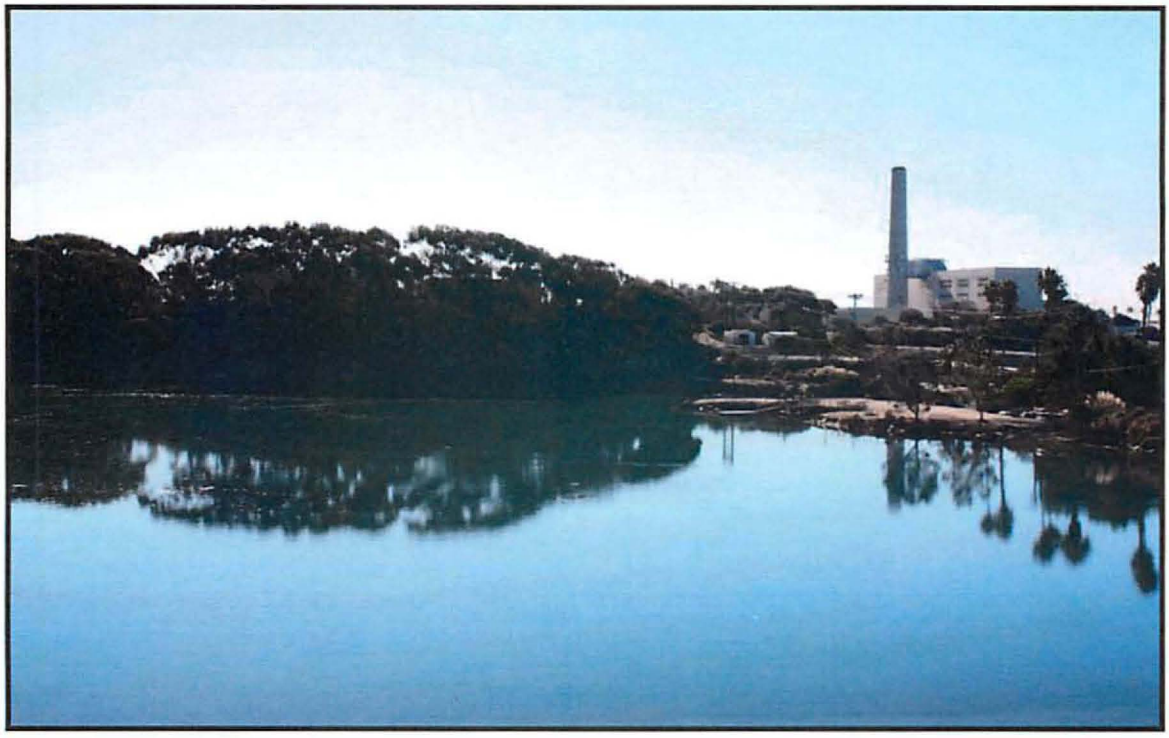


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMETAL PROTECTION DIVISION

SOURCE: CEC2012a

VISUAL RESOURCES - FIGURE 9c and 9d
Carlsbad Energy Center Project Amendment - KOP 5 – Amended CECP from Harbor Drive

(Phase III)



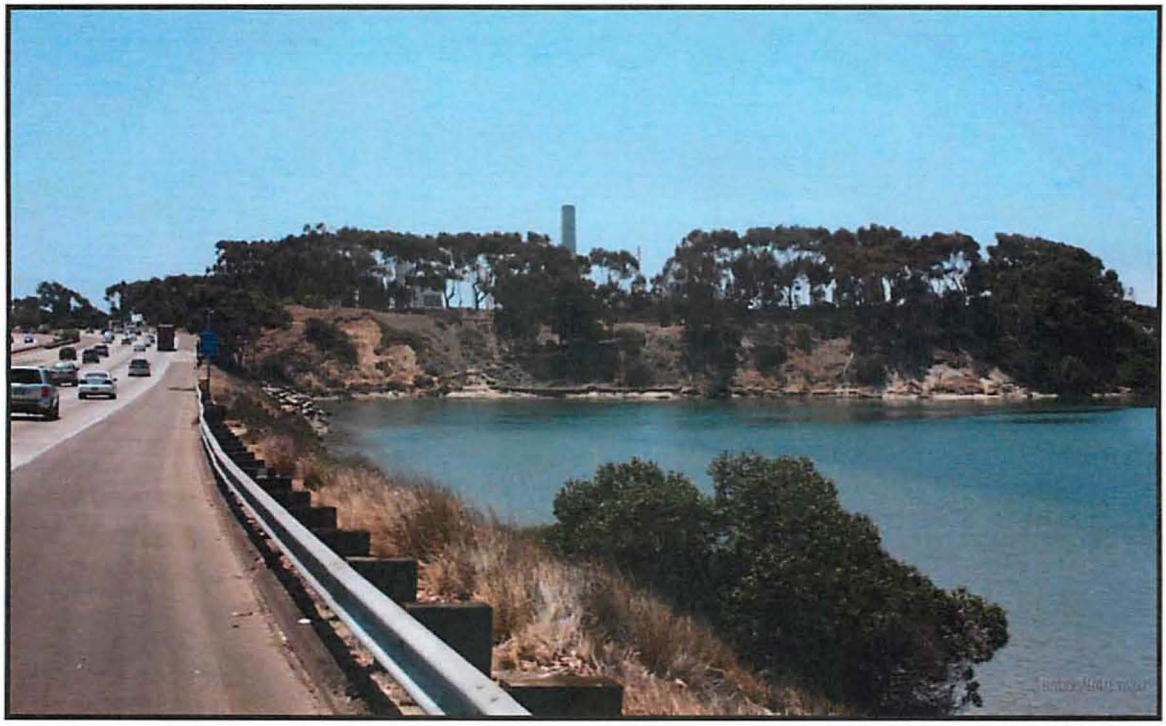
(Phase IV)

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMETAL PROTECTION DIVISION
SOURCE: LL2014d

VISUAL RESOURCES - FIGURE 10a and 10b
Carlsbad Energy Center Project Amendment - KOP 6 - Existing View and Licensed CECP from I-5 Southbound

KOP 6- Existing View from southbound Interstate 5 looking south

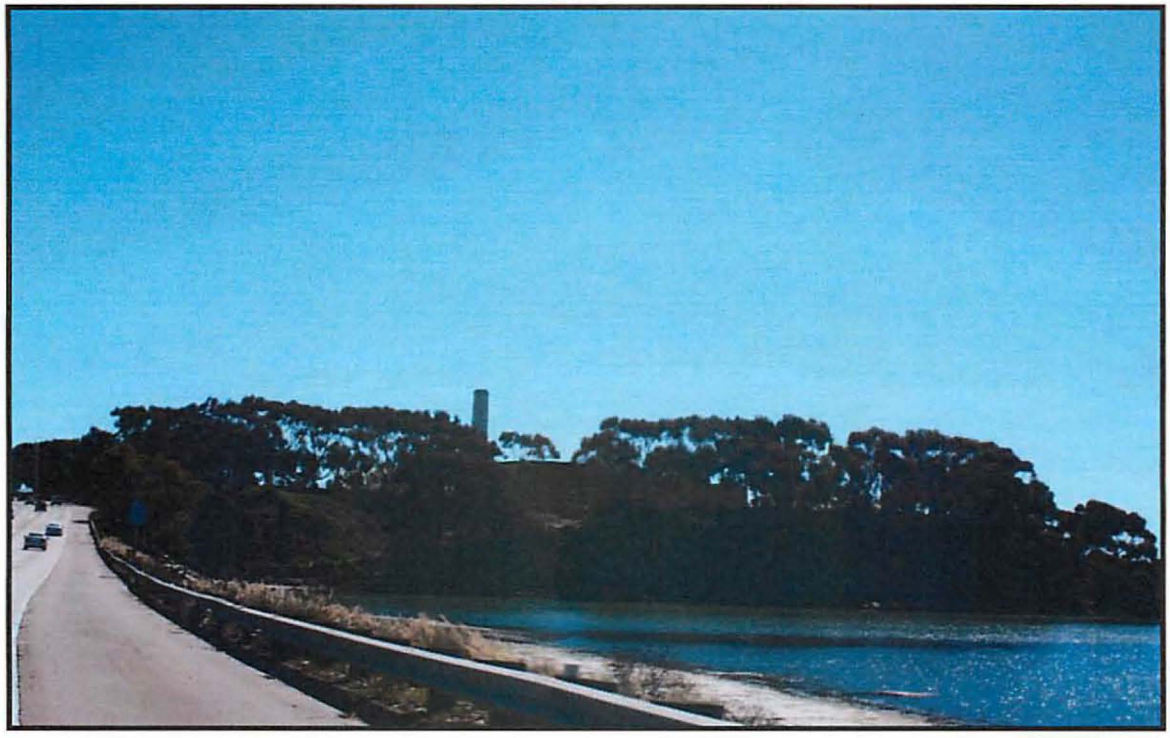
KOP 6- Visual Simulation, Licensed CECP



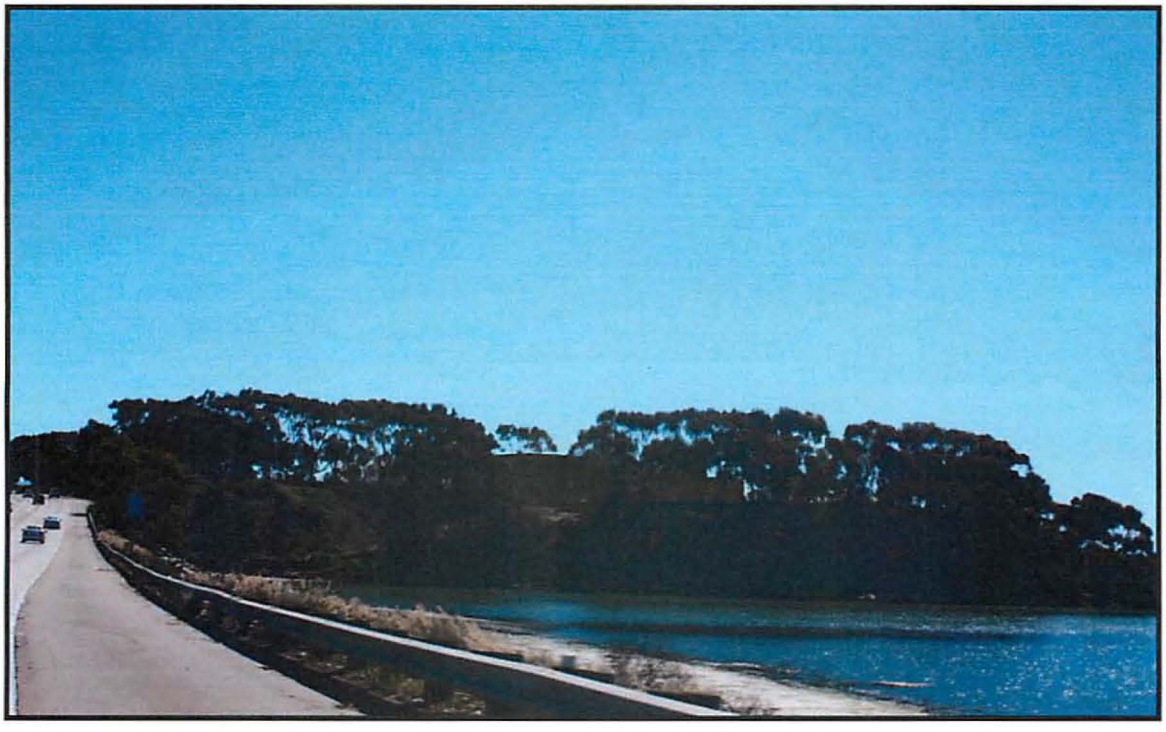
CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMETAL PROTECTION DIVISION
SOURCE: CEC2012a

VISUAL RESOURCES - FIGURE 10c and 10d
Carlsbad Energy Center Project Amendment - KOP 6 – Amended CECP from I-5 Southbound

(Phase III)



(Phase IV)



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMETAL PROTECTION DIVISION
SOURCE: LL2014d

VISUAL RESOURCES - FIGURE 11a and 11b

Carlsbad Energy Center Project Amendment - KOP 7 - Existing View and Licensed CECP from I-5 Northbound

KOP 7- Existing View from northbound Interstate 5 looking northwest

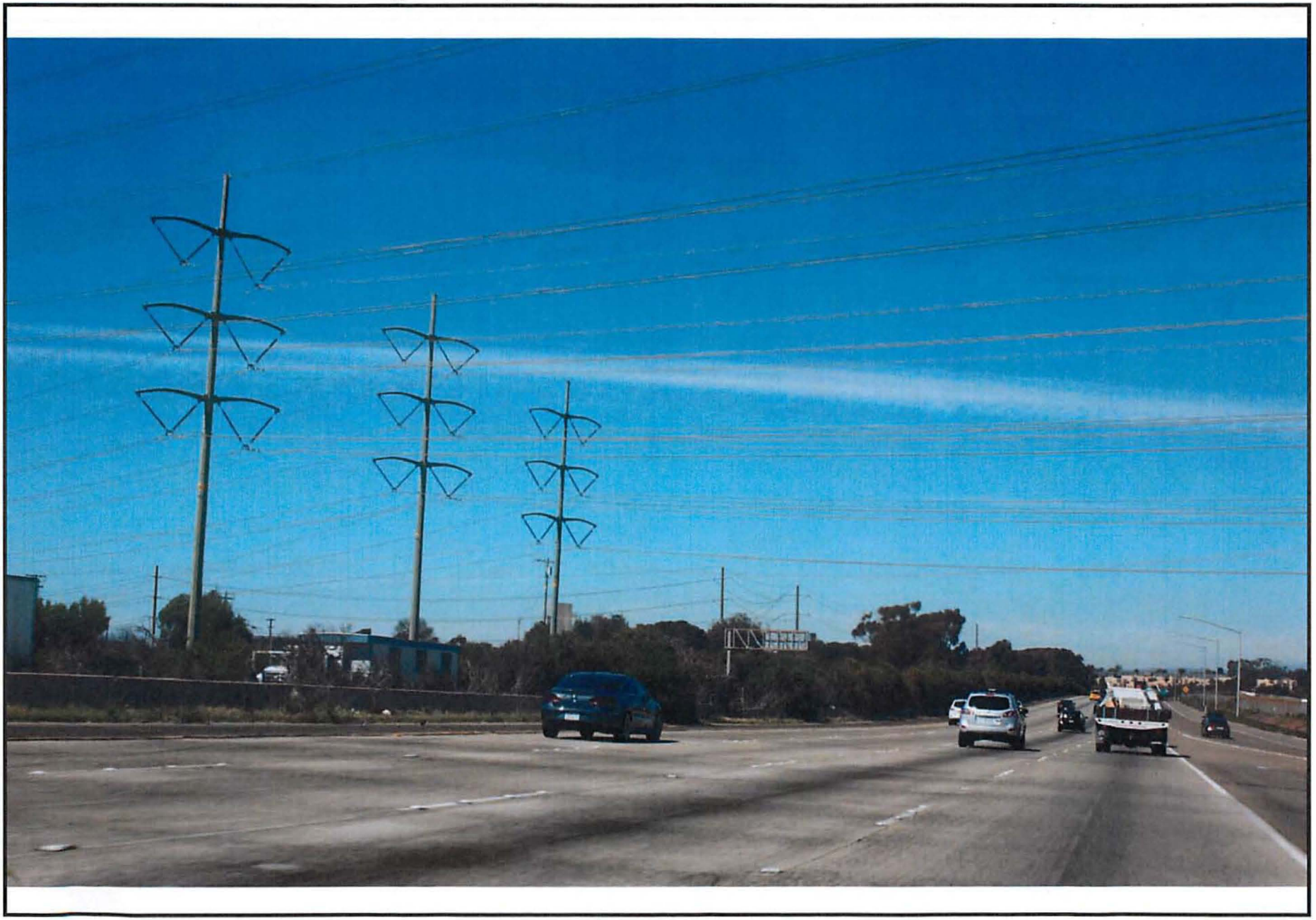
KOP 7- Visual Simulation, Licensed CECP

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMETAL PROTECTION DIVISION

SOURCE: CEC2012a

VISUAL RESOURCES - FIGURE 11c

Carlsbad Energy Center Project Amendment - KOP 7 – Amended CECP from I-5 Northbound

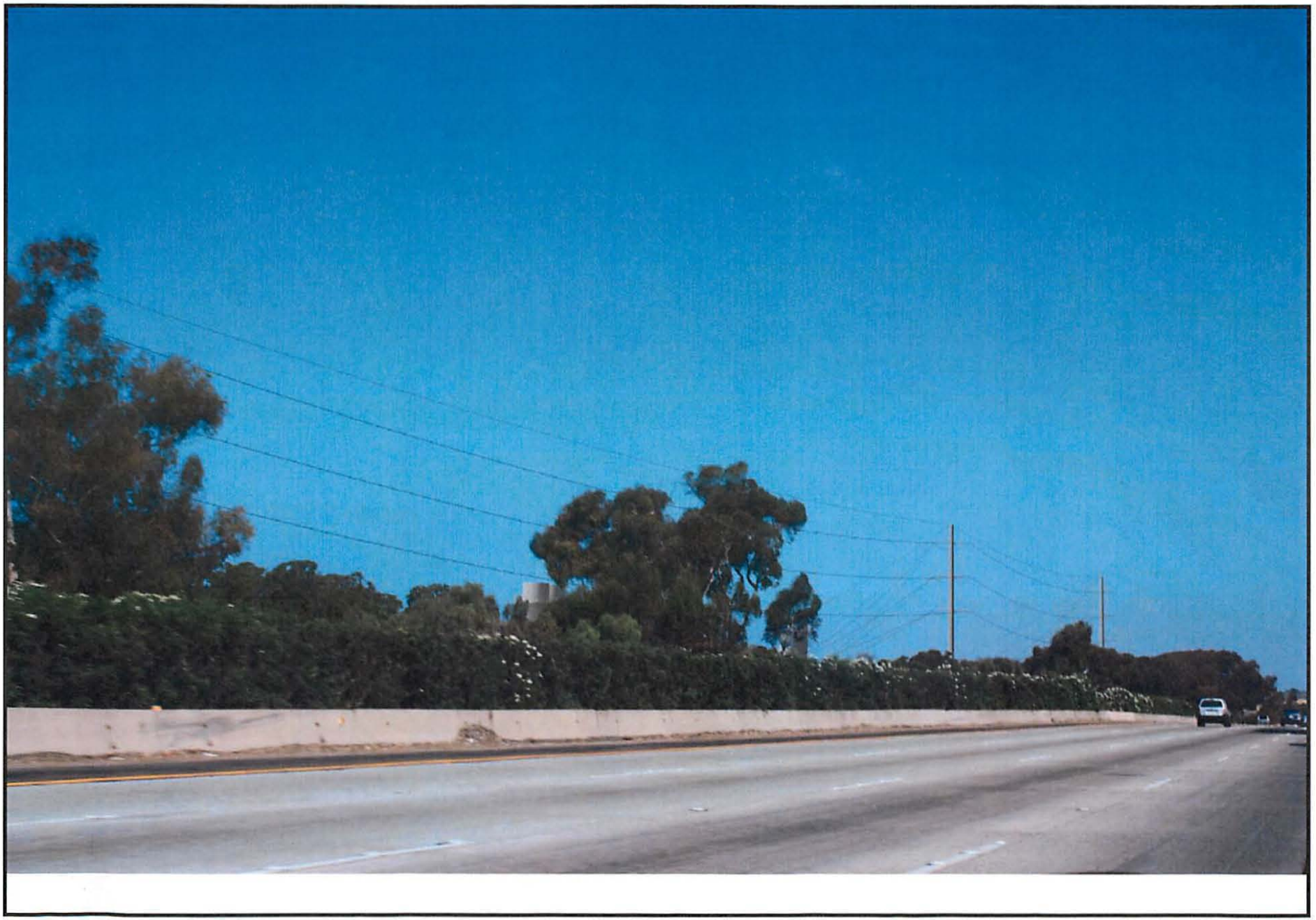


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: LL2014d

VISUAL RESOURCES - FIGURE 11d

Carlsbad Energy Center Project Amendment - Amended CECP from KOP 7A Looking North



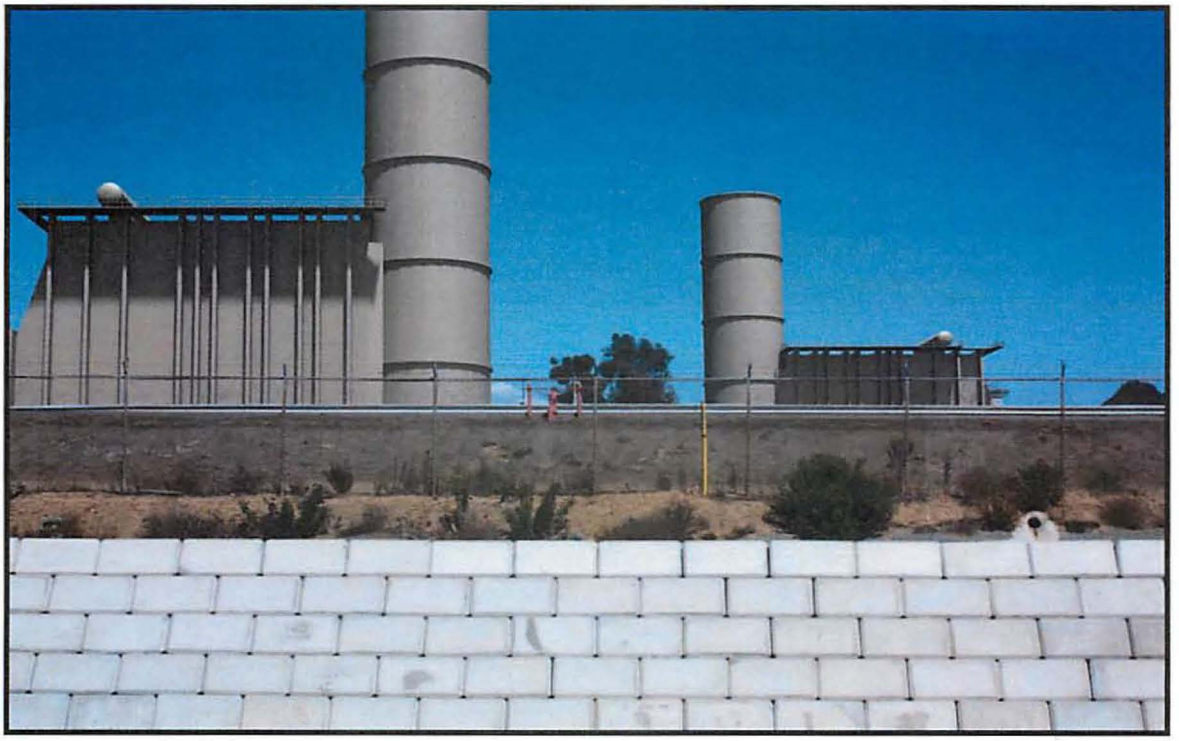
VISUAL RESOURCES

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

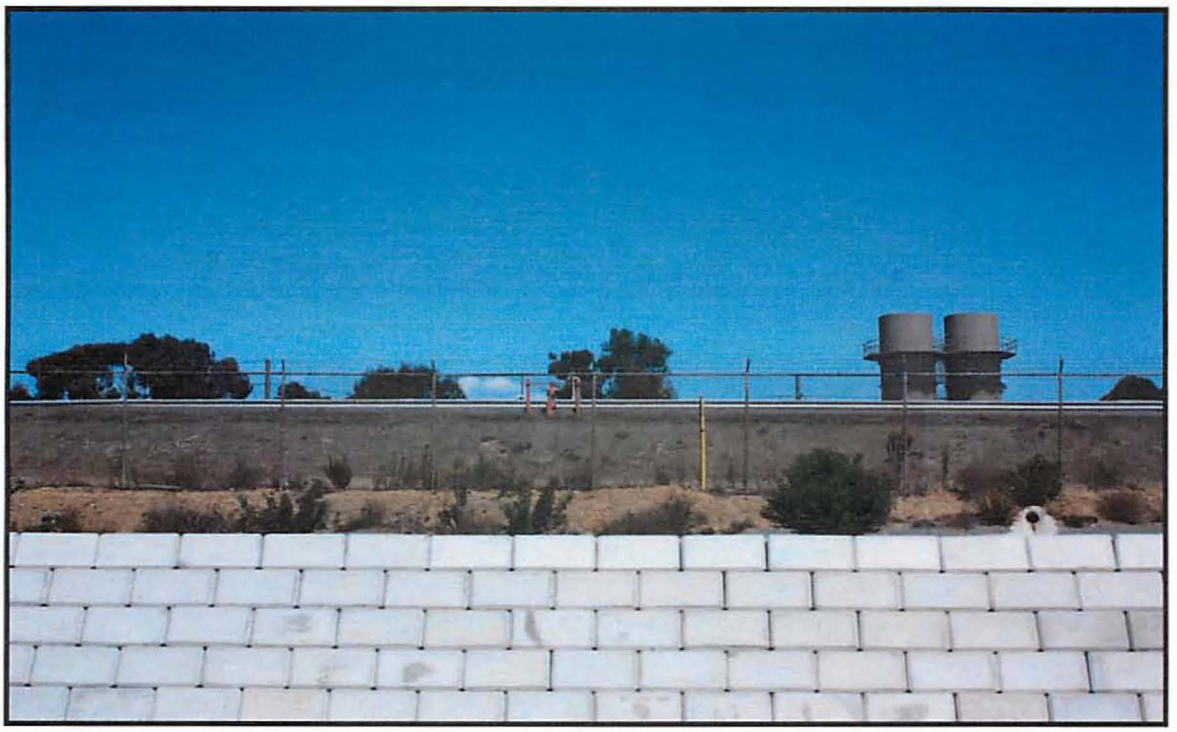
SOURCE: Figure DR POV 5-3

VISUAL RESOURCES - FIGURE 12a and 12b
Carlsbad Energy Center Project Amendment - KOP 9 - Licensed and Amended CECP

12a - Licensed CECP - Baseline view looking toward the CECP site that is equivalent to the view seen by Passengers on train cars passing adjacent to the site. The licensed power plant's HRSGs and stacks would be readily visible.



12b - Amended CECP - View toward the CECP site equivalent to the view seen by passengers on train cars passing adjacent to the site as it would appear after the development of the Amended CECP. Only the tops of the Amended project's stacks would be visible in this view.



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMETAL PROTECTION DIVISION
SOURCE: Figure DR 58-11

VISUAL RESOURCES - FIGURE 13a and 13b
Carlsbad Energy Center Project Amendment - KOP 11 - Licensed and Amended CECP

13a - Licensed CECP
View looking toward southeast toward the CECP site from the rail corridor.

13b - Amended CECP
View looking southeast toward the CECP site from the rail corridor as it would appear with development of the Amended CECP

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMETAL PROTECTION DIVISION
SOURCE: Figure DR58-13

Engineering Assessment

FACILITY DESIGN

Edward Brady and Shahab Khoshmashrab

SUMMARY OF CONCLUSIONS

The California Energy Commission staff concludes that the Carlsbad Energy Center Project Amendment (amended CECP, or project) would comply with applicable engineering laws, ordinances, regulations and standards (LORS). The proposed conditions of certification, below, would ensure compliance with these LORS.

INTRODUCTION

Facility design encompasses the civil, structural, mechanical, and electrical engineering aspects of the amended 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 petitioner's proposed design criteria, including identification of criteria essential to public health and safety; 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 (LORS)

Lists of LORS applicable to each engineering discipline (civil, structural, mechanical, and electrical) are described in the CECP amendment (LL 2014e, Appendix 2C). Key LORS are listed in **Facility Design Table 1**, below.

Facility Design Table 1
Key Engineering Laws, Ordinances, Regulations and Standards (LORS)

Applicable LORS	Description
Federal	Title 29 Code of Federal Regulations, Part 1910, Occupational Safety and Health standards
State	2013 (or the latest edition in effect) California Building Standards Code (also known as Title 24, California Code of Regulations)
Local	City of Carlsbad Municipal Ordinance, Title 18, Building Codes and Standards
General	American National Standards Institute (ANSI) American Society of Mechanical Engineers (ASME) American Welding Society (AWS) American Society for Testing and Materials (ASTM)

The following conditions of certification require the project to comply with the California Building Standards Code (CBSC) and the city of Carlsbad codes to ensure that the project would be built to applicable engineering codes and ensure public health and safety.

For the project to be built in a manner that would ensure public health and safety, the LORS listed above in **Facility Design Table 1** under the "**General**" heading, must also be met by the project. The LORS listed under this heading are only some of the key engineering standards applicable to the project; for a comprehensive list of engineering LORS, please see **Facility Design Appendix A**.

PROJECT DESCRIPTION

The amended CECP would include the demolition of above-ground fuel oil storage tanks 1, 2 and 4 (ASTs 1, 2, and 4), the construction of the amended CECP power plant (LL 2014d, § 1.1), and the demolition of the Encina Power Station (EPS) (LL 2014b, § 1.2). The amended CECP electrical generation re-configuration would include six simple cycle natural gas-fired combustion turbines, instead of the combined cycle units approved in the licensed CECP 2012 Final Decision. For more details and specifics regarding the proposed modifications to the licensed CECP sought by the petitioner/project owner, please see the **PROJECT DESCRIPTION** section of this document.

SETTING

Like the licensed CECP, the amended CECP would be located on the northeastern section of the Encina Power Station (EPS) site, located immediately south of the Agua Hedionda Lagoon and west of Interstate-5, within the city of Carlsbad, in northern San Diego County.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The purpose of this analysis is to ensure that the demolition and construction activities proposed by the amended CECP would comply with applicable engineering codes, ensure public health and safety, and verify that applicable engineering LORS have been identified. This analysis also evaluates the petitioner'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 petitioner to adopt a compliance monitoring program that will verify compliance with these LORS.

SITE PREPARATION AND DEVELOPMENT

The petitioner proposes the use of accepted industry standards, design practices, and construction methods in preparing and developing the site (see LL 2014e, Appendix 2C, for a representative list of applicable industry standards). Staff concludes that the proposed design criteria for grading, flood protection, erosion control, and site drainage would comply with all applicable site preparation LORS. To ensure compliance, staff proposes the conditions of certification listed below.

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 could become potential health and safety hazards if not constructed according to applicable engineering LORS.

The amended CECP will be designed and constructed to the 2013 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 2013 CBSC takes effect, the 2013 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 petitioner 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 (LL 2014e, Appendix 2C). Compliance with design requirements will be verified through specific inspections and audits. Implementation of this quality assurance and quality control program will ensure that the amended CECP is actually designed, procured, fabricated, and installed as described in this analysis.

COMPLIANCE MONITORING

Under Division II, Section 104 of the 2013 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 of the 2013 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 may include the local building official and/or independent consultants hired to provide technical expertise that is not provided by the local official alone. The petitioner, through permit fees provided by the CBC, pays the cost of these reviews and inspections. While building permits in addition to Energy Commission certification are not required for this project, the petitioner pays in lieu of CBC permit fees to cover the costs of these reviews and inspections.

Engineering and compliance staff will invite 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 **GEN-1** through **GEN-8**, **STRUC-1** through **STRUC-4**, **CIVIL-1** through **CIVIL-4**, **MECH-1** through **MECH-3**, and **ELEC-1**, to ensure protection of 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-4** and **GEN-5**). 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 demolition and 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 (Condition of Certification **GEN-6**).

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) which 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 petitioner 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, and inspection processes.

FACILITY CLOSURE

Facility closure is defined in the **COMPLIANCE CONDITIONS** section of this document as a facility shutdown with no intent to restart operation. It may also be the cumulative result of unsuccessful efforts to re-start over an increasingly lengthy period of non-operation[1], condemned by inadequate means and/or lack of a viable plan. Facility closures can occur due to a variety of factors, including, but not limited to, irreparable damage and/or functional or economic obsolescence.

In order to ensure that facility closure would be completed in a manner that is environmentally sound, safe, and protects the public health and safety, the project owner must submit a closure plan to the Energy Commission for review and approval prior to the commencement of closing the facility, as required in Condition of Certification **COM-15** (Facility Closure Planning) in **COMPLIANCE CONDITIONS**.

Though future conditions that could affect facility closure are largely unknown at this time, the requirements in **COMPLIANCE CONDITIONS** are adequate protection, even in the unlikely event that the project is abandoned.

CONCLUSIONS AND RECOMMENDATIONS

1. The laws, ordinances, regulations and standards (LORS) identified above apply to the project.

2. Staff has evaluated the proposed engineering LORS, design criteria, and design methods in the record, and concludes that the project will comply with applicable engineering LORS.

3. The proposed conditions of certification will ensure that the amended CECP is completed 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. Staff will audit the CBO to ensure satisfactory performance.

[1] Non-operation is defined in the **COMPLIANCE CONDITIONS** section as a time-limited event and can encompass part or all of a facility. Non-operation can be a planned event, usually for minor equipment maintenance or repair, or unplanned, usually the result of unanticipated events or emergencies.

4. Though future conditions that could affect facility closure are largely unknown at this time, it can reasonably be concluded that if the project owner submits a facility closure plan in accordance with **COM-15** as provided in the **COMPLIANCE CONDITIONS** portion of this document prior to facility closure, facility closure procedures will comply with all applicable engineering LORS.

Energy Commission staff recommends that:

1. The following conditions of certification be adopted to ensure that the project is completed 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 2013 CBSC (or successor standards, if in effect when initial project engineering designs are submitted to the CBO for review); and

3. The CBO review the final designs, check plans, and perform field inspections during construction. Energy Commission staff shall audit and monitor the CBO to ensure satisfactory performance.

CONDITIONS OF CERTIFICATION

Following are the existing conditions of certification applicable to the amended CECP with the following revisions. The compliance requirements for facility design designated Conditions of Certification **GEN-1** through **GEN-8**, **CIVIL-1** through **CIVIL-4**, **STRUC-1** through **STRUC-4**, **MECH-1** through **MECH-3**, and **ELEC-1** have been revised accordingly. These revisions include the following.

- The applicable version and section references of the CBSC have been updated.
- Condition of Certification **GEN-1** has been updated to require that the demolition of ASTs 1, 2, and 4 and the demolition of the EPS be subject to the CBO's approval, in compliance with the CBC.
- Condition of Certification **GEN-2** has been updated to reflect the equipment proposed for the amended CECP as specified in **GEN-2**, **Table 1**: **Major Structures and Equipment List**.
- The building code requires that the minimum electrical load for electrical equipment and systems requiring CBO review and inspection be 120 volts, not 480 volts as currently stated in Condition of Certification **ELEC-1**; **ELEC-1** has been revised accordingly.

The added text is identified as **bold** and **underlined**, and the deleted text is identified as ~~strikethrough~~.

GEN-1 The project owner shall design, construct, and inspect the project in accordance with the **2013**~~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**, including the demolition of above-ground fuel oil storage tanks 1, 2, and 4 (ASTs 1, 2, and 4), and the demolition of the Encina Power Station (EPS)** (**2013**~~2007~~ CBC, Appendix Chapter 1, § **1.1.3**~~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 **2013**~~2007~~ CBSC is in effect, the **2013**~~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: **At least 30 days prior to the demolition of ASTs 1, 2, and 4, the project owner shall contact the CBO to obtain the CBO's approval of the work. At least 5 days prior to the start of this demolition, the project owner shall notify the CPM of the CBO's approval of this work.**

At least 30 days prior to the demolition of the EPS, the project owner shall contact the CBO to obtain the CBO's approval of the work. At least five days prior to the start of this demolition, the project owner shall notify the CPM of the CBO's approval of this work.

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 (**2013**~~2007~~ CBC, Appendix Chapter 1, § **111**~~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	6
Selective Catalytic Reduction Stack Foundations and Connections	6
CGT Generator Foundations and Connections	6
CGT Transformer Foundations and Connections	6
Auxiliary Transformer Foundations and Connections	6
Generator Circuit Breaker Foundations and Connections	6
Fin Fan Cooler Foundations and Connections	6
Balance of Plant PDC	1
CGT Lube Oil Cooler Foundations and Connections	2
CGT Inlet Filter Foundations and Connections	2
Air Compressor Building Structure, Foundations and Connections	1
Fuel Gas Compressors Building Structure, Foundations and Connections	1
Water Treatment Trailer Foundations and Connections	1
Continuous Emissions Monitoring System Foundations and Connections	3
Shell and Tube Heat Exchanger Foundations and Connections	6
Auxiliary Skid Foundations and Connections	6
Attemporation Blower Skid Foundations and Connections	6
CGT and Intercooler MCC	6
Warehouse and Maintenance Building Structure, Foundations and Connections	1
Control Room and Administration Building Structure, Foundations and Connections	1
Emergency Diesel Generator Foundations and Connections	1
Storage Tanks Structure, Foundations and Connections	4
Fuel Gas Metering Foundations and Connections	1
Ammonia Prep Foundations and Connections	1
Raw/Fire Water Tank Foundation and Connections	1
Demineralized Water Storage Tank Foundation and Connections	1
Fire Water Pumps Building Foundations and Connections	1
Crane Maintenance Pad Foundations and Connections	2

~~Facility Design Table 2~~
~~Major Structures and Equipment List~~

~~Equipment/System~~	~~Quantity (Plant)~~
~~Combustion Gas Turbine (CGT) Foundation and Connections~~	~~2~~
~~Heat Recovery 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~~
~~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~~

~~Equipment/System~~	~~Quantity (Plant)~~
~~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 **2013**~~2007~~ CBC (**2013**~~2007~~ CBC, **Appendix Chapter 1, § 109, Fees** ~~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 (**2013**~~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 (**2013**~~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 (**2013**~~2007~~ CBC, **Chapter 18, § 1803, Soils Engineering Report** ~~Appendix J, § J104.3, Soils Report; 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 **2013**~~2007~~ CBC, **Chapter 17, § 1704, Special Inspection** ~~Appendix J,~~

~~section J105, Inspections, and the **2013**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 (**2013**~~2007~~ CBC, Appendix Chapter 1, § **115**~~114~~, Stop **Work** 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 **2013**~~2007~~ California Administrative Code, § 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 **2013**~~2007~~ CBC, Chapter 17, § 1704; Special Inspections, Chapter 17A, § 1704A, Special Inspections; and Appendix Chapter 1, § **110**~~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 [**2013**~~2007~~ CBC, Chapter 17, Section 1704.**2.4**~~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 (**2013**~~2007~~ CBC, ~~Appendix Chapter 1, § 109.6, Approval Required;~~ Chapter 17, § 1704.**2.4**~~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 (**2013**~~2007~~ CBC, Appendix Chapter 1, § **110**~~106.3.1~~, **Inspections** ~~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 **2013**~~2007~~ CBC, **Chapter 18, § 1803.6 Reporting, and § 1803, Geotechnical Investigation** ~~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 (**2013**~~2007~~ CBC, § **115**~~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 **2013**~~2007~~ CBC, Appendix Chapter 1, § **110**~~109~~, Inspections; and Chapter 17, § 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 (**2013**~~2007~~ CBC, Chapter 17, § 1704.**2.4**~~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 (**2013**~~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 (**2013**~~2007~~ CBC, Appendix Chapter 1, §**104.1, Duties and Powers of Building Official, 105, Permits**~~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 (**2013 CBC, Appendix Chapter 1, § 107.5 Retention of Construction Documents**~~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 (**2013**~~2007~~ CBC, Appendix Chapter 1, §**107.3.4** ~~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 (**2013**~~2007~~ CBC, Appendix Chapter 1, § **107.3.4** ~~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 **2013**~~2007~~ CBC, Chapter 17, § 1704, Special Inspections~~,~~ and ~~§ 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 (**2013**~~2007~~ CBC, Chapter 17, § 1704.**2.4**~~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 **2013**~~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 (**2013**~~2007~~ CBC, Appendix Chapter 1, § **107**~~106.1~~, Submittal Documents~~;, §106.4, Amended Construction Documents;~~ **2013**~~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 **2013**~~2007~~ CBC~~, Chapter 3, Table 307.1(2),~~ shall, at a minimum, be designed to comply with **H-2 Occupancy Category of the 2013 CBC** ~~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 **quality assurance and quality control** ~~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 (**2013**~~2007~~ CBC, Appendix Chapter 1, § **107**~~106.1~~, Submittal Documents; § **110**~~109.5~~, **Inspections** ~~Inspection Requests~~; § **105, Permits**~~109.6, Approval Required~~; **2013**~~2007~~ California Plumbing Code, § **301**~~301.1.1~~, **Materials** ~~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 (**2013**~~2007~~ CBC, Appendix Chapter 1, § **107.3.4**~~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); and
- ~~San Diego County codes; and~~

- City of Carlsbad **Municipal Ordinance, Title 18, Building Codes and Standards** ~~regulations and ordinances~~.

The CBO may deputize inspectors to carry out the functions of the code enforcement agency (**2013**~~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 (**2013**~~2007~~ CBC, Appendix Chapter 1, §**110**~~109.5~~, Inspections ~~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 (**2013**~~2007~~ CBC, Appendix Chapter 1, § **110.3.7**~~109.3.7~~, Energy Efficiency Inspections; § **107.3.4**~~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 **120**~~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 (**2013**~~2007~~ CBC, Appendix Chapter 1, § **107**~~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 (**2013**~~2007~~ CBC, Appendix Chapter 1, § **105**~~109.6~~, **Permits;** ~~Approval Required;~~ § **110**~~109.5~~, Inspection**s** ~~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 **120/**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 **120/**480 V systems; **and**

~~6. system grounding requirements; and~~

6~~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

LL 2014b – Locke Lord LLP (TN202267). Petition to Remove Obsolete Facilities to Support Construction of the Carlsbad Energy Project. Submitted 04/29/2014

LL 2014d – Locke Lord LLP (TN202287-2). Petition to Amend Carlsbad Energy Center Project. Submitted 05/02/2014.

LL 2014e – Locke Lord LLP (TN202287-3). Petition to Amend Carlsbad Energy Center Project, Part Two, Appendix 2A-5.11A. Submitted 05/02/2014.

FACILITY DESIGN APPENDIX A

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

This appendix lists the LORS that would be used in the engineering design and construction of the Carlsbad Energy Center Project Amendment (amended CECP).

1. CIVIL ENGINEERING LORS:

American Association of State Highway and Transportation Officials (AASHTO)— Standards and Specifications

American Concrete Institute (ACI) − Standards and Recommended Practices

American Institute of Steel Construction (AISC) − Standards and Specifications

American National Standards Institute (ANSI) − Standards

American Society of Testing and Materials (ASTM) − Standards, Specifications, and Recommended Practices

American Water Works Association (AWWA) − Standards and Specifications

American Welding Society (AWS) − Codes and Standards

Asphalt Institute (AI) − Asphalt Handbook

State of California Department of Transportation (CALTRANS) Standard Specification

California Energy Commission (CEC) − Recommended Seismic Design Criteria for Non-Nuclear Generating Facilities in California, 1989

Concrete Reinforcing Steel Institute (CRSI) − Standards

Factory Mutual (FM) − Standards

National Fire Protection Association (NFPA) − Standards

California Building Code (CBC) 2013

Steel Structures Painting Council (SSPC) − Standards and Specifications

American Society of Civil Engineers (ASCE) – Standards and Recommended Practices

International Building Code (IBC) 2012 Edition

United States Geological Survey (USGS)

2. STRUCTURAL ENGINEERING LORS:

California Building Code, 2013 Edition

American Concrete Institute (ACI)

American Society of Civil Engineers (ASCE)

American Society of Mechanical Engineers (ASME)

American Welding Society (AWS)

Code of Federal Regulations, Title 29—Labor, Chapter XVII, Occupational Safety and Health Administration (OSHA)

National Association of Architectural Metal Manufacturers (NAAMM)—Metal Bar Grating Manual

Hoist Manufacturers Institute (HMI), Standard Specifications for Electric Wire Rope Hoists (HMI 100)

IEEE 980 – Guide for Containment and Control of Oil Spills in Substations

National Electric Safety Code (NESC), C2-2007

National Fire Protection Association (NFPA Standards)

OSHA Williams-Steiger Occupational Safety and Health Act of 1970

Steel Deck Institute (SDI)—Design Manual for Floor Decks and Roof Decks

3. MECHANICAL ENGINEERING LORS:

California Building Standards Code, 2013 Edition

American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code

ASME/ANSI B31.1 Power Piping Code

ASME Performance Test Codes

ASME Standard TDP-1

American National Standards Institute (ANSI) B16.5, B16.34, and B133.8

American Boiler Manufacturers Association (ABMA)

American Gear Manufacturers Association (AGMA)

Air Moving and Conditioning Association (AMCA)

American Society for Testing and Materials (ASTM)

American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE)
American Welding Society (AWS)

Cooling Tower Institute (CTI)

Heat Exchange Institute (HEI)

Manufacturing Standardization Society (MSS) of the Valve and Fitting Industry

National Fire Protection Association (NFPA)

Hydraulic Institute Standards (HIS)

Tubular Exchanger Manufacturer's Association (TEMA)

4. ELECTRICAL ENGINEERING LORS:

American National Standards Institute (ANSI)

American Society for Testing and Materials (ASTM)

Anti-Friction Bearing Manufacturers Association (AFBMA)

California Building Standards Code

California Electrical Code

Insulated Cable Engineers Association (ICEA)

Institute of Electrical and Electronics Engineers (IEEE)

Illuminating Engineering Society (IES)

National Association of Corrosion Engineers (NACE)

National Electrical Code (NEC)

National Electrical Manufacturers Association (NEMA)

National Electrical Safety Code (NESC)

National Fire Protection Association (NFPA)

Underwriters Laboratories, Inc. (UL)

GEOLOGY & PALEONTOLOGY

Casey Weaver, CEG

SUMMARY OF CONCLUSIONS

The proposed Carlsbad Energy Center Project Amendment (amended CECP) is located in an active geologic area on the coast of Southern California between Los Angeles and San Diego. The site is not underlain by an active fault and the site is not subject to surface fault rupture. The closest known active fault is the Rose Canyon segment of the Newport - Inglewood Fault Zone which is located approximately two miles southwest of the proposed project site. Numerous active faults are located in both the onshore and offshore vicinity of the project site.

Because of its geologic setting, the site could be subject to very strong levels of earthquake-related ground shaking. While the potential for earthquake ground rupture is low, several major off-shore faults are located between two and 11 miles of the site. The significant effects of strong ground shaking on the CECP structures must be mitigated through structural designs required by the most recent edition of the California Building Code (CBC 2013). CBC 2013 requires that structures be designed to resist seismic stresses from anticipated maximum ground acceleration.

Due to the relative dense and granular nature of site soils, the project would not likely be subject to seismically induced soil failure. 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.

The project area is subject to inundation by tsunami, however, the project site is mapped outside of a tsunami inundation zone. U.S. Building codes generally have not addressed the subject of designing structures in tsunami zones (Reynolds 2013). FEMA's Coastal Construction Manual (FEMA P55), developed to provide design and construction guidance for structures built in coastal areas, addresses seismic loads for coastal structures and provides information on tsunami and associated loads (FEMA 2013).

Based on the sea level rise projections developed by the Sea-Level Rise Task Force of the Coastal and Ocean Working Group of the California Climate Action Team, sea level is predicted to rise a maximum of 17 inches above 2014 level by the year 2050 (CO-CAT 2013). Analysis of the effects of sea-level rise on the project is presented in the **SOIL & WATER RESOURCES** section of this document.

There are no known viable geologic or mineralogical resources at the amended CECP site. Numerous paleontological resources have been documented within three 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 are not likely, but if discovered during construction, they would be mitigated through worker training and monitoring by qualified paleontologists, as required by proposed Conditions of Certification, **PAL-1** through **PAL-8**.

Based on this information, Energy Commission staff (staff) concludes that the potential adverse cumulative impacts to the project facilities from geologic hazards during their design life would be less than significant. Similarly, staff concludes the potential adverse cumulative impacts to potential geologic, mineralogic, and paleontologic resources from the construction, operation, and closure of the proposed project, if any, would be less than significant. It is staff's opinion that the amended CECP would 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.

INTRODUCTION

As discussed in detail in the **PROJECT DESCRIPTION** of this PSA, the amended CECP would be different than the licensed CECP approved by the Energy Commission on May 31, 2012. For that reason, an evaluation of impacts, including the potential for changes or additions to the licensed CECP Conditions of Certification (COCs) for the project is required. The amended CECP proposes implementing the following general changes and modifications to the licensed CECP:

1. Add the demolition of three additional above-ground fuel oil storage tanks (AST's 1, 2 and 4), and associated piping and equipment, removal of oily sands from under ASTs 1, 2, and 4, and removal of a an earthen berm between ASTs 4 and 5.

2. Change in generation equipment and technology from Siemens fast response, combined-cycle to six natural gas-fired GE LMS 100 simple-cycle turbines with approximately 632 MW net output of electrical generating capacity.

3. Add retirement and demolition of Encina Power Station (EPS). Units 1 through 5 of EPS will be retired and all above-grade elements of the EPS power and support buildings will be demolished and removed.

The amended CECP will continue to be situated adjacent to the EPS, in the north eastern portion of the 95-acre parcel, between the existing North County Transit District (NCTD) railroad tracks and Interstate-5, but the amended CECP will have a larger footprint, occupying most of that area (30 acres). Construction equipment/material laydown and construction worker parking areas for the project will remain immediately north of the existing EPS facility and in various areas west of the existing railroad tracks. No offsite parking or laydown areas are anticipated to be necessary for the construction of the amended CECP.

The amended CECP will continue to interconnect to the electrical transmission system via 138-kilovolt (kV) and 230-kV lines that connect to the respective San Diego Gas and Electric Company (SDG&E) switchyards situated on the EPS site. Natural gas will be delivered to the amended CECP from the existing SDG&E transmission pipeline (Line TL 2009, "Rainbow line") via an approximate 1,100-foot-long interconnection pipeline that runs parallel to the existing NCTD railroad tracks. Similar to the licensed CECP, with the exception of short, onsite interconnections, no offsite gas supply lines are required for the amended CECP. The amended CECP will use reclaimed water and/or

potable water from the Carlsbad Municipal Water District, and will connect to an existing City of Carlsbad (Encina Wastewater Authority) sanitary sewer line.

Upon completion of construction of the amended CECP and achievement of commercial operations, the EPS will be decommissioned, and the above-grade elements of the main EPS power building and all support and ancillary buildings will be demolished. Upon completion of demolition of EPS, approximately 40 acres west of the railroad tracks will transition from Energy Commission regulatory jurisdiction to that of the city, and be made available for future redevelopment. Some portions west of the railroad tracks will remain dedicated to the amended CECP, such as for transportation access, electrical interconnection, and water or gas supply.

Since the original project was licensed, additional regional geologic information has been developed in association with studies performed in accordance with AB 1632 and for the proposed relicensing of the San Onofre Nuclear Generating Station (SONGS). Information from those studies that pertain to the project site has been included in this PSA and this PSA includes information not provided in the licensed CECP FSA and Decision. The additional information provides some of the basis for changes to the conditions of certification being recommended in the PSA.

Condition of Certification **GEO-1** was added to assure that design and construction of the plant conforms with the most recent edition of the California Building Code. Condition of Certification **PAL-5** was added to require that all site workers associated with ground disturbing activities be adequately trained to respond to unexpected discovery of paleontological resources. Condition of Certification **PAL-8** was added to ensure that all elements that are presented in the Paleontological Resources Monitoring and Mitigation Plan (PRMMP) are adequately performed. (Previously, the requirement was to merely prepare the PRMMP). Other changes to the conditions of certification were made for editorial considerations or to make the conditions more enforceable.

PROPOSED MODIFIED PROJECT

Geology & Paleontology Table 1 below shows what staff previously analyzed in the licensed CECP and the new or additional project elements for the amended CECP. Where new or additional disturbance would occur there is the potential to impact geologic and paleontologic resources beyond that analyzed in the licensed CECP. Also, where new facilities are added or expanded for the amended CECP there is potential for geologic hazards to exist beyond that analyzed in the licensed CECP.

Geology & Paleontology Table 1
Licensed vs. Amended CECP Features Potentially Impacting Geologic and Paleontologic Resources and Impacted by Geologic Hazards

Feature	Licensed CECP (558 MW)	Amended CECP (632 MW)
Power production	Two 1-on-1 combined cycle units	Six simple-cycle combustion turbine units with intercoolers
Annual capacity factor	Up to 47 percent (4,100 of 8,760 possible hours)	Estimated 31 percent (approximately 2,700 operating hours)
Project footprint	Approximately 23 acres	Approximately 30 acres
Area of temporary construction laydown	10 acres	19 acres
Site preparation	Demolish above-ground fuel oil storage Tanks 5, 6, and 7	Demolish above-ground fuel oil storage Tanks 1, 2, 4, 5, 6, and 7
Encina Power Station	Retire units 1-3	Retire units 1-5 and demolish all above-ground structures
Length of construction	25 months (from site preparation to CECP plant begin operation)	64 months (from site preparation to EPS plant demolition to ground level)
Off-site linear facilities	The amended project includes a new reclaimed water line approximately 3,700 feet long.	

Source: CEC2012a, LL2014d, LL2014b

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

Applicable laws, ordinances, regulations and standards (LORS) are listed in the Petition to Amend (PTA) (LL2014d, e). The following briefly describes the current LORS for both geologic hazards and resources and mineralogic and paleontologic resources.

Geology & Paleontology Table 2
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
Federal	The amended CECP is not located on federal land. There are no federal LORS for geologic hazards and resources for this site.
State	
California Building Code (2013)	The California Building Code (CBC 2013) includes a series of standards that are used in project investigation, design, and construction (including seismicity, grading and erosion control). The CBC has adopted provisions in the International Building Code (IBC, 2012).
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.
Seismic Hazards Mapping Act, PRC section 2690–2699	Maps identify areas (zones) that are subject to the effects of strong ground shaking, such as liquefaction, landslides, tsunamis, and seiches. Requires a geotechnical report be prepared that defines and delineates any seismic hazard prior to approval of a project located in a seismic hazard zone.
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.
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	The county guidelines address whether the project would directly or indirectly destroy a unique paleontological resource or site, as described in the CEQA Guidelines 2014, Appendix G, Environmental Checklist Form.
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.
Standards	
Society for Vertebrate Paleontology (SVP), 2010	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 developed by the SVP, a national organization of professional scientists. The measures were adopted in October 1995, and revised in 2010 following adoption of the Paleontological Resources Preservation Act (PRPA) of 2009.
Bureau of Land Management (BLM) Instructional Memorandum 2008-009	Provides up-to-date methodologies for assessing paleontological sensitivity and management guidelines for paleontological resources on lands managed by the Bureau of Land Management. While not required on non-BLM lands, the methodologies are useful for all paleontological studies, regardless of land ownership.

SETTING

The amended CECP would be constructed on an approximately 30 acre portion of the existing Encina Power Station (EPS) property (approximately 95 total acres) located in southern Carlsbad, California in San Diego County (**Geology & Paleontology Figure 1**). The amended CECP site occupies the surface of an elevated peninsula with the Pacific Ocean to the west and the Agua Hedionda lagoon to the north and east **(Geology & Paleontology Figure 2**). The amended 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 active railroad right of way to the west.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

This section considers two types of impacts. The first is the potential impacts the proposed construction and operation of the facility could have on existing geologic, mineralogic, and paleontologic resources in the area. The second is geologic hazards, which could impact the proper functioning of the proposed facility and create life/safety concerns.

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 2013 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 the summary of the records review by the San Diego County Natural History Museum that is presented in the original CECP AFC (CECP 2007a). Site-specific information generated by the applicant for the amended CECP was also reviewed. All research was conducted in accordance with accepted assessment

protocol (SVP 2010) 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.

Staff reviewed current geologic studies recently performed in association with evaluation of seismicity of SONGS. The evaluation of site seismicity in this PSA has been updated from that presented in the licensed CECP FSA and Decision.

DIRECT/INDIRECT IMPACTS AND MITIGATION

An assessment of the potential impacts to geologic, mineralogic, and paleontologic resources, and from geologic hazards is provided below. The assessment of impacts is followed by a summary of potential impacts that may occur during construction and operation of the project and provides recommended conditions of certification that would ensure potential impacts are mitigated to a level that is less than significant. The recommended conditions of certification would allow the Energy Commission's compliance project manager (CPM) and the applicant to adopt a compliance monitoring scheme ensuring ongoing compliance with LORS applicable to geologic hazards and the protection of geologic, mineralogic, and paleontologic resources.

GEOLOGIC AND MINERALOGIC RESOURCES

At the amended CECP site, the geologic units at the surface and in the subsurface are widespread alluvial deposits that occur throughout the Carlsbad area (**Geology & Paleontology Figure 5A).** These geologic units are not unique in terms of recreational, commercial, or scientific value.

Staff did not identify any geological resources at the energy facility location or along project linears. Aggregate for Portland cement concrete (PCC) has been produced from two pits in the area, located three to seven 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 amended 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. Staff concludes there would be no impacts to geologic and mineralogic resources from the amended CECP construction or operation.

PALEONTOLOGIC RESOURCES

Staff 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).

Many paleontological sites are documented within three miles of the amended 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; CECP 2007a). The Quaternary fossils consist of marine invertebrates, such as worms, bryozoans, 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 amended 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 existing EPS 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 amended 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 neighboring Pleistocene marine terrace deposits (Scott, 2008). 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).

The Pleistocene age paralic deposits, which represent sediments mapped at the surface in the vicinity of the amended CECP site (and are expected to underlie fill soils on the project site), are generally considered to have a high paleontological sensitivity. Underlying the terrace deposits is the Eocene age Santiago Formation, which is also considered to be highly sensitive.

Fill materials are assigned a zero sensitivity rating and have no paleontological potential because any fossils that may be discovered would have been disturbed and cannot provide useful scientific information.

GEOLOGICAL HAZARDS

The AFC (CECP 2007a) provides documentation of potential geologic hazards at the amended 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 2013 requirements.

Staff's independent research included the review of available geologic maps, reports, and related data of the amended 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 Geological Survey.

Faulting and Seismicity

In southern California, tectonic deformation between the Pacific and North American plates is accommodated primarily by a zone of northwest trending strike-slip faults; however, within this complex zone of shear, areas of compression also occur. Major active and potentially active faults in the region are shown on **Geology & Paleontology - Figure 6**. Most of the tectonic deformation in southern California occurs along strike slip faults associated with the on-land portion of the San Andreas fault system. In addition to the on-land faults, the tectonic shear is shared with faults in the offshore inner Continental Borderland region (Grant 2004) (**Geology & Paleontology - Figure 7)**.

In 2002, Grant and Rockwell postulated that an active 300-km-long Coastal Fault zone extends between the Los Angeles basin and coastal Baja California (Grant 2002). This Coastal Fault zone includes those faults contained within the inner Continental Borderland which become contiguous with the Agua Blanca fault in Baja California (Grant 2004). The Agua Blanca fault is considered to have a slip rate between five and seven millimeters/year (Rockwell 2012). That slip is believed to be transferred to the offshore faults within the inner Continental Borderland (Rockwell 2012). The geometry and slip rate of faults in the inner Continental Borderland are poorly constrained relative to onshore faults, yet they may pose significant seismic risk because they are close to populated areas, and several offshore faults appear to displace seafloor sediments (Legg, 1991).

Active faults in southern California associated with shear between the north American and Pacific plates include (from east to west), the San Andreas fault zone, the San Jacinto fault zone, the Elsinore fault zone, the Whittier fault zone, the Newport-Inglewood fault zone, the Palos Verdes fault zone, the San Diego Trough fault zone and the San Clemente fault zone. Faults specific to the inner Continental Borderland include

the Newport-Inglewood fault zone, the Palos Verdes fault zone, the San Diego Trough fault zone and the San Clemente fault zone (Legg 2002).

In addition, to transform strike slip faulting, tectonic compression in the southern California area has formed folds (anticlines and synclines), reverse faults and blind thrust faults (Blind thrusts). Blind thrusts underlie regions undergoing contraction in the Los Angeles Basin and are expressed at the surface only as active folds. The Compton-Los Alamitos fault and the San Joaquin Blind thrust are examples of this style of deformation. Seismic hazards posed by active thrusts are assessed in the Los Angeles Basin by a number of means, all of which are aimed at placing constraints on fault slip rates, earthquake recurrence and fault geometry and segmentation (Mueller 2005). Research into the relationship between fault slip, fault geometry and fold growth thus provides insight into the occurrence of earthquakes produced on these structures. Large earthquakes originating on blind thrusts within Southern California have occurred in the past century, illuminating their geometry and potential for seismic hazard and include the moment magnitude (Mw) 5.9 1987 Whittier Narrows earthquake and the Mw6.8 1994 Northridge earthquake. It is likely that in 1769, a M7+ earthquake occurred on the San Joaquin Blind thrust which uplifted coastal Orange County approximately ten feet (Grant 2004).

Active faults with a potential to affect the amended CECP site are listed and described below and their locations presented on **Geology & Paleontology - Figures 6** and **7.**

San Andreas Fault Zone

The San Andreas is the "master" fault of an intricate fault system that defines the boundary between the Pacific and North American crustal plates in California (Schulz 1992). The entire San Andreas fault system is more than 800 miles long and extends to depths of at least ten miles within the Earth. In detail, the fault is a complex zone of crushed and broken rock from a few hundred feet to a mile wide. Many smaller faults branch from and join the San Andreas fault zone.

Over much of its length, a linear trough reveals the presence of the San Andreas fault; from the air, the linear arrangement of lakes, bays, and valleys in this trough is striking. Viewed from the ground, however, the features are more subtle. For example, many people driving near Crystal Springs Reservoir, near San Francisco, or along Tomales Bay, or through Cajon or Tejon Passes may not realize that they are within the San Andreas fault zone. On the ground, the fault can be recognized by carefully inspecting the landscape. The fault zone is marked by distinctive landforms that include long straight escarpments, narrow ridges, and small undrained ponds formed by the settling of small blocks within the zone. Many stream channels characteristically jog sharply to the right where they cross the fault.

At least 350 miles of offset has occurred along the San Andreas fault since it came into being about 15-20 million years ago (Schulz 1992). Surveying demonstrates the strain (displacement) occurs along the fault at the rate of approximately two inches per year.

San Jacinto Fault Zone

The San Jacinto fault zone is one of the major branches of the San Andreas fault system in southern California (Sharp 1965).

The San Jacinto fault zone is a complex zone of splaying and overlapping strike-slip fault segments, steps and bends, and associated zones of contractional and extensional deformation (Dorsey 2002). Offsets on basement piercing points and Pleistocene strata indicate that about 25 km of slip has accumulated on the San Jacinto fault during the past 1.5 to 2.0 Ma (Dorsey 2002). Based on GPS studies and offsets of dated Quaternary deposits, the rate of slip on the San Jacinto system is generally agreed to be ~10-12 mm/yr. This represents 20-25 percent of the present-day Pacific-North American relative plate motion (Dorsey 2002).

The straightness, continuity, and high seismicity of the San Jacinto fault zone suggest that it may be currently the most important member of the San Andreas fault system in southern California (Sharp 1965).

Elsinore Fault Zone

The Elsinore fault zone parallels the San Jacinto and is part of the same right-lateral crustal plate strain system as the San Andreas and the San Jacinto (ECI 2000).The Elsinore branches into the Whittier fault near Santa Ana Canyon, where it borders the Puente Hills to the southwest and the Chino fault to the northeast. The most apparent displacements on the Whittier-Elsinore have been vertical, as evidenced by the steep scarp (an earthquake-built cliff) along the Santa Ana Mountains.

Whittier Fault Zone

The Whittier fault zone is exposed for a distance of about 25 miles along the south slopes of the Puente Hills from the Whittier Narrows on the northwest to the Santa Ana River near its southwest end (Yerkes 1965). In the vicinity of the Santa Ana River, it joins with the northern end of the Elsinore Fault Zone. Recent deformation along the Whittier Fault Zone is indicated by steeply tilted and locally overturned strata of late Pleistocene age (Yerkes 1965). Trenching along the fault has uncovered evidence of recent offsets, including faulted Holocene alluvium dated at 1400 to 2200 years before present (Gath 1988).

Compton-Los Alamitos Fault Zone

The Compton blind thrust fault is active and has generated at least six large-magnitude earthquakes (M_w 7.0–7.4) during the past 14,000 years (Leon 2009). Deformed Holocene strata record recent activity on the Compton thrust and are marked by discrete sequences that thicken repeatedly across a series of buried fold scarps. Minimum uplift in each of the scarp-forming events, which occurred at 0.7–1.75 thousand years ago (ka) (event 1), 0.7–3.4 ka or 1.9–3.4 ka (event 2), 5.6–7.2 ka (event 3), 5.4–8.4 ka (event 4), 10.3–12.5 ka (event 5), and 10.3–13.7 ka (event 6), ranged from ~0.6 to ~1.9 m, indicating minimum thrust displacements of ≥1.3 to 4.2 m. Such large displacements are consistent with the occurrence of large-magnitude earthquakes ($M_w \geq 7$). This large, concealed fault underlies the Los Angeles metropolitan area and

thus poses one of the largest deterministic seismic risks in the United States (Leon 2009).

Newport-Inglewood Fault Zone

The Newport-Inglewood fault zone (NIFZ) is approximately 1.5-2.5 km wide, trends N45-60W, is mainly a right-lateral tectonic structure that extends from the Santa Monica Mountains on the north to offshore connection with the Rose Canyon fault at San Diego on the south (Shlemon 2008). Known active fault traces in the NIFZ zone of deformation have been mapped in Alquist-Priolo Special Studies Zones (CDMG 1997).

The Newport–Inglewood fault zone (NIFZ) was first identified as a significant threat to southern California residents in 1933 when it generated the M6.3 Long Beach earthquake, killing 115 people and providing motivation for passage of the first seismic safety legislation in the United States (Grant 2004).

Ongoing studies indicate the NIFZ is capable of generating earthquakes with magnitudes up to 7.4 Mw (Toppozada 1989) or 7.5Mw (Petersen 2008). The higher magnitude indicated by Petersen uses a fault length of 208 km as described by Shlemon (2008).

Rose Canyon Fault Zone

The Rose Canyon Fault is interpreted as the southern continuation of the historically active Newport-Inglewood Fault and is a major component of the coastal system of strike-slip faults that together transfer 5-7 mm/yr of the crustal plate boundary deformation (Rockwell 2012). Historical and paleoseismic activity on this zone suggests that much or all of the primary fault elements of the Newport-Inglewood/Rose Canyon Fault Zone sustained rupture in a sequence of earthquakes over the past few hundred years (Grant and Rockwell, 2002).

The size and frequency of earthquakes on the Rose Canyon Fault Zone are key parameters in the seismic ground motion hazard analysis of CECP. However, there is a paucity of data on the late Holocene rupture history of large earthquakes on the Newport-Inglewood/Rose Canyon Fault Zone. The Rose Canyon Fault has sustained at least one late Holocene rupture, with the date of the earthquake estimated to be after AD 1450 (Grant and Rockwell, 2002) and most likely prior to construction of the San Diego Mission in 1769, as a large historical Rose Canyon earthquake would likely have destroyed that mission (Rockwell 2012).

The slip rate on the Rose Canyon fault is not well constrained. Lindvall and Rockwell (1995) determined a minimum early Holocene to present slip rate of 1.1 mm/yr, with a best estimate of approximately 1.5mm/yr based on 3D trenching in Rose Creek and interpretation of geomorphology. Review of early aerial imagery in the Old Town San Diego area identified two deflected streams that are offset about 250 m, with both streams incised into a 120 thousand year old (ka) terrace (Rockwell 2010). If correct, and if the deflected streams reflect actual displacement, then this implies a long-term slip rate of about two mm/yr for the Rose Canyon fault. Ongoing studies indicate the Rose Canyon Fault Zone is capable of generating earthquakes with magnitudes up to 7.0 Mw (Rockwell 2014).

San Joaquin Hills Blind Thrust

The late Quaternary uplift rate of the San Joaquin Hills is approximately twice as high as uplift rates parallel to the Newport-Inglewood Fault Zone (NIFZ) along the coast to the south (Grant 2002). Several observations suggest that the San Joaquin Hills are underlain by a fault that is distinct from the NIFZ, although they may be linked kinematically. There are several Quaternary anticlines along the NIFZ north of the San Joaquin Hills (Grant 2002). However, the San Joaquin Hills anticline is longer and has the greatest topographic expression. Other topographically prominent anticlines, such as Signal Hill, are located within the structurally complex NIFZ and are associated with step-overs (Barrows, 1974).

Geomorphic studies along the coastline in the vicinity of the San Joaquin Hills have discovered emergent shorelines along the open coast and an elevated marsh bench in Newport Back Bay. The surface of the marsh bench is approximately five feet above the current marsh elevation (Grant 2002). Radiocarbon dating and interpretation of the introduction of exotic pollens contained within the elevated marsh bench indicates that the marsh bench was uplifted between the years 1635 and 1797 (Grant 2002).
On July 28, 1769 a strong temblor was described by explorer Gaspar de Portola while he was in the central Los Angeles basin area (Townley 1939). The mainshock was described as violent, and at least two dozen earthquakes followed it over the course of several days. It is likely that the 1769 San Joaquin Hills earthquake occurred on the San Joaquin Blind Thrust and was responsible for the uplift of the elevated marsh bench in Newport Bay and the emergent shorelines along the open coastline (Grant 2002). The San Joaquin earthquake may be the largest known earthquake that has originated within the greater Los Angeles region in the last few centuries (Grant 2002).

Palos Verdes Fault Zone

The Palos Verdes Fault Zone extends southwestward from the northern part of Santa Monica Bay to the area southwest of Lasuen Knoll, offshore from Dana Point (Fisher 2004).The structure of the Palos Verdes Fault Zone changes markedly southeastward across the San Pedro Shelf and slope. Under the northern part of the shelf, this fault zone includes several strands, but the main strand dips west and is probably an oblique-slip fault (Fisher 2004). Under the slope, this fault zone consists of several fault strands having normal separation, most of which dip moderately east. To the southeast near Lasuen Knoll, the Palos Verdes Fault Zone locally is a low angle fault that dips east, but elsewhere near this knoll the fault appears to dip steeply. Fresh sea-floor scarps near Lasuen Knoll indicate recent fault movement (Fisher 2004).

Analysis of wave-cut terraces and offset stream courses indicates total fault-slip rate to be around three mm/yr. (Fisher 2004). The main style of movement along the Palos Verdes Fault Zone has been strike slip and multibeam bathymetric data show recent scarps along this fault near Lasuen Knoll indicating the fault's recent activity.

Coronado Bank Fault Zone

The Coronado Bank Fault Zone (CBFZ) is located approximately 20 miles west of the project site. It is postulated that the CBFZ is the southern extension of the Palos Verde Fault Zone (Rockwell 2012). Similar to other faults within the Inner Continental Borderland, the CBFZ is part of a 90-km-wide zone of faults within the inner Continental

Borderland that accommodates motion between the Pacific and North American plates (Ryan 2012). Based on studies conducted by the Southern California Earthquake Data Center, estimated slip rate of the CBFZ is two mm/yr.

San Diego Trough Fault Zone

The San Diego Trough Fault Zone runs roughly from the Mexican border northward toward Catalina Island. The San Diego trough fault zone (SDTFZ) is part of an Inner Continental Borderland. New seismic reflection data shows that the fault zone steps across a five-km-wide stepover and continues for an additional 60 km north of its previously mapped extent. At the latitude of Santa Catalina Island, the SDTFZ bends 20° to the west and may be linked via a complex zone of folds with the Palos Verdes fault zone (PVFZ). If this is the case, this fault zone would be one of the longest in the California Borderland, and could produce some of the largest earthquakes in the region (Poppick 2013). The 1986 epicenter of the Oceanside earthquake (a magnitude 5.4 quake that caused nearly one million dollars in damage, 29 injuries, and one death) and the associated 1986 earthquake swarm is located within the SDTFZ (Poppick 2013). In a cooperative program between the U.S. Geological Survey (USGS) and the Monterey Bay Aquarium Research Institute (MBARI), the coseismic offset of a submarine channel that intersects the fault zone near the SDTFZ– PVFV junction was measured and dated. This research indicated an estimated horizontal slip rate of about 1.5±0.3 mm/yr over the past 12,270 yr (Ryan 2012).

San Clemente Fault Zone

The San Clemente fault zone is the westernmost of the group of right lateral faults traversing the California Inner Continental Borderland (Legg 1989). The main trace of the San Clemente fault cuts a straight path directly across the rugged topography of the region, displaying evidence of a steeply dipping (near vertical) fault surface. Modern tectonic activity along the San Clemente fault zone is demonstrated by numerous earthquakes with epicenters located along the fault's trend. The average strike of the San Clemente fault is parallel to the Pacific-North American relative plate motion vector at this location and is a part of the broad Pacific-North American transform plate boundary (Legg 1989).

Fault Rupture

All of the faults discussed above have the potential to generate strong seismic shaking at the project site. However, none have the potential to cause fault offset of the ground surface at the project site.

The Alquist-Priolo Earthquake Fault Zoning Act of 1994 (formerly known as the Alquist-Priolo Special Studies Zone Act of 1972) stipulates that no structure for human occupancy may be built within an Earthquake Fault Zone until geologic investigations demonstrate that the site is free of fault traces that are likely to rupture with surface displacement. Earthquake Fault Zones include faults considered to have been active during Holocene time and to have a relatively high potential for surface rupture (CGS 2008). An Earthquake Fault Zone has not been mapped on the project site.

Fault rupture almost always follows pre-existing faults, which are zones of weakness (CGS 2007). No active faults are shown on published maps as crossing the boundary of

new construction on the amended CECP power plant site or associated linear facilities. Therefore, it is highly unlikely that the site would experience surface fault rupture during the project's design life.

Seismic Shaking

Preliminary estimates of ground motion based on probabilistic seismic hazard analyses have been calculated for the project site using the USGS Earthquake Hazards application called the U.S. Seismic "DesignMaps" Web Application (**Geology & Paleontology Table 3**). This application produces seismic hazard curves, uniform hazard response spectra, and seismic design values. The values provided by this application are based upon data from the 2008 USGS National Seismic Hazard Mapping Project. These design parameters are for use with the 2012 International Building Code, the 2010 ASCE-7 Standard, the 2009 NEHRP Provisions, and their respective predecessors.

Geology & Paleontology Table 3
Planning Level 2010 CBC Seismic Design Parameters Maximum Considered Earthquake, ASCE 7 Standard

Parameter	Value
Assumed Site Class	D
Structure Risk Category	III - Substantial
SS – Mapped Spectral Acceleration, Short (0.2 Second) Period	1.155 g
S1 – Mapped Spectral Acceleration, Long (1.0 Second) Period	0.444 g
Fa – Site Coefficient, Short (0.2 Second) Period	1.038
Fv – Site Coefficient, Long (1.0 Second) Period	1.556
SDS – Design Spectral Response Acceleration, Short (0.2 Second) Period	0.799 g
SD1 – Design Spectral Response Acceleration, Long (1.0 Second) Period	0.460 g
SMS – Spectral Response Acceleration, Short (0.2 Second) Period	1.199 g
SM1 – Spectral Response Acceleration, Long (1.0 Second) Period	0.691g

ASCE = American Society of Civil Engineers
Values from USGS 2010b

These parameters are project-specific and, based on amended CECP's location, were calculated using latitude and longitude inputs of 33.141 degrees north and 117.334 degrees west, respectively. Other inputs for this application are the site "type" which is based on the underlying geologic materials and the "Structure Risk Category". The assumed site class for amended CECP is "D", which is applicable to soft clay soil. These parameters can be updated as appropriate following the results presented in a project-specific geotechnical investigation report performed for the site. The assumed "Structure Risk Category" is "III", which is based on its inherent risk to people and the need for the structure to function following a damaging event. Risk categories range from I (non essential) to IV (critical). Examples of risk category I include agriculture facilities, minor storage facilities, etc., while examples of category IV include fire stations, hospitals, nuclear power facilities, etc.

The ground acceleration values presented are typical for the area. Other developments in the adjacent area will also be designed to accommodate strong seismic shaking. The potential for and mitigation of the effects of strong seismic shaking during an earthquake

should be addressed in a project-specific geotechnical report, per CBC 2013 requirements, and proposed Condition of Certification **GEO-1** and **FACILITY DESIGN** Conditions of Certification **GEN-1**, **GEN-5** and **CIVIL-1**. Compliance with these conditions of certification would ensure the project is built to current seismic standards and potential impacts would be mitigated to insignificant levels in accordance with current standards of engineering practice.

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. Historic groundwater levels in monitoring wells on the EPS site have ranged from 14 feet below msl to ten feet above mean sea level (msl), but actual static groundwater level is likely to be near or above msl. The ground surface elevation across the EPS property varies from mean sea level (msl) to 55-feet above msl. The East and West Tank Farms are located on marine terrace bluffs approximately 30- to 50-feet above msl. Measurements taken on February 2014 in monitoring wells located in the central part of the EPS property, in the vicinity of the Carlsbad Seawater Desalination Project, showed groundwater levels between 29.7 and 31.8 feet below ground surface (LL2014kk §3.2). The basements of EPS Units 4 and 5 are more than 16 feet below msl and, as a result, receive seepage from groundwater.

Assuming elevations of 30 to 31feet above mean sea level (msl) for amended CECP building footings and three to five feet msl for the ground water surface, the depth to ground water would be approximately 25 feet below the amended CECP power plant site(CECP 2007d). Standard penetration testing (blowcounts) in borings conducted during geotechnical evaluation of the adjoining desalination plant at the southeast end of the amended CECP project site and across the railroad tracks to the southwest on the desalination plant site are greater than 50 blows/foot below depths of 15.5 to 43 feet below ground surface (bgs). Blowcounts of 50 or greater indicate dense to very dense materials that are unlikely to liquefy during an earthquake. Based on interpretation of off-site subsurface information, soils become dense to very dense through the groundwater saturated soil materials. Therefore, liquefaction potential would be minimal. Based on the geotechnical report conducted for the desalination plant, the basement walls and footings of the EPS structures are founded on and in Santiago Formation bedrock and are not susceptible to liquefaction.

Ground water levels should be confirmed, and the liquefaction potential on the amended CECP site should be addressed in a project-specific geotechnical report, per CBC 2013 requirements and proposed **FACILITY DESIGN** Conditions of Certification **GEN-1**, **GEN-5** and **CIVIL-1**.

Lateral Spreading

Lateral spreading of the ground surface during an earthquake usually takes place along weak shear zones that have formed within a liquefiable soil layer. Lateral spreading generally takes place in the direction of a free-face (i.e., retaining wall, slope, and channel).

An empirical model is typically used to predict the amount of horizontal ground displacement within a site. For sites located in proximity to a free-face, the amount of lateral ground displacement is strongly correlated with the distance of the site from the free-face. Other factors such as earthquake magnitude, distance from the earthquake epicenter, thickness of the liquefiable layers, and the fines content and particle sizes of the liquefiable layers also affect the amount of lateral ground displacement.

A free-face slope occurs at the northern end on the peninsula on which the project is proposed. Applicant did not provide a site-specific geotechnical investigation for the amended CECP site, which could have addressed the potential for lateral spreading. Rather, petitioner submitted the geotechnical report previously conducted for the adjacent Desalination Project. The geotechnical report indicated that the adjoining property to the southwest was not susceptible to lateral spreading due to the depth to groundwater and the dense nature of the strata in which the groundwater occurs (CECP 2007d).

The potential for and mitigation of the effects of lateral spreading on the proposed site should be addressed in a project-specific geotechnical report, per CBC 2013 requirements and proposed Conditions of Certification **GEO-1**, **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 in soil density). The decrease in volume can result in settlement of overlying structural improvements. Nearby borings advanced for the desalination 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 2013 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 amended 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 2013 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 geotechnical 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 2013 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 amended 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 the southwest of the site 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 2013 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.

Corrosive Soils

The project site is located in a geologic environment that could potentially contain soils that are corrosive to concrete and metals. Corrosive soils are defined as having earth materials with more than 500 ppm chlorides, a sulfate concentration of 0.20 percent (i.e., 2,000 ppm) or more, a pH of less than 5.5, or an electrical resistivity of less than 1,000 ohm-centimeters.

Corrosive soil conditions may exacerbate the corrosion hazard to buried conduits, foundations, and other buried concrete or metal improvements. Corrosive soil could cause premature deterioration of underground structures or foundations. Constructing project improvements on corrosive soils could have a significant impact to the project.

The applicant did not provide a site-specific geotechnical investigation for the amended CECP site. Rather, the applicant submitted the geotechnical report previously conducted for the adjacent Desalination Project.

The potential for and mitigation of the effects of corrosive soils on the proposed site should be addressed in a project-specific geotechnical report, per CBC 2013 requirements and proposed Conditions of Certification **GEO-1**, **GEN-1**, **GEN-5** and **CIVIL-1**. Mitigation of corrosive soil conditions may involve the use of concrete resistant to sulfate exposure. Corrosion protection for metals may be needed for underground foundations or structures in areas where corrosive groundwater or soil could potentially cause deterioration. Typical mitigation techniques include epoxy and metallic protective coatings, the use of alternative (corrosion resistant) materials, and selection of the appropriate type of cement and water/cement ratio.

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). The amended CECP has been mapped as lying within Landslide Susceptibility Area 2 (LSA 2) (Tan 1995), Designation LSA 2 denotes an area marginally susceptible to landsliding. According to Tan 1995, “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” (Tan 1995). 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 30-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 amended CECP and the 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 amended CECP site. The project-specific engineering geology report should verify that landslide potential would be minimal, in accordance with the

requirements of the CBC 2013 and proposed **FACILITY DESIGN** Condition of Certification **GEN-4**.

Tsunamis and Seiches

Tsunamis are large-scale seismic-sea waves caused by offshore earthquakes, landslides and/or volcanic activity. The amended 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 three 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 impact the amended CECP site. Further, the site has been mapped to lie outside of a tsunami inundation zone (**Geology & Paleontology Figure 8**).

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. According to the city of Carlsbad South Coastal Redevelopment Plan (2000), seiches are not expected to affect areas five to ten feet above the mean water level in the Agua Hedionda Lagoon. Therefore, the elevation of the amended CECP site would render impacts from seiches negligible as well.

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 three miles of the amended CECP construction site or linear routes, although several PCC-grade aggregate pits are present within seven miles. Staff concludes there would be no impacts to geologic or mineralogic resources and no mitigation measures are necessary.

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 amended 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 sedimentary 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 two 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-8** 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 otherwise 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 chance of finding significant fossils. In other cases, the PRS can propose increased monitoring due to unexpected fossil discoveries or in response to repeated out-of-compliance incidents by the earthwork contractor.

Based upon the literature and archives search and onsite field surveys for the amended CECP, the applicant has proposed monitoring and mitigation measures to be followed during the construction of the amended 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.

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 2013 and proposed **FACILITY DESIGN** Conditions of Certification **GEN-1**, **GEN-5**, and **CIVIL-1** requirements.

Operation Impacts and Mitigation

Operation of the proposed plant facilities would 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 amended CECP would be situated in an active geologic environment. Strong ground shaking potential must be mitigated through foundation and structural design as required by CBC 2013. 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 CBC 2013, 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 licensed CECP. The potential impacts to paleontological resources due to construction activities would be mitigated as required by proposed Conditions of Certification **PAL-1** to **PAL-8**.

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 cumulative impacts to geologic, mineralogic, and paleontologic resources would be very low.

Based upon the literature and archives search and onsite field surveys for the amended CECP project, the applicant proposes monitoring and mitigation measures during the construction phase of the amended CECP. 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 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.

CONCLUSIONS

Because of its geologic setting, the site could be subject to very strong levels of earthquake-related ground shaking. While the potential for earthquake ground rupture is low, several major off-shore faults are located between two and 11 miles of the site. The significant effects of strong ground shaking on the amended CECP structures must be mitigated through structural designs required by the most recent edition of the California Building Code (CBC 2013). CBC 2013 requires that structures be designed to resist seismic stresses from anticipated maximum ground acceleration.

Due to the relative dense and granular nature of site soils, the project would not likely be subject to seismically induced soil failure. 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.

The project area is subject to inundation by tsunami, however, the project site is mapped outside of a tsunami inundation zone. U.S. Building codes generally have not addressed the subject of designing structures in tsunami zones (Reynolds 2013). FEMA's Coastal Construction Manual (FEMA P55), developed to provide design and construction guidance for structures built in coastal areas, addresses seismic loads for coastal structures and provides information on tsunami and associated loads (FEMA 2013).

Based on the sea level rise projections developed by the Sea-Level Rise Task Force of the Coastal and Ocean Working Group of the California Climate Action Team, sea level is predicted to rise a maximum of 17 inches above 2014 level by the year 2050 (CO-CAT 2013). Analysis of the effects of sea-level rise on the project is presented in the **SOIL & WATER RESOURCES** section of this document.

There are no known viable geologic or mineralogical resources at the amended CECP site. Numerous paleontological resources have been documented within three 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 are not likely, but if discovered during construction, they would be mitigated through worker training and monitoring by qualified paleontologists, as required by proposed Conditions of Certification, **PAL-1** through **PAL-8**.

Based on this information, staff concludes that the potential adverse cumulative impacts to the project facilities from geologic hazards during their design life are less than significant. Similarly, staff concludes the potential adverse cumulative impacts to potential geologic, mineralogic, and paleontologic resources from the construction, operation, and closure of the proposed project, if any, are less than significant. It is staff's opinion that the amended 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.

PROPOSED CONDITIONS OF CERTIFICATION

Staff has proposed modifications to the **GEOLOGY & PALEONTOLOGY** Conditions of Certification as shown below. (**Note:** Deleted text is in ~~strikethrough~~, new text is **bold and underlined**).

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 and in GEO-1 of this section. Proposed paleontological Conditions of Certification follow in **PAL-1** through **PAL-8**. It is staff's opinion that the likelihood of encountering paleontologic resources could be high in areas where native Pleistocene age deposits occur. Staff would consider reducing monitoring intensity, at the recommendation of the project PRS, following examination of sufficient, representative excavations that fully describe site stratigraphy.

GEO-1 **A Soils Engineering Report as required by Section 1803 of the California Building Code (CBC 2013), shall specifically include laboratory test data, associated geotechnical engineering analyses, and a thorough discussion of seismicity; liquefaction; dynamic compaction; compressible soils; corrosive soils; and tsunami. In accordance with CBC 2013, the report should also include recommendations for ground improvement and/or foundation systems necessary to mitigate these potential geologic hazards, if present.**

Verification: **The project owner shall include in the application for a grading permit a copy of the Soils Engineering Report which addresses the potential for strong seismic shaking; liquefaction; dynamic compaction; settlement due to compressible soils; corrosive soils, and tsunami, and a summary of how the results of the analyses were incorporated into the project foundation and grading plan design for review and comment by the Chief Building Official (CBO). A copy of the Soils Engineering Report, application for grading permit and any comments by the CBO are to be provided to the CPM at least 30 days prior to grading.**

PAL-1 The project owner shall provide the **compliance project manager**~~Compliance Project Manager~~ (CPM) with the resume and qualifications of its **paleontological resource specialist**~~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 (PRR),**~~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 **Qualified Professional Paleontologist**~~vertebrate paleontologist~~ as **defined**~~described~~ in the **Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources by the** Society of Vertebrate Paleontology (SVP **2010).**~~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.**

~~Paleontologic Resource Monitors~~ (PRMs) shall have the equivalent **or combination** of the following qualifications **approved by the CPM**:

- 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.

The project owner shall keep resumes on file for qualified paleontological resources monitors (PRMs). If a PRM is replaced, the resume of the replacement PRM shall also be provided to the CPM for review and approval.

Verification: ~~**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 **to the CPM, whose approval must be obtained prior to initiation of ground disturbing activities.**

(2) At least 20 days prior to ground disturbance, the PRS or project owner shall provide a letter with resumes naming anticipated **PRM's**~~monitors~~ for the project**. The letter shall state**~~, stating~~ that the identified **PRM's**~~monitors~~ meet the minimum qualifications for paleontological resource monitoring **as** required by **this**~~the~~ condition **of certification.** If additional **PRM's**~~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 **for approval** no later than one week prior to the monitor's beginning on-site duties.

(3) Prior to **any change** ~~the termination or release~~ of **the** ~~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 **the** plan and profile drawings for the utility lines would be acceptable for this purpose. The plan drawings should show the location, depth, and extent of all ground disturbances and 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) (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) ~~(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) ~~(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 **a Paleontological Resources Monitoring** and **Mitigation Plan (PRMMP) and** ~~the project owner~~ submits **the PRMMP** 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. **The PRMMP** ~~This document~~ shall be used as the basis of

discussion when on-site decisions or changes are proposed. Copies of the PRMMP shall **include all updates and** 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 **2010**~~, 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 **these conditions**~~the Conditions~~ of **certification**~~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 **sampling is needed, a description of the sampling methodology,** ~~how,~~ and how much sampling is expected to take place ~~and~~ in **which geologic**~~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 **at these locations**;

6. A discussion of procedures to be followed**: (a)** in the event of a significant fossil discovery, **(b) stopping**~~halting~~ construction, **(c)** resuming construction, and **(d)** 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**~~Conditions~~ of **certification**~~Certification~~.

Verification: At least 30 days prior to ground disturbance, the project owner shall provide a copy of the PRMMP to the CPM. **Approval of the PRMMP by the CPM shall occur prior to any ground disturbance.** 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 the project owner and the PRS shall prepare a CPM-approved Worker Environmental Awareness Program (WEAP).

~~**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 purpose of the WEAP is to train project workers to recognize paleontologic resources and identify procedures they should follow to ensure there are no impacts to sensitive paleontologic resources. The WEAP shall include:**

~~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 **stop**~~halt~~ or redirect construction in the event of a discovery or unanticipated impact to a paleontological resource;

4. Instruction that employees are to **stop**~~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.

8. **The Project Owner shall also submit the training script and, if the project owner is planning to use a video for training, a copy of the training video with the set of reporting procedures for workers to follow that will be used to present the WEAP and qualify workers to conduct ground disturbing activities that could impact paleontologic resources.**

Verification:

(1) At least 30 days prior to ground disturbance, the project owner shall submit **to the CPM for review and comment the draft**~~the proposed~~ WEAP, including the brochure **and sticker. The submittal shall also include a draft training script and, if the project owner is planning to use a video for training, a copy of the training video** with the set of reporting procedures for workers to follow.

(2) At least **15**~~30~~ days prior to ground disturbance, the project owner shall submit ~~the script and final video~~ to the CPM for approval ~~if~~ the **final WEAP and**~~project owner is planning to use a video for interim~~ training **script.**

PAL-5 No worker shall excavate or perform any ground disturbance activity prior to receiving CPM-approved WEAP training by~~(3) If~~ the **PRS, unless specifically approved by**~~owner requests an alternate paleontological trainer,~~ the **CPM.**

Prior to project kick-off~~resume~~ and **ground disturbance** ~~qualifications of~~ the **following workers**~~trainer~~ shall be **WEAP trained by** ~~submitted to~~ the **PRS in-person: project managers, construction supervisors, foremen,**~~CPM for review~~ and **all general workers involved with or who operate ground-disturbing equipment or tools. Following project kick-off** ~~approval prior to installation~~ **A WEAP certification** of **completion form shall be used** ~~an alternate trainer. Alternate trainers shall not conduct training prior~~ to **document who has received the required training** ~~CPM authorization.~~

Verification:

~~(4)~~ In the **Monthly Compliance Report** ~~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 **and/**or video) offered that month. **An example of a suitable WEAP certification complete form is**

provided below. The MCR shall also include a running total of all persons who have completed the training to date.

(1) If the project owner requests an alternate paleontological WEAP 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 WEAP training prior to CPM authorization.

PAL-6~~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 **stop**~~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**~~Conditions~~ of **certification**~~Certification~~. The PRS shall recommend corrective action to resolve the issues or achieve compliance with the **conditions**~~Conditions~~ of **certification**~~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**, when**~~where~~ construction has been **stopped**~~halted~~ because of a paleontological find.

The project owner shall ensure that the PRS prepares a summary of monitoring and other paleontological activities **that will be included in each MCR.**~~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 ten days in advance of any proposed changes in monitoring different from **that**~~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 **shall be submitted**~~submit it~~ to the CPM for ~~review and~~ approval.

The report shall include, but ~~is~~ not **be** limited to, a description and inventory of recovered fossil materials; a map showing the location of paleontological resources encountered; **and the PRS' description**~~determinations~~ of sensitivity and significance **of those**~~; 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.

PAL-8 **The project owner, through the designated PRS, shall ensure that all components of the PRMMP are adequately performed, including collection of fossil material, preparation of fossil material for analysis, analysis of fossils, identification and inventory of fossils, preparation of fossils for curation, and delivery for curation of all significant paleontological resource materials encountered and collected during project construction. The project owner shall pay all curation fees charged by the museum for fossil material collected and curated as a result of paleontological mitigation. The project owner shall also provide the curator with documentation showing the project owner irrevocably and unconditionally donates, gives, and assigns permanent, absolute, and unconditional ownership of the fossil material.**

Verification: **Within 60 days after the submittal of the PRR, the project owner shall submit documentation to the CPM showing fees have been paid for curation and the owner relinquishes control and ownership of all fossil material.**

Certification of Completion
Worker Environmental Awareness Program
Amended Carlsbad Energy Center Project (07-AFC-6C)

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.

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Cultural Trainer: _____ Signature:_____ Date: ___/___/____

PaleoTrainer: _____ Signature:_____ Date: ___/___/____

Biological Trainer: _____Signature:_____ Date:___/___/__

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GEOLOGY AND PALEONTOLGY - FIGURE 1

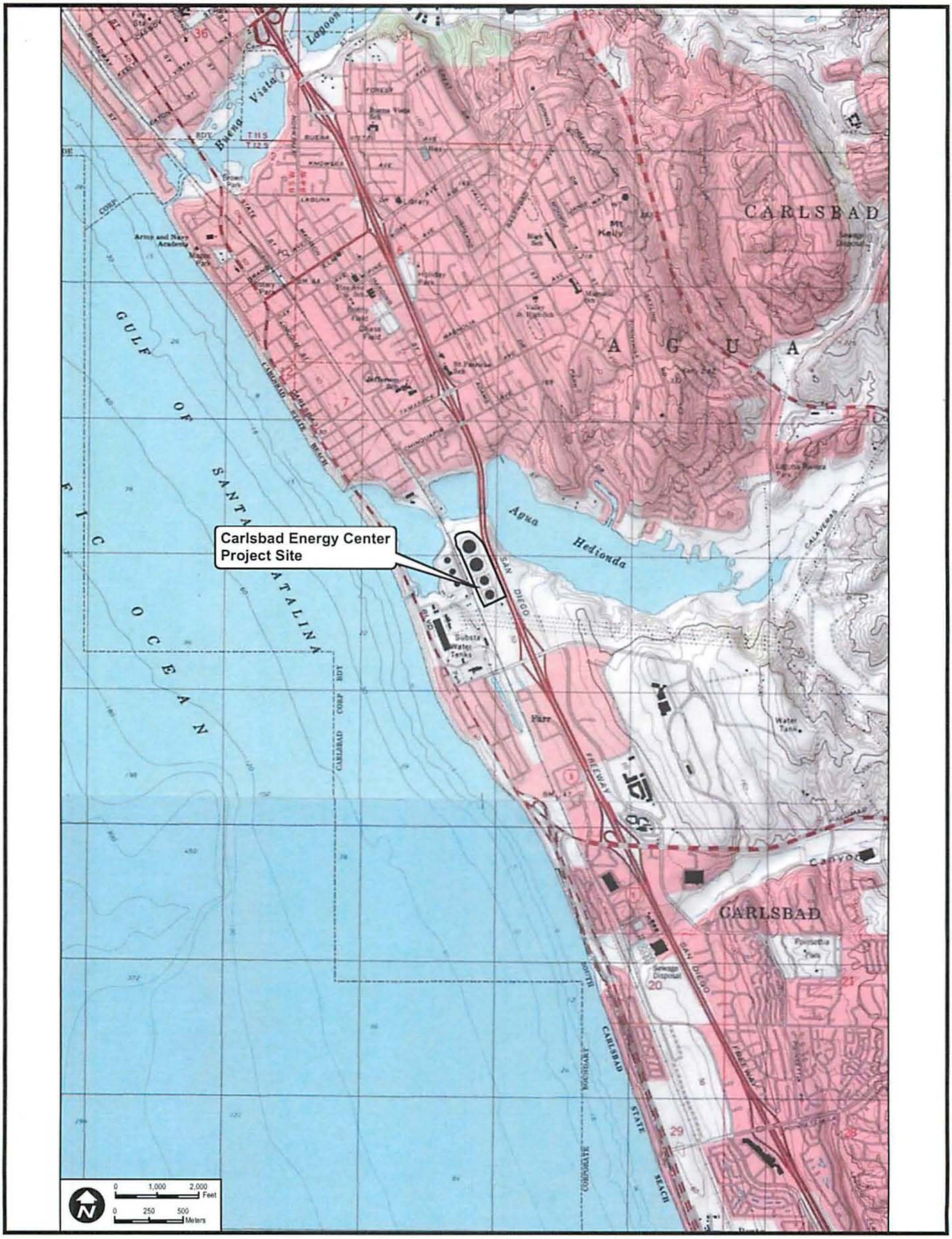
Carlsbad Energy Center Project Amendment - Regional Map

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: DUDEK 2014

GEOLOGY AND PALEONTOLGY - FIGURE 2

Carlsbad Energy Center Project Amendment - Project Location Map

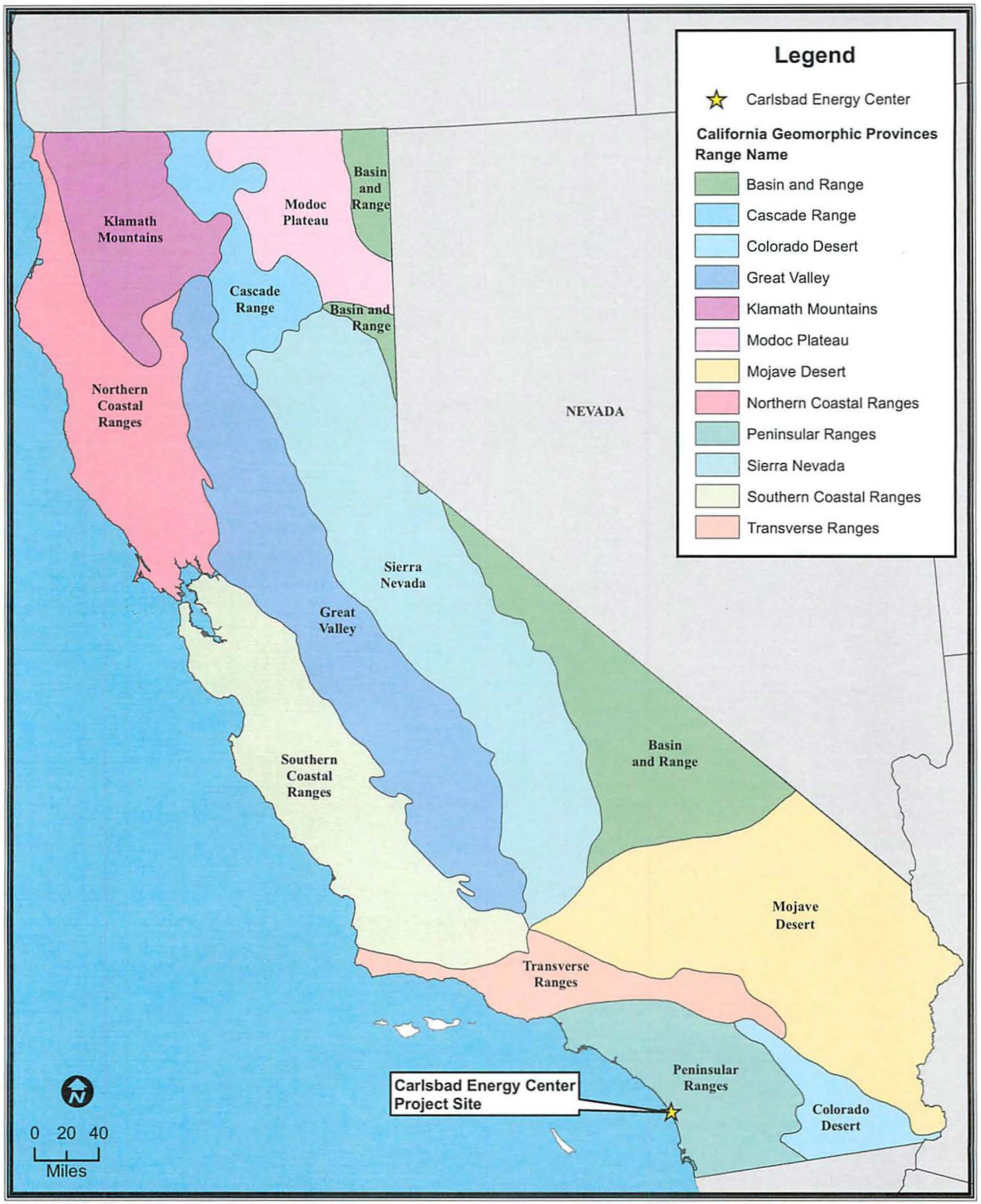


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: DUDEK 2014

GEOLOGY AND PALEONTOLOGY - FIGURE 3

Carlsbad Energy Center Project Amendment - Geomorphic Provinces

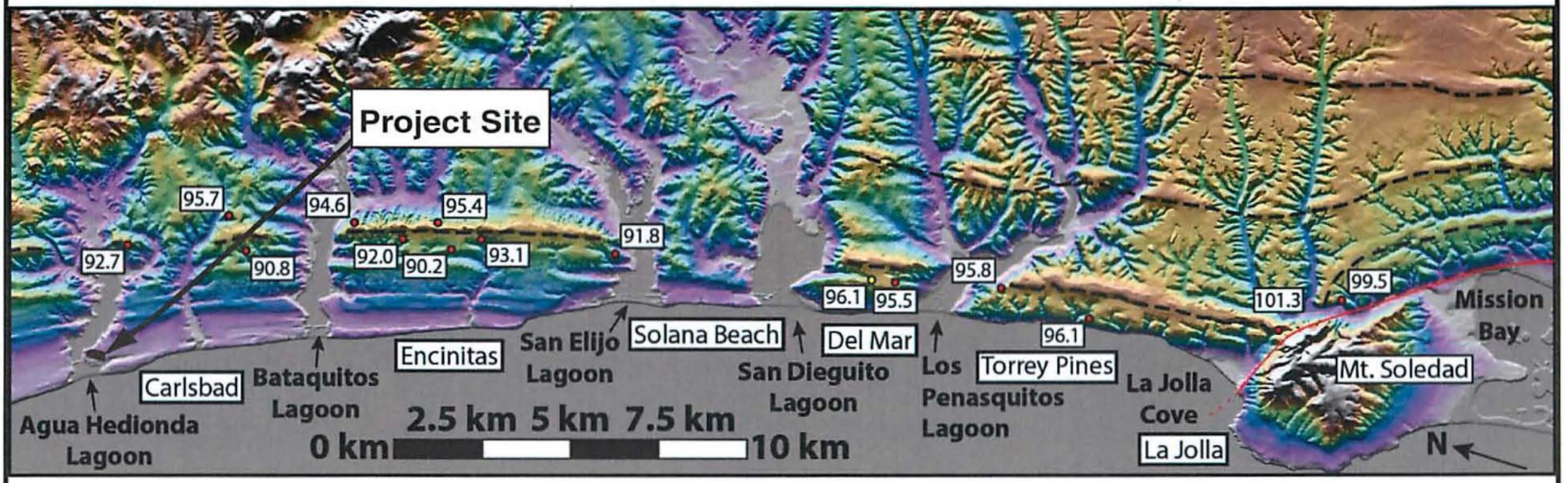


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: California Department of Conservation, California Geological Survey, 2002.

GEOLOGY AND PALEONTOLOGY - FIGURE 4

Carlsbad Energy Center Project Amendment - Emergent Terraces



Digital Elevation Model (DEM) depicting the Linda Vista suite of terrace beach ridges (dashed) that span the central San Diego County coastal zone. (Haaker 2015)

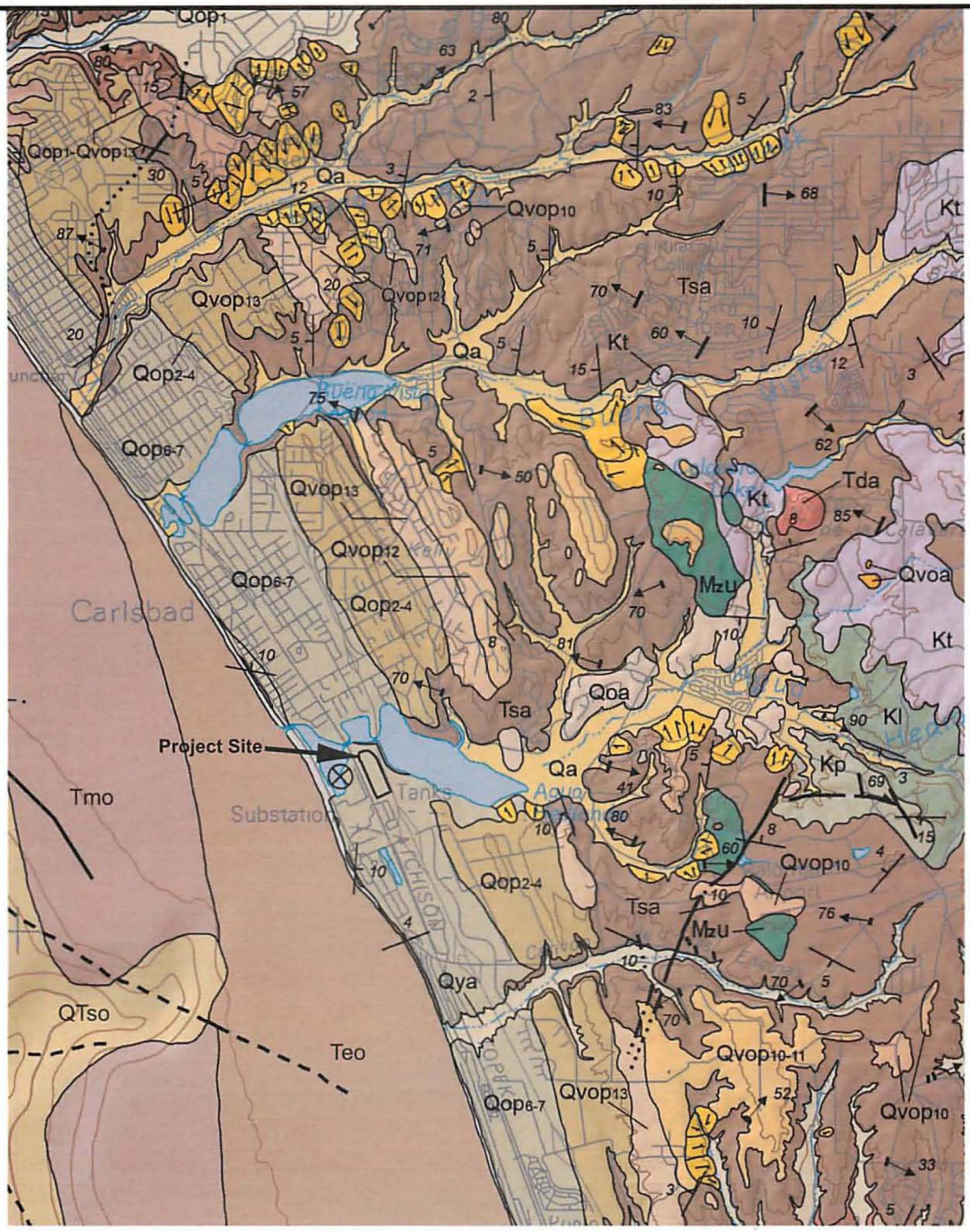
92.7

Numbers Represent Elevations in Meters at Corresponding Red Dot Locations

GEOLOGY AND PALEONTOLOGY

SOURCE: Haaker 2015

GEOLOGY AND PALEONTOLGY - FIGURE 5A
Carlsbad Energy Center Project Amendment - Regional Geology



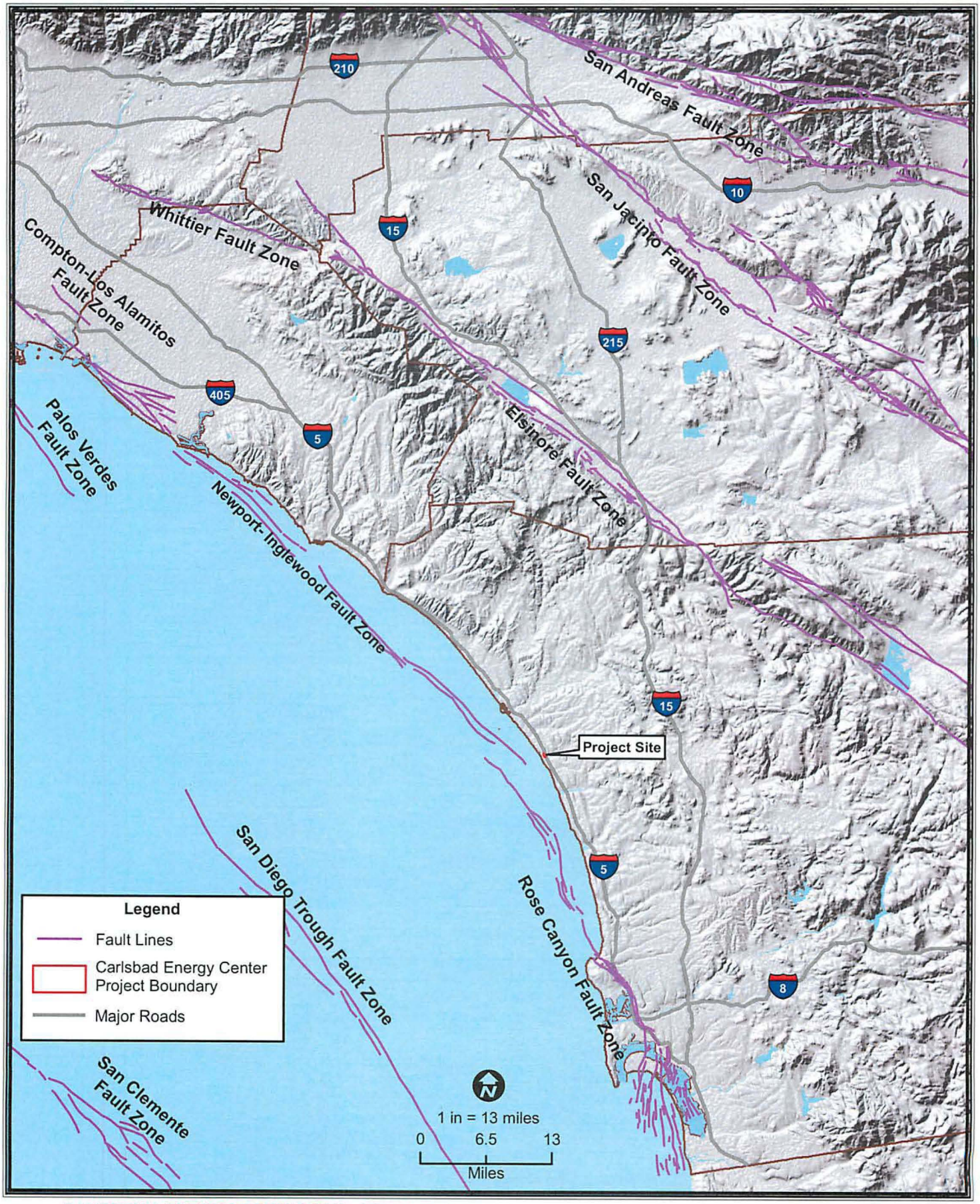
LEGEND
NOTE:
SEE
GEOLOGY AND PALEONTOLGY FIGURE 5B
FOR LEGEND

N
1 inch = Approx.
1 Mile
0 1

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION
SOURCE: California Department of Conservation- Geologic Map of the Oceanside 30' x 60' Quadrangle

GEOLOGY AND PALEONTOLOGY - FIGURE 6

Carlsbad Energy Center Project Amendment - Fault Locations

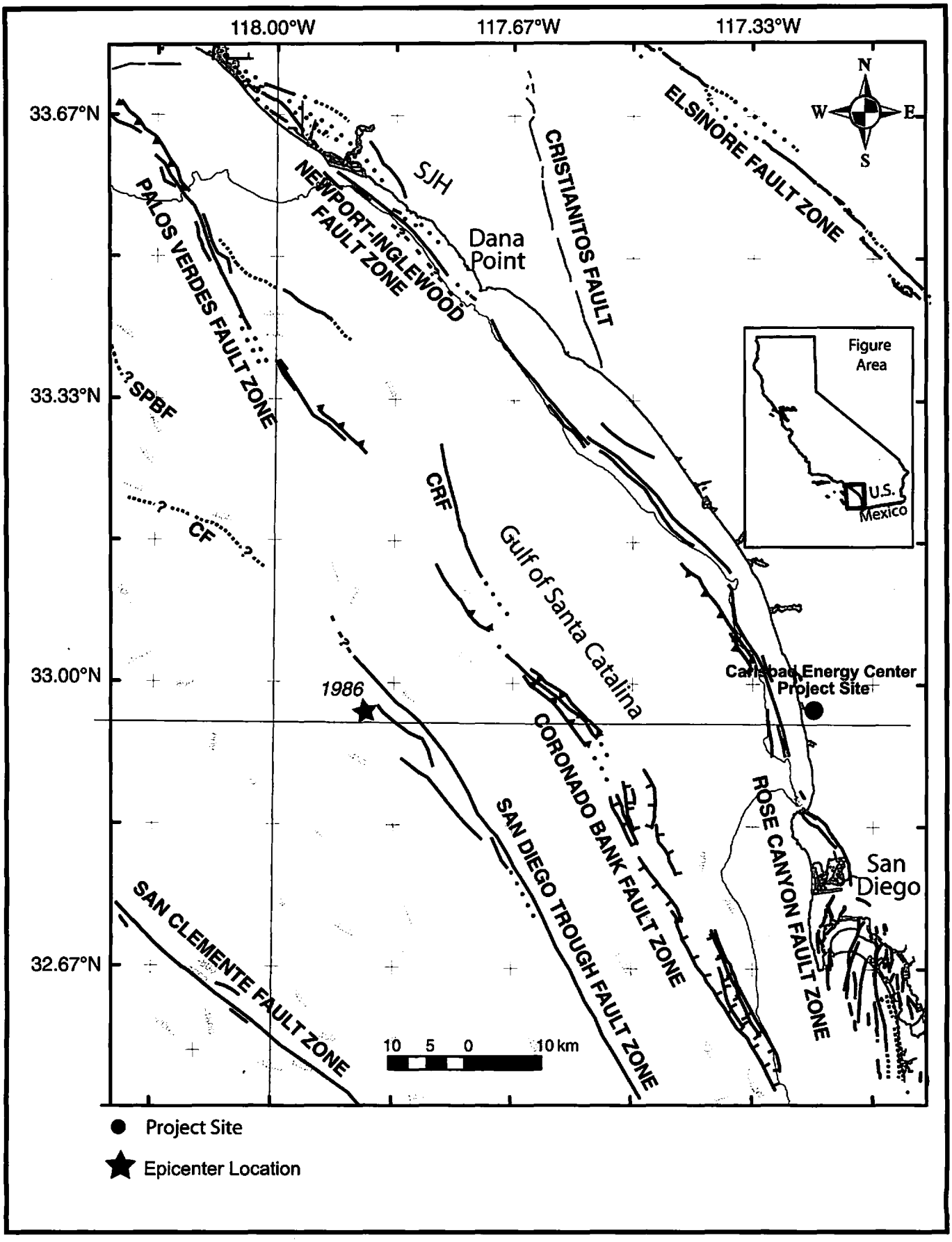


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE:California Geological Survey Seismic Hazard Assessment & Geologic Mapping Programs

GEOLOGY AND PALEONTOLOGY - FIGURE 7

Carlsbad Energy Center Project Amendment - Inner Continental Borderland Faults

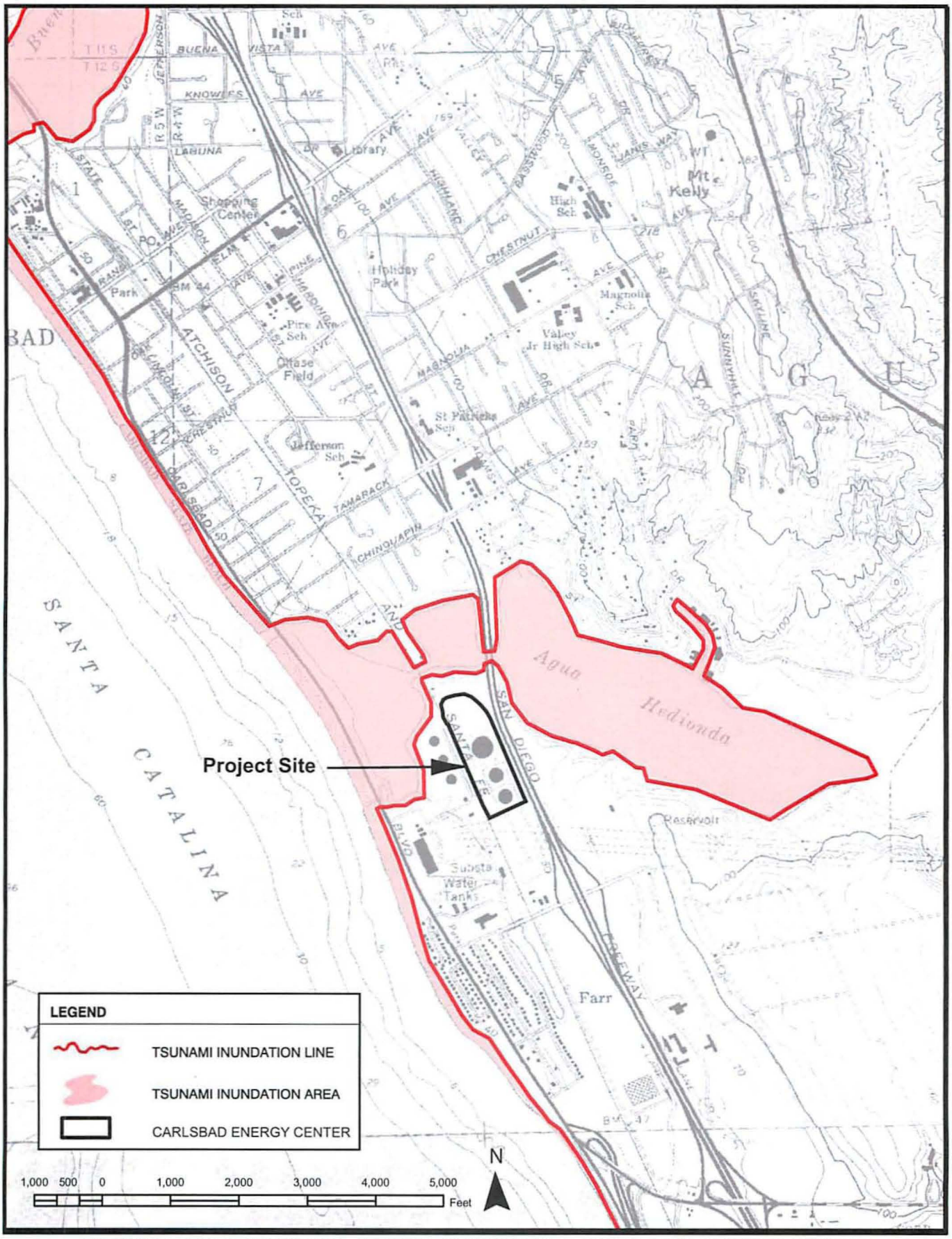


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

Modified from: Recent Faulting in the Gulf of Santa Catalina: San Diego to Dana Point (Ryan 2009)

GEOLOGY AND PALEONTOLOGY - FIGURE 8

Carlsbad Energy Center Project Amendment - Tsunami Inundation Map



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: State of California, County of San Diego - 2009 Tsunami Inudation Map for Emergency Planning, Oceanside/San Luis Rey Quadrangle, Dated June 1, 2009

POWER PLANT EFFICIENCY

Edward Brady and Shahab Khoshmashrab

SUMMARY OF CONCLUSIONS

The amended Carlsbad Energy Center project (amended CECP) would generate 632 MW (nominal net output) of peaking electric power at an overall project fuel efficiency of 43 percent lower heating value (LHV[1]) at maximum full load and average annual ambient conditions[2]. While it would consume substantial amounts of energy, it would do so in a sufficiently efficient manner to satisfy the project's objectives of producing peak load electricity and ancillary load-following services. 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.

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 amended CECP would result in significant adverse impacts on the environment, as defined in the California Environmental Quality Act (CEQA). If the Energy Commission finds that the amended 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 fully evaluate the project in this regard, this analysis:

- Examines whether the facility would likely present any adverse impacts upon energy resources;
- Examines whether these adverse impacts are significant; and if so,
- Examines whether feasible mitigation measures or alternatives 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.

[1] LHV is low heating value, or a measurement of the energy content of a fuel correcting for post-combustion water vapor.

[2] At site average annual ambient temperature of 60.3°F and relative humidity of 70 percent (LL 2014d, § 2.0, Footnote 3)

PROJECT DESCRIPTION

The petitioner proposes to modify the project licensed by the Energy Commission (licensed CECP) by reconfiguring the project to include six simple cycle LMS100 natural gas-fired combustion turbine generators (also referred to as gas turbines, combustion turbines, or CTGs), instead of the two combined cycle units approved in the licensed CECP Commission Final Decision (CEC2012a) (Final Decision). For more details and specifics regarding the proposed modifications to the licensed CECP sought by the petitioner, please see the **PROJECT DESCRIPTION** section of this Preliminary Staff Assessment (PSA).

SETTING

The petitioner proposes to construct and operate the 632-MW (nominal net output) simple cycle, quick-start[3] amended CECP, providing peaking and load following power to the San Diego area (LL 2014d, § 2.1.2). The project would consist of six General Electric (GE) LMS100 CTGs and ancillary equipment (LL 2014d, §§ 2.3.1, 2.3.5).

Natural gas would be delivered to the amended CECP via a 20-inch-diameter pipeline from an existing San Diego Gas & Electric (SDG&E) high-pressure, natural gas pipeline (Line TL 2009, "Rainbow Line") (CEC 2014a, §§ 2.0, 2.1.6, 4.0). Natural gas would flow through the gas metering and filtration stations and finally through the natural gas compressors to boost gas pressure before injection into the CTGs.

ASSESSMENT OF IMPACTS

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE OF ENERGY RESOURCES

CEQA guidelines state that the environmental analysis "…shall describe feasible measures which could minimize significant adverse impacts, including where relevant, inefficient and unnecessary consumption of energy" (California Code of Regulations, title 14, §15126.4[a][1]). Appendix F of the guidelines further suggests consideration of such factors as the project's energy requirements and energy use efficiency; its effects on local and regional energy supplies and energy resources; its requirements for additional energy supply capacity; its compliance with existing energy standards; and any alternatives that could reduce the wasteful, inefficient, and unnecessary consumption of energy (California Code of Regulations, title 14, §15000 et seq., Appendix F).

The inefficient and unnecessary consumption of energy, in the form of non-renewable fuels such as natural gas and oil, constitutes an adverse environmental impact. An adverse impact can be considered significant if it results in:

- Adverse effects on local and regional energy supplies and energy resources;

[3] The LMS100 machines to be employed in this project can achieve full load in ten minutes (LL 2014d, § 2.3.5; GE 2008).

- 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 thermal power plant large enough to fall under Energy Commission siting jurisdiction (50 MW or greater), by definition, consumes large amounts of energy. At average annual ambient conditions, amended CECP would burn natural gas at a maximum rate of approximately 5,323 million Btu[4] per hour LHV (LL 2014d, § 2.3.5). This is a substantial rate of energy consumption that could potentially impact energy supplies (See **ADVERSE EFFECTS ON ENERGY SUPPLIES AND RESOURCES** below for further discussion). Under typical ambient conditions, electricity would be generated at a full load efficiency of approximately 43 percent LHV (LL 2014d, § 2.3.5). This efficiency level compares favorably with the average fuel efficiency of a typical simple cycle power plant.

ADVERSE EFFECTS ON ENERGY SUPPLIES AND RESOURCES

The petitioner has described its sources of supply of natural gas for the project (LL 2014d, §§ 2.3.5, 4.0). Natural gas for the amended CECP would be supplied from an existing SDG&E natural gas transmission pipeline (Line TL 2009, “Rainbow Line”). The SDG&E natural gas system has access to gas from the Rocky Mountains, Canada and the southwest. This represents a resource of considerable capacity. Staff concludes that there would be adequate natural gas supply and pipeline capacity to meet the project’s needs.

ADDITIONAL ENERGY SUPPLY REQUIREMENTS

Natural gas would be delivered to the project site via a new natural gas pipeline that would be connected to an existing SDG&E natural gas transmission pipeline (LL 2014d, § 2.3.5). This is a resource with adequate delivery capacity for this project. SDG&E has confirmed its system’s adequate capacity to supply the project; a will-serve letter is included in Appendix 4A of the petition (LL 2014d). The amended CECP would not require additional capacity since regional supplies are currently plentiful.

COMPLIANCE WITH ENERGY STANDARDS

No standards apply to the efficiency of the amended CECP or other non-cogeneration projects.

ALTERNATIVES TO REDUCE WASTEFUL, INEFFICIENT AND UNNECESSARY ENERGY CONSUMPTION

The amended CECP could create significant adverse impacts on energy resources if alternatives reduced the project’s use of fuel. The evaluation of alternatives to the project that could reduce wasteful, inefficient, or unnecessary energy consumption first requires examination of the project’s energy consumption. Project fuel efficiency, and

[4] British thermal units

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 power.

Project Configuration

The amended CECP would be configured as six independent simple cycle power trains in parallel, in which electricity is generated by six CTGs (gas turbines) (LL 2014d, §§ 2.0, 2.1.2, 2.1.4). This configuration, with its short start-up time and fast ramping[5] capability, is well suited to providing peaking power.

A gas turbine operates most efficiently at full load power output and its efficiency drops at part load power output. When the project is required to operate at part load, one or more gas turbines can be shut down, allowing the remaining machine(s) to operate at full load at optimum efficiency, rather than operating more machines at a less efficient part load.

Equipment Selection

Modern gas turbines embody the most fuel-efficient electric generating technology available today. The amended CECP would employ six GE LMS100 modern gas turbines. This model of the LMS100[6] is nominally rated at 103.5 MW at a fuel efficiency of 43.6 percent (GTW 2014).

Alternative machines that can meet the project's objectives are the LM6000 SPRINT, FT8 TwinPac, and the SGT-800, which are aeroderivative machines adapted from General Electric, Pratt & Whitney, and Siemens Power Generation aircraft engines, respectively.

The General Electric LM6000PC SPRINT gas turbine in a simple cycle configuration is nominally rated at 50.8 MW and 40.3 percent efficiency LHV at ISO conditions[7] (GTW 2014).

The Pratt & Whitney FT8 TwinPac gas turbine in a simple cycle configuration is nominally rated at 51.2 MW and 38.3 percent efficiency LHV at ISO conditions (GTW 2014).

The Siemens SGT-800 gas turbine in a simple cycle configuration is nominally rated at 47.5 MW and 37.7 percent efficiency LHV at ISO conditions (GTW 2014).

See **Efficiency Table 1** below.

[5] Ramping is increasing and decreasing electrical output to meet fluctuating load requirements.
[6] Amended CECP would employ LMS100PA machines with single annular combustors equipped with water injection to control oxides of nitrogen.
[7] ISO (International Organization for Standardization): In this case, ISO Standard 27.040 for measurement of gas and steam turbine capacity. These standard conditions are 15°C (59°F), 60 percent relative humidity, and one atmosphere of pressure (equivalent to sea level).

Efficiency Table 1 – Simple Cycle Comparison at ISO Conditions

Machine	ISO Rated Net Output[8] (MW)	ISO Efficiency (LHV)
GE LMS100PA	**103.2**	**43.6 %**
GE LM6000PC SPRINT	50.8	40.3 %
P & W FT8 TwinPac	51.2	38.3 %
Siemens SGT-800	47.5	37.7 %

Source: GTW 2014

As seen in **Efficiency Table 1** above, the LMS100 enjoys a fair advantage in fuel efficiency over these alternative machines (especially the FT8 TwinPac and SGT-800). Staff concludes that in terms of thermal efficiency, the GE LMS100 is an appropriate choice of machine for the amended CECP.

Efficiency of Alternatives to the Project

Alternative Generating Technologies

For purposes of this analysis, staff considered solar technology, other fossil fuels, nuclear, biomass, hydroelectric, wind, and geothermal technologies as alternative generating technologies for the amended CECP. Due to regulatory prohibitions, nuclear technology was rejected. Biomass, hydroelectric, geothermal, wind, and solar technologies were ruled out due to the limitations on the availability of these energy resources in the project area and/or their unavailability all hours of the day. Given the project objectives, location, and the commercial availability of the above technologies, staff believes that the petitioner's selection of a natural gas-burning technology is reasonable.

Natural Gas-Burning Technologies

Fuel consumption is one of the most important economic factors in selecting an electric generator; fuel typically accounts for over two-thirds of the total operating costs of a fossil-fired power plant. Under a competitive power market system, where operating costs are critical in determining the competitiveness and profitability of a power plant, the plant owner is thus strongly motivated to purchase fuel-efficient machinery.

Although power plant efficiency is recognized as an important characteristic, it is not exclusive. The licensed CECP limits the project's start-up and shutdown cycles to 300 per year. The petitioner proposes to increase the start-up and shutdown cycle requirements to 400 per year for the amended CECP. This requirement effectively shifted the project's start-up profile toward a quicker and more responsive plant system. The amended CECP's simple cycle configuration suits the requirements outlined in the petition, providing peaking power at a fast ramping rate, and reaching plant-wide full-load operation in less time than the combined cycle system proposed in the licensed CECP. Although the combined cycle units proposed in the licensed CECP would demonstrate a higher full load efficiency than the simple cycle units proposed in the amended CECP (48 percent versus 43 percent), these simple cycle units, with their

[8] ISO rated MW values are used here because site-specific values are not available for the comparable systems, such as the LM6000 SPRINT, FT8 TwinPac, and the SGT-800 machines. The 103.2 MW rating used here for the GE LMS100 machine, thus, does not reflect the site-specific climatic conditions that result in 632 MW plant wide (105.3 MW x 6 machines).

faster ramping rate capability would be more suitable to respond to the project's start-up requirements than the approved combined cycle units.

Inlet Air Cooling

Other alternatives include gas turbine inlet air cooling methods.[9] 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 minor.

Given the climate at the project site (mild summers) and the relative lack of clear superiority of one system over another, staff believes that the applicant's choice of an evaporative gas turbine inlet air cooling system (LL 2014d, § 2.1.4) would have no significant adverse energy impacts.

In conclusion, the project configuration (simple cycle) and generating equipment (LMS100) chosen represent a sufficiently efficient combination to satisfy the project objectives identified in the petition (LL 2014d, § 1.6). There are no alternatives that could significantly reduce energy consumption.

CUMULATIVE IMPACTS

No nearby projects have been identified that could potentially combine with the amended CECP to create cumulative impacts on natural gas resources. Note that the SDG&E natural gas supply system draws from extensive supplies originating in the Rocky Mountains, in the southwest, and in Canada. Staff concludes that the SDG&E system is adequate to supply the project without adversely impacting its other customers.

CONCLUSIONS

The project would generate 632 MW (nominal net output) of peaking electric power at an overall project fuel efficiency of 43 percent LHV at maximum full load and average annual ambient conditions. While it would consume substantial amounts of energy, it would do so in a sufficiently efficient manner to satisfy the project's objectives of producing peak load electricity and ancillary load-following services. 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.

[9] A gas turbine's power output decreases as ambient air temperatures rise. Cooling the air as it enters the machine increases its power output.

PROPOSED CONDITIONS OF CERTIFICATION

No conditions of certification are proposed.

REFERENCES

CEC 2012a – California Energy Commission (TN66185). Commission Decision on the Carlsbad Energy Project Application for Certification, dated June 1, 2012. Submitted July 11, 2012.

CEC2014a – California Energy Commission (TN202392). Notice of Receipt Petition to Amend Final Decision for the Carlsbad Energy Center Project. Submitted 05/29/2014.

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POWER PLANT RELIABILITY

Shahab Khoshmashrab and Jacquelyn Record

SUMMARY OF CONCLUSIONS

Based on other power plant projects with similar technologies, the Carlsbad Energy Center Project Amendment (amended CECP) would be expected to demonstrate an equivalent availability factor[1] between 95 to 98 percent, which is the industry norm.

Based on a review of the Petition to Amend (petition) (LL2014d), a water will-serve letter is needed before staff can conclude that the source of water supply is adequate to yield reliable operation of this project. Upon receiving this letter, California Energy Commission staff (staff) can then conclude that the amended CECP would operate in a manner consistent with industry norms for reliable operation, and that the equivalent availability factor of 95-98 percent would be achievable.

INTRODUCTION

In this analysis, staff addresses the potential reliability issues of the amended CECP to determine if the power plant is likely to be built in accordance with typical industry norms for reliable power generation. Staff uses these norms as a benchmark because they ensure that the resulting project would not be likely to degrade the overall reliability of the electric system it serves (see Setting, below).

The scope of this power plant reliability analysis covers these benchmarks:

- equipment availability and plant maintainability;
- fuel and water availability; and,
- power plant reliability in relation to natural hazards.

Staff uses the above benchmarks as appropriate industry norms to evaluate the project's reliability and determine if the expected availability factor is achievable.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

No specific federal, state, or local/county laws, ordinances, regulations, or standards (LORS) apply to the reliability of this project.

PROJECT DESCRIPTION

The project owner, Carlsbad Energy Center LLC (petitioner), proposes to modify the project licensed by the Energy Commission (licensed CECP) by re-configuring the project to include six simple-cycle LMS100 natural gas-fired combustion turbine generators (CTGs), instead of two combined cycle units approved in the licensed CECP

[1] Equivalent availability factor is the percentage of time a power plant is available to generate electrical power, and reflects the probability of planned and unplanned (forced) outages.

2012 Final Decision. Refer to the **PROJECT DESCRIPTION** section of this Preliminary Staff Assessment (PSA) for a detailed discussion of the proposed project design.

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 (CAISO), which purchase, dispatch, and sell electricity throughout the state. How the CAISO and other control area operators ensure system reliability is an evolving process; new protocols are being developed and put in place to ensure sufficient reliability with the integration of renewable power sources in the competitive, market system.

Historically, one of the primary mechanisms used to ensure system reliability was the CAISO's "Reliability Must-Run", or RMR, power purchase agreement. In recent years, the means of ensuring system reliability has shifted from RMR agreements to the California Public Utilities Commission's (CPUC's) Resource Adequacy (RA) program. Nearly all RAs have "Participating Generator Agreement", or PGA, to ensure an adequate supply of reliable power. PGA allows the CAISO operators to invoke "command and control" authority on PGA resources and forces resources to conform to the CAISO Tariff.

The CAISO also requires that power plants selling ancillary services fulfill certain requirements, including:

- filing periodic reports on plant reliability;
- reporting all outages and their causes; and
- scheduling all planned maintenance outages with the CAISO.

The above mechanisms to ensure adequate power plant reliability have apparently been developed with the assumption that individual power plants competing to sell power into the system will exhibit reliability levels similar to those of power plants of past decades. Staff recommends that power plant owners continue to build and operate their projects to the industry's current level of reliability.

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 (California Code of Regulations, Title 20, § 1752(b)(2)). Staff concludes that a project is acceptable if it does not degrade the reliability of the utility system to which it is connected. This will be the case if a project is at least as reliable as other power plants on that system.

The equivalent availability factor of a power plant is the percentage of time it is available to generate electrical 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. 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, power plant maintainability with scheduled maintenance outages, fuel and water availability, and resistance to natural hazards. Staff examines these factors for the amended CECP and compares them to industry norms. If they compare favorably for this project, staff will then conclude that the amended CECP would be as reliable as other power plants on the electric system and would not degrade system reliability. Please see the analysis below.

The project is expected to achieve an equivalent availability factor between 95 to 98 percent. It is expected that the amended CECP would operate mainly to support dispatch service in response to customer demands, as opposed to base load mode (LL2014d, § 2.3.3.1). The operation of the amended CECP is limited to no more than 2,700 hours per CTG (combustion turbine generator) in a year, which would yield an annual capacity factor of approximately 30 percent (based on 8,760 hours in a year). Please note that annual capacity factor is a measure of how much electricity a power plant is expected to actually produce during the year as compared to the maximum power it could produce at continuous full power operation during the same period of time. The 632 megawatt (MW) (nominal net output) amended CECP with operating flexibility (that is, the ability to start up, shut down, turn down, and provide load following, when needed) would allow the system operator to adapt the power plant's output to changing conditions in the energy and ancillary services markets in real time.

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 petitioner describes a quality assurance/quality control (QA/QC) program that is typical of the power industry (LL2014d, § 2.3.4). Equipment would be purchased from qualified suppliers based on technical and commercial evaluations. Suppliers' personnel, production capability, past performance, QA/QC programs, and quality history would be evaluated. The project owner would perform receipt inspections, test components, and administer independent testing/commissioning contracts. Also, a power plant operation and maintenance program would be implemented during initial power plant startup (LL2014d, § 2.3.4.2). Staff expects that implementation of these programs would result in standard reliability of design, operation, and construction.

PLANT MAINTAINABILITY

Equipment Redundancy

A generating facility 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. Because the project consists of six LMS100 CTGs operating in parallel as independent generating trains, the failure of a single train cannot disable more than one train, which allows the power plant to continue to generate, but at reduced output. Power plant ancillary systems are also designed with adequate redundancy to ensure their continued operation if equipment fails. Staff concludes 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 project owner would base the project's maintenance program on those recommendations (LL2014d, § 2.3.4.2). Historically, power plant owners' standard approach in employing maintenance programs has resulted in an acceptable level of reliability. Because power plant equipment is costly to repair or replace, and the length of time it takes for major repairs or replacements can sometimes result in lengthy power plant shutdowns, power plant owners are strongly motivated to follow equipment manufacturers' maintenance recommendations to avoid such issues. The maintenance program would encompass both preventive and predictive maintenance techniques. When maintenance is needed, maintenance outages would probably be planned for periods of low electricity demand. Staff concludes 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 water for cooling or process use 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 power plant could be curtailed, threatening both the power supply and the economic viability of the power plant.

Fuel Availability

Natural gas would be delivered to the amended CECP via a 20-inch-diameter pipeline from an existing San Diego Gas & Electric (SDG&E) high-pressure, natural gas pipeline. This pipeline would extend to the facility from the existing SDG&E natural gas pipeline (Line TL 2009, "Rainbow line") located adjacent to the amended CECP site (LL2014e, §§ 2.0, 2.1.6, 4.0). SDG&E has confirmed its system's adequate capacity to supply the project; a will-serve letter is included in Appendix 4A of the petition, SDG&E's natural gas system represents a resource of considerable capacity and offers access to adequate supplies of gas. This natural gas comes from resources in the Southwest, Canada, and the Rocky Mountains. Staff concludes that there would be adequate natural gas supply and pipeline capacity to meet the project's needs.

Water Supply Reliability

The petitioner proposes to use reclaimed water provided by the city of Carlsbad for power plant service needs, cooling system makeup, combustion turbine injection, combustion turbine evaporative cooling makeup, and secondary fire protection. However, the petitioner has not furnished a will-serve letter from the city confirming that it would provide this water for the project. Staff requested this letter in a data request as a part of Data Request Set 4 docketed on October 28, 2014 (CEC2014tt). To date, the petitioner has not responded to this data request. Therefore, at this time, due to the lack of a will-serve letter, staff cannot conclude that the project's source of water supply is reliable. For further discussion of water supply, refer to the **SOIL & WATER RESOURCES** section of this PSA.

POWER PLANT RELIABILITY IN RELATION TO NATURAL HAZARDS

Natural forces can threaten the reliable operation of a power plant. Seismic shaking (earthquakes), flooding, and tsunami could present credible threats to the project's reliable operation.

Seismic Shaking

The principal natural hazard associated with the amended CECP site is earthquakes. The site is located in Seismic Risk Zone 4 (LL2014d, § 2.3.2); refer to the **GEOLOGY & PALEONTOLOGY** section of this PSA. The project would be designed and constructed to the latest appropriate engineering LORS. A design-level geotechnical investigation is required for the project by the 2013 California Building Code (CBC 2013), and standard engineering design requirements would be applied to mitigate strong seismic shaking, liquefaction and potential excessive settlement due to dynamic compaction. To ensure this, staff has proposed Condition of Certification **GEO-1** in the **GEOLOGY & PALEONTOLOGY** section of this PSA, and Conditions of Certification **GEN-1**, **GEN-5**, and **CIVIL-1** in the **FACILITY DESIGN** section of this PSA.

Compliance with current seismic design LORS represents an upgrading of performance during seismic shaking compared to older facilities since these LORS have been 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 power plants in the electric power system. In light of the general historical performance of California power plants and the electrical system in seismic events, and considering the project will be constructed to comply with the latest applicable engineering LORS, staff has no special concerns with the power plant's functional reliability during seismic events.

Flooding

According to the Federal Emergency Management Agency (FEMA), the project site is outside the 100-year floodplain (LL2014d § 2.3.2.1). A drainage and grading plan, and an erosion and sediment control plan would be implemented (see Condition of Certification **CIVIL-1** in the **FACILITY DESIGN** section of this PSA). In light of this, staff believes there are no special concerns with power plant functional reliability due to flooding.

Tsunami

U.S. building codes generally have not addressed the subject of designing structures in tsunami zones (Reynolds 2013). The FEMA's Coastal Construction Manual (FEMA 2013), developed to provide design and construction guidance for structures built in coastal areas, addresses seismic loads for coastal structures and provides information on tsunami and associated loads. This manual cites ASCE Standard 7-10, *Minimum Design Loads for Buildings and Other Structures* as the reference to be consulted during design of structures. ASCE 7-10 is codified in CBC 2013. Although the amended CECP project site is not subject to inundation by tsunami, it would be designed and constructed to CBC 2013 (see **GEN-1** in the **FACILITY DESIGN** section of this PSA).

For further discussion, refer to the **GEOLOGY & PALEONTOLOGY** of this PSA.

COMPARISON WITH EXISTING FACILITIES

Industry statistics for equivalent availability factors 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 2007 through 2011 (NERC 2011):

For gas turbine units 50 MW and larger:

Availability Factor = 91.8 percent

The project's combustion turbine models have been on the market for several years and are expected to exhibit high availability. The project is expected to have an annual equivalent availability factor of 95 to 98 percent, which appears reasonable when compared with NERC figures for similar power plants throughout North America (91.8 percent). In fact, these machines can well be expected to outperform the fleet of various, mostly older combustion turbines that make up NERC statistics. Additionally, because the power plant would consist of six independent power generating trains, maintenance can be scheduled during times of the year when the full power plant output is not required to meet market demand, which is typical of industry standard maintenance procedures. The expected power plant availability, therefore, is realistic. Stated procedures for assuring the design, procurement, and construction of a reliable power plant are consistent with industry norms, and staff believes they would ultimately produce an adequately reliable power plant.

CONCLUSION

Based on other power plant projects with similar technologies, the amended CECP would be expected to demonstrate an equivalent availability factor between 95 to 98 percent, which is the industry norm.

Based on a review of the petition, a water will-serve letter is needed before staff can conclude that the source of water supply is adequate to yield reliable operation of this project. Upon receiving this letter, staff can then conclude that the amended CECP

would operate in a manner consistent with industry norms for reliable operation, and that the equivalent availability factor of 95-98 percent would be achievable.

PROPOSED CONDITIONS OF CERTIFICATION

No conditions of certification are proposed.

REFERENCES

CBC 2013 — California Code of Regulations, Title 24, California Building Standards Code [CBSC], Part 2, California Building Code (CBC), 2013.

CEC2014tt – California Energy Commission (tn: 203263). Data Request Set 4, Soil & Water (Nos. 86-90), TSE (91-92), dated October 28, 2014. Submitted 10/28/2014.

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TRANSMISSION SYSTEM ENGINEERING

Ajoy Guha, P. E. and Mark Hesters

SUMMARY OF CONCLUSIONS

This discussion addresses the proposed interconnecting facilities for the amended Carlsbad Energy Center Project (amended CECP), including the 230 kV and 138 kV switchyards, the generator tie lines to the existing 138 kV and 230 kV Encina switchyards and their terminations, and San Diego Gas and Electric (SDG&E) reliability network upgrades and changes required for the project. The amended CECP would meet all industry standards and good utility practices, and comply with applicable engineering laws, ordinances, regulations, and standards (LORS).

Interconnection studies performed by the California Independent System Operator indicate that the transmission system impacts to the California grid could be mitigated by operating procedures and transmission line projects in the SDG&E annual plan. Therefore the proposed project can be reliably connected to the SDG&E grid.

The amended CECP would conform to applicable LORS upon satisfactory compliance with the staff recommended conditions of certification.

INTRODUCTION

The Transmission System Engineering (TSE) analysis examines whether or not the facilities associated with the proposed interconnection conform 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 proposed to satisfy 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. As proposed, the amended CECP would interconnect to the SDG&E transmission network and require 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 its Tariffs, the California ISO will determine the "need" for transmission additions or upgrades downstream from the interconnection point to ensure reliability of the transmission grid. The California ISO will, therefore, review the SIS performed by SDG&E and/or any third party, and 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 to execute a Large Generator Interconnection Agreement (LGIA) with the project owner and subsequently perform an operational study/procedure examining the impacts of the project on the grid based on the expected date of operation. 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. 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 petioner has proposed interconnection of the amended CECP simple-cycle Units 10 and 11 at the existing SDG&E Encina 138 kV switchyard, and amended CECP simple-cycle Units 6-9 at an expanded SDG&E Encina 230 kV switchyard, both located within the site of the Encina Power Station (EPS) property. Located at the coast line of the city of Carlsbad, the EPS has five existing generating units with a total 965 MW generation capacity. The EPS Units 1, 2, 3 and 4, with 620 MW generation output, are connected to the existing SDG&E Encina 138 kV switchyard, and the 345 MW Unit 5 is connected to the existing SDG&E Encina 230kV switchyard. Units 1, 2 and 3 are vintage gas-fired steam units about 50 years old, and Units 4 and 5 were commissioned in the mid to late-1970's.

PROJECT DESCRIPTION

The amended CECP project site would have three switchyards. The CTG Units 6 & 7 and Units 8 & 9 will be installed in the 13.8/230 kV switchyards A & B respectively, which would be located side by side at the northeastern side of the plant site. CTG Units 10 & 11 will be installed in the 13.8/138 kV switchyard C, which would be located on the southeastern side of the plant site (LL2014d, pages 3-2 and 3-3).

CECP SWITCHYARDS AND INTERCONNECTION FACILITIES:

Besides two concealed GE CTG gen units with auxiliaries, the amended CECP switchyards would contain the following:

a. Two concealed steel frames, one for each CTG unit. Each concealed steel frame would contain 13.8 kV interconnection facilities between the CTG 13.8 kV terminals and the 13.8 kV insulators of the outdoor generator step-up (GSU) transformer.

b. Two outdoor 13.8/230 kV or 13.8/138 kV GSU transformers, one for each CTG unit.

c. Two steel H-pole gen outlet line take-off structures, one each for connection with the high side (230 kV/138 kV) of each GSU transformer.

A concealed steel frame containing 13.8 kV interconnection facilities would be attached with a GE CTG unit's steel frame on one end and with the GSU transformer's 13.8 kV terminal insulators on the other end. Each H-pole take-off structure would connect to the high side (230 kV/138 kV) of a GSU transformer at one end and with the Gen outlet line with metering at the other end (LL2014d, Section 3).

CECP Units 6 and 7: Switchyard A and Outlet Line

According to the latest one-line electrical diagram of the switchyards (LL2014vv, Figure DR 21-1), each CTG would be connected to its own dedicated 76/101/127 MVA, 13.8/230 kV generator step-up (GSU) transformer with a specified impedance of 9.0 percent @76 MVA and 1,200 Amp circuit breakers (LL2014vv, Figure DR 21-1).H-pole Take-off structures and Gen outlet line

In switchyard A, two steel H-pole structures would be installed near the eastern fence line of the switchyard and along the proposed right of way (ROW) of the 230 kV north-south gen tie line. Each of the steel H-pole structures, 60-feet high and 42-feet wide, with three cross arms, would be aligned close to high voltage terminals of each GSU transformer. At the bottom of each H-pole on a concrete platform, a 1200-ampere circuit breaker would be installed which would be connected with adequately sized jumper wires with a 1,200-ampere disconnect switch mounted on the lowest two cross arms and the third top cross arm would be used for terminating the 1590-kcmil Steel-supported Aluminum conductor (ACSR) 230 kV gen outlet line and also for mounting the current transformers and potential transformers on top of the cross arm for metering of the power output from the CTGs in the switchyard. All equipment on the switchyard A H-pole structure would be rated for 230 kV (LL2014d, Section 3).

Two sets of three-phase 1590-kcmil ACSR overhead gen-outlet lines of about 465-foot length would terminate vertically at a 98-foot high dead-end pole for the north-south 230 kV gen-tie line (LL2014d, Section 3).

CECP Units 8 and 9: Switchyard B and Outlet Line

According to the latest one-line electrical diagram of the switchyards (LL2014vv**,** Figure DR 21-1), each CTG would be connected to its own dedicated 76/101/127 MVA, 13.8/230 kV generator step-up (GSU) transformer with a specified impedance of 9.0 percent @76 MVA and 1,200 Amp circuit breakers in Switchyard B.

In switchyard B, two steel H-pole structures would be installed near the eastern fence line of the switchyard and along the proposed right of way (ROW) of the 230 kV north-south gen tie line. Each of the steel H-pole structures, 60-feet high and 42-feet wide, with three cross arms, would be aligned close to high voltage terminals of each GSU transformer. At the bottom of each H-pole on a concrete platform, a 1200-ampere circuit breaker would be installed which would be connected with adequately sized jumper wires with a 1,200-ampere disconnect switch mounted on the lowest two cross arms and the third top cross arm would be used for terminating the 1590-kcmil Steel-ACSR 230 kV gen outlet line and also for mounting the current transformers and potential transformers on top of the cross arm for metering of the power output from the CTGs in the switchyard. All equipment on the switchyard A H-pole structure would be rated for 230 kV (LL2014d, Section 3).

The CTG unit 9 would also be connected through a 6,000-ampere 15 kV breaker to the high voltage terminal of a 13.8/4.6 kV GSU designed to supply on-site station power.

Two sets of three-phase, 1590-ACSR conductor overhead gen-outlet lines about 465-feet long would terminate vertically at a 98-foot high dead-end pole for the north-south 230-kV gen-tie line (LL2014vv, Figure DR 21-1).

CECP Units 10 and 11: Switchyard C and Outlet Line

According to the latest one-line electrical diagram of the switchyards (LL2014vv**,** Figure DR 21-1), each CTG would be connected to its own dedicated 76/101/127 MVA, 13.8/138 kV generator step-up (GSU) transformer with a specified impedance of 9.0 percent @76 MVA and 1,200 Amp circuit breakers in Switchyard C (LL2014vv, Figure DR 21-1).

In switchyard B, two steel H-pole structures would be installed near the eastern fence line of the switchyard and along the proposed right of way (ROW) of the 230 kV north-south gen tie line. Each of the steel H-pole structures, 60-feet high and 42-feet wide, with three cross arms, would be aligned close to high voltage terminals of each GSU transformer. At the bottom of each H-pole on a concrete platform, a 1200-ampere circuit breaker (CB) would be installed which would be connected with adequately sized jumper wires with a 1,200-ampere disconnect switch mounted on the lowest two cross arms and the third top cross arm would be used for terminating the 1033-kcmil ACSR 138 kV gen outlet line and also for mounting the current transformers and potential transformers on top of the cross arm for metering of the power output from the CTGs in the switchyard. All equipment in switchyard would be rated for 138 kV (LL2014d, Section 3).

The CTG unit 10 would also be connected through a 6,000-ampere 15 kV breaker to the high voltage terminal of a 13.8/4.6 kV GSU designed to supply on-site station power (LL2014vv, Figure DR 21-1).

138 kV and 230 kV Overhead Gen-Tie Lines To SDG&E Encina Switchyards

The proposed generators would interconnect to the existing Encina substation at both the 138 kV and 230 kV. The 230 kV gen-tie line would be about 2,500 feet long, with 2,171 feet overhead and 450 feet underground. The overhead portion of the 230 kV line would be split into two segments, the first segment would be single circuit and about 1,018 feet long and the second segment, 1,090 feet, would use double circuit towers with the 230 kV gen-tie line on one side and the 138 kV gen-tie line on the other side (LL2014d, Section 3).

The entire 2,171-foot long 230 kV overhead gen-tie line would use1590-kcmil steel ACSR while the 450-foot underground cable would use single-core 2,500-kcmil copper 230 kV Cross Linked Polyethylene (XLPE). The 138 kV would all be overhead and use 1,033-kcmil ACSR conductors.

The first segment of the 230 kV overhead gen-tie line between switchyard A and switchyard C outlets would be a single-circuit line built on 98-foot high tubular steel poles. The second segment of the gen-tie line (1,090 feet) would be built with double-circuit 98- to 106-foot high steel tubular poles starting from the the Switchyard C outlet to the northeast corner of the Encina 138 kV switchyard. The line would have a railway

crossing over the double track North Coast Transit District Rail Corridor (NCTD) with 106-foot high steel poles on both sides and 94-foot ground clearance of the railway tracks from the lowest conductor (LL2014pp, Figure DR76-1a).

The current north-south ROW near the eastern boundary of the site beside Interstate 5 (I-5) would be shifted 75 feet towards the west. For the overhead north-south portion of the gen-tie line beside I-5, the gen tie overhead 230 kV line construction profile would be:

- The first northern 98-foot 230 kV dead-end pole (switchyard A gen-outlet line termination pole) would be installed about 65 feet from the eastern boundary line of the125-foot-wide ROW.
- The second double-circuit 98-foot high pole from the north would be installed about 100 feet away the eastern boundary line of the 125-foot-wide ROW. This pole would be about 25-feet below normal ground level in the area.
- The third 230 kV 98-foot pole from the north would be installed about 55 feet from the eastern boundary line of the 125 foot-wide ROW.
- The fourth double-circuit 98-foot high pole from the north about 42 feet away from the eastern boundary line of the 125-foot-wide ROW.
- The fifth double circuit 98-foot high dead-end pole from the north would be installed about 42 feet away from the eastern boundary line of the 125-foot-wide ROW.

The 230 kV overhead line circuit terminating at the 98-foot high dead-end pole near the northeast corner of the Encina 138 kV switchyard would be connected to the 450-foot underground cable by installing an H-frame cable termination structure. The 450-foot, three 2500-kcmil copper 230 kV XLPE underground cable lines would be installed within six-inch PVC conduits with 2-inch PVC conduits for grounding and communication lines embedded in concrete as duct-bank construction. At the Encina 230 kV switchyard end, the 230 kV cable line would connect to switchyard overhead buses through a 230 kV cable Riser structure. The petitioner/project owner Carlsbad Energy, LLC will build, own and operate the amended CECP switchyards and the gen-tie lines (LL2014d, Section 3.1). Interconnection of the proposed Amended CECP units 6 Thru 9 at the SDG&E Encina 230 kV Switchyard:

In the 230 kV switchyard, SDG&E has agreed to take necessary action to ensure that a switching bay position would be available in the future for interconnection of amended CECP Units 6-through 9 thru 230 kV overhead and underground interconnection line. SDG&E would build, own and operate the interconnection transmission outlet and reliability upgrades in the existing Encina 230 kV switchyard.

Interconnection of the proposed Amended CECP units 10 & 11 at the SDG&E Encina 138 kV Switchyard:

The existing Encina generating Unit Nos. 1, 2, and 3 will be retired and be disconnected from Switching Bays (SB) 2, 6, and 9, respectively, of the Encina 138 kV switchyard. To

accommodate termination of the new 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 after disconnection of 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 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-foot outlet to the double bus of the existing 138 kV Encina switchyard (LL2014d, Section 3.1).

TRANSMISSION SYSTEM ANALYSIS AND IMPACTS

For the interconnection of a proposed generating unit or transmission facility to the grid, the interconnecting utility or Participating Transmission Owner (PTO), SDG&E in this case, and the control area operator (CA ISO) are responsible for ensuring grid reliability. According to the California ISO Large Generator Interconnection Procedure (LGIP), these entities perform the Phase 1, or System Impact Study, and Phase 2, or Facility Study, Interconnection cluster studies to determine the transmission system impacts for individual generating projects and to identify any mitigation measures needed to ensure system conformance with reliability standards. These standards include the NERC reliability standards, WECC system performance criteria, and CA ISO planning standards. The licensed CECP had completed the California ISO interconnection process up to the signing of a Large Generator Interconnection Agreement (LGIA). The amended project relies on the completed studies plus several updates which are described below.

The CA ISO issued the Interconnection Facilities Studies (IFS) on July 7, 2008 and June 4, 2008 for the licensed CECP 260-MW net Unit 6 and the 260-MW net combined-cycle unit 7 to the then Interconnection Customer (IC), NRG West (now the IC is Carlsbad Energy Center LLC.), in order to replace Encina Generating Station units 1, 2, and 3.The proposed points of interconnection were at the 138 kV bus of the SDG&E Encina 138 kV Switchyard and at the 230 kV bus of the SDG&E Encina 230 kV Switchyard. The report provided an analysis of the system impacts and necessary mitigation measures. Subsequently the IC signed a Large Generation Interconnection Agreement (LGIA) for both the queue projects that made up the Carlsbad Energy Center.

However, the IC delayed the commercial operation date (COD), October, 2010, for both the proposed Unit 6 and Unit 7 in a letter dated December 9, 2011 to the California ISO and SDG&E to July 1, 2015. Subsequently the COD was extended to September 1, 2016.

On October 22, 2012 the California ISO issued an Interconnection Reassessment Study for the all of the projects in the interconnection queue in the San Diego area. This study included the Carlsbad Energy Center Project, and was done because of major changes in the San Diego area including the retirement of the San Onofre Nuclear Generating Station, the withdrawal of several projects from the interconnection queue, and new transmission projects expected in the region.

In situations where the reassessment study results indentified any required network upgrades or interconnection facilities, the California ISO will use the results to amend the existing executed Large Generation Interconnection Agreements (LGIA).

These existing studies have analyzed the licensed CECP combined-cycle project with the retirement of the existing Encina units 1-4. The amended CECP simple-cycle project would consist of six new CTG Units 6 thru 11, each rated as 155 MVA, 138 kV with a total net 633-MW output and would include the retirement of all of the existing Encina units (1,2,3, 4, and 5). The California ISO has found that electrically the amended project with the retirement of Encina 5 would not substantially differ from the combined-cycle project with Encina 5 operating. Thus, the previous interconnection studies are valid for the proposed amendment (LL2014p, Attachment DR30-1).

TRANSMISSION SYSTEM IMPACT STUDIES

The California ISO performed the following Transmission System Impact Studies (SISs) in coordination with SDG&E in three phases as follows:

A. Interconnection Reassessment Study (SDG&E Area Report), dated October 22, 2013.

B. Interconnection Reassessment Study Individual Report (Encina Repower Project), dated October 22, 2013.

C. Optional Interconnection Study and Repower Project (Encina Peaking and Repower Project), dated September 11, 2014.

Interconnection Reassessment Study, Dated October 22, 2013:

This Reassessment study evaluates the system Impacts on the network upgrades identified in the previous studies due to interconnection request withdrawals, transmission additions, and upgrades approved by the California ISO in the most recent transmission planning process (TPP) cycle and the San Onofre Nuclear generating Station (SONGS) retirement (LL2014d, Appendix 3a and Appendix 3b).

The reassessment includes reliability and deliverability assessments. The study comprised steady state power flow analysis, transient stability analysis, post-transient voltage analysis, and short circuit study.

Study Assumptions

The Reliability Assessment evaluated the projects that entered the California ISO Generator Interconnection Queue before the Cluster 5 (higher queued projects with in-service dates by 2016) under the 2016 heavy summer and light load conditions. Interconnection request withdrawals were removed from the studies, transmission additions and updates that were approved in the most recent TPP cycle were added, and SONGS was not dispatched due to retirement.

The Deliverability Assessment on-peak case modeled system load as 5,308 MW plus losses in the SDG&E system (1-in-5 load SDG&E peak load forecast for 2016 from the Energy Commission). The total import target was modeled as12, 599 MW in the on-peak base case.

Reassessment Study Results and Mitigation

Results for generators in the Pre-Transition Cluster
The San Luis Rey bank 51 160 MVA 138/69 kV no.1 transformer would be overloaded by 74 percent of its normal capacity of 160 MVA. due to category C contingency of SDG&E TL23003 Encina-San Luis Rey 230 kV no.1 and TL23011 Encina-San Luis Rey-Palomer 230 kV #1 transmission lines.

The preferred mitigation identified for this overload is a Special Protection System (SPS) to trip generation at EPS, preferably Q137 and Q189, if all the generation projects modeled in the Reassessment study are developed.

Results for generators in the Transition Cluster
All network upgrades in the previous studies for Transition Cluster Projects remain unchanged.

Results for generators in Queue Cluster 1 & 2
The SDG&E TL23042 Miguel-Bay Boulevard 230 kV no.1 transmission line was overloaded by 1 percent to19 percent of its normal rating of 1176 Amperes for one category B contingency and four category C contingencies. The maximum 19 percent overload was found for outages of SDG&E TL230022 & TL 230023 Miguel-Sycamore 230 kV no. 1 and no. 2 lines

The preferred mitigation identified for this overload is a SPS to trip generation. It is recommended that if all the generation projects modeled in the Reassessment Study are developed, then the Q510, Q574, Q590 and Q608 projects participate in the SPS.

Results for generators in the Queue Cluster 3 &4
All network upgrades in the previous studies for Transition Cluster 3 & 4 projects remain unchanged.

Short Circuit Duty Analysis
The analysis of the SDG&E System did not find any overstressed Circuit Breakers.

The Transient Stability Analysis:
For the pre-QC5 projects, transient stability studies were performed with 2016 heavy summer and light load cases following simulated selected critical disturbances within SDG&E transmission system, no transient stability issues were identified in this reassessment study

Post-Transient Voltage Stability Analysis
No Voltage violations were observed.

Conclusions:

Based on the above Study results:

1. Pre-transition Cluster, Impacted projects: Q137 and Q189 (CECP and the amended CECP).

   Mitigation required: Implement an SPS to protect overloading on the San Luis Rey Bank 51 138/69 kV transformer no.1 following a category C contingency.

2. Queue Cluster 1 & 2, Impacted projects: Q510, Q574, Q590 and Q608.

   Mitigation required: Modify the proposed SPS to protect overloading on the SDG&E TL23042 Miguel-Bay Blvd. 230 kV line following a Category B and several Category C contingencies.

Interconnection Reassessment Study Individual Report

The purpose of the October 22, 2013 Individual Reassessment was to update the results of their Interconnection Facility Studies performed on July 7, 2008 and June 4, 2008. In situations where the reassessment study results indentified any Network Upgrades and/or Interconnection Facilities, the California ISO will use the results to amend the existing executed Large Generation Interconnection Agreements. The study determined that a bay position at SDG&E's Encina 138 kV switchyard would need to be reconfigured and the 230 kV switchyard would need to be extended to accommodate the project. A Special Protection System would need to be implemented in order to prevent overloads on the San Luis Rey Bank 51 138/69 kV transformer (LL2014d, Appendix 3a and Appendix 3b).

Optional Interconnection Study And Repower Report

The September 11, 2014 Optional Interconnection Study and Repower Report was prepared by the California ISO in coordination with SDG&E (LL2014W, Attachment DR30-1)

This Study determined that, as was the case for the previous interconnection studies, the new generators' responses are not in violation of NERC Reliability Standards.

System Impacts Study (SIS) Results

Power Flow Study

A set of bus faults and N-1 contingencies were applied to two cases, one with OLD generators (pre-project case) i.e. the licensed CECP with Encina 5 operating and the NEW case, amended CECP generators (post-project case) i. e. the amendment with the six combustion turbines operating and Encina 5 retired, and the overload and voltage violations were compared.

Transient Stability Analysis & Post-Transient Voltage Analysis

A full set of Transient Stability simulation including the Worst Case Analysis and Post-transient Voltage Analysis were performed for a set of major bus faults (Category C contingency) and N-1 contingencies. In all cases no NERC Standards and WECC Performance Criteria violations were observed.

Short Circuit Duty Analysis

From the results of the SIS, it is apparent that the Encina 5 Repower unit which would be interconnected at the Encina switchyard 230 kV bus, would have no additional Reliability Network impacts.

Interconnection Facilities and Reliability Network Upgrades

For the proposed amendment, the California ISO provided the PTO's (SDG&E) Interconnection Facilities and Reliability Network upgrades:

1. Extend gen-tie from the 230 kV Encina switchyard 230 kV bus to the SDG&E property line. Reconfigure a bay position at the Encina 138 kV switchyard to accommodate the amended CECP's interconnection.

2. Implement an SPS to trip generation at Encina following Category C outage of Encina –San Luis Rey 230 kV and Encina-San Luis Rey-Palomer 230 kV line.

DOWNSTREAM FACILITIES

For the proposed amended 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 amended 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. These modifications would be made by SDG&E within the existing fence line of the Encina 138 kV switchyard.

For the 230 kV interconnection, besides the proposed facilities which include the new CECP 230 kV switchyard, the 230 kV overhead line and underground cable, accommodating the interconnection would need require expansion of the 230 kV Encina substation but this would occur with the fence-line of the existing facility.

CUMULATIVE IMPACTS

The TSE analysis focuses on whether or not a proposed project will meet required codes and standards. At all times the transmission grid must remain in compliance with reliability standards, whether one project or many projects interconnect. Potential cumulative impacts on the transmission network are identified through the California ISO and utility generator interconnection process. In cases where a significant number of proposed generation projects could affect a particular portion of the transmission grid, the interconnecting utility or the California ISO can study the cluster of projects in order to identify the most efficient means to interconnect all of the proposed projects.

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 2,171-foot long 230 kV

overhead line and a 450-foot long underground cable line. The 138 interconnection to the existing SDG&E Encina 138 kV switchyard bus would use the same towers as the 230 kV gen tie, but only requires about 1,050-feet. Both the tie lines would follow the shortest and economic route within the fence line of the Encina Power Station.

COMPLIANCE WITH LORS

The proposed interconnecting facilities, which include the switchyards, generator tie-lines, and the terminations in SDG&E Switchyards, are adequate in accordance with industry standards and good utility practices, and are acceptable to staff. Staff believes that Conditions of Certification **TSE-1** through **TSE-6** will ensure the amended CECP would comply with applicable LORS.

Staff's proposed conditions of certification TSE-1 through TSE-6 would help ensure that construction and operation of the transmission facilities for the proposed RBEP would comply with applicable LORS:

1. Staff proposed Condition of Certification TSE-1 would ensure that the preliminary equipment is in place for construction of the transmission facilities of the proposed project to comply with applicable LORS.

2. Staff proposed Condition of Certification TSE-2 would ensure the final design of the proposed transmission facilities comply with applicable LORS.

3. Staff proposed Condition of Certification TSE-3 would ensure that the proposed project would be properly interconnected to the transmission grid. TSE-3 also ensures that the generator output would be properly delivered to the transmission system.

4. Staff proposed Condition of Certification TSE-4 would ensure that the project would synchronize with the existing transmission system and the operation of the facilities would comply with applicable LORS.

5. Staff proposed Condition of Certification TSE-5 would ensure that the proposed project has been built to required specifications and the operation of the facilities would comply with applicable LORS.

CONCLUSIONS AND RECOMMENDATIONS

The CECP project would conform to the applicable LORS and CEQA review upon satisfactory compliance of the recommended conditions of certification.

Transmission system impacts on the California grid could be mitigated by operating procedures and transmission line projects in the SDG&E annual plan, the proposed project can be reliably connected to the SDG&E grid.

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 For the power plant switchyard, outlet line and termination, the project owner shall not begin any increment of construction until plans for that increment have been approved by the CBO. These plans, together with design changes and design change notices, shall remain on the site for one year after completion of construction. The project owner shall request that the CBO inspect the installation to ensure compliance with the requirements of applicable LORS. The following activities shall be reported in the Monthly Compliance Report:

1. receipt or delay of major electrical equipment;

2. testing or energization of major electrical equipment; and

3. the number of electrical drawings approved, submitted for approval, and still to be submitted.

Verification: At least 30 days (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-3 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.

1. 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.

2. 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.

3. 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.

4. The project conductors shall be sized to accommodate the full output from the project.

5. Termination facilities shall comply with applicable SDG&E interconnection standards.

    a. The project owner shall provide the following for 6 thru 11 to the CPM:

    b. The Special Protection System (SPS) sequencing and timing if applicable,

    c. A letter stating that the mitigation measures or projects selected by the transmission owners for each criteria violation are acceptable, if applicable,

    d. The operational study report based on 2017 in-service date or current commercial operation date (COD) system conditions from the California ISO and/or SDG&E.

Verification: A copy of the executed LGIA signed by the California ISO and the project owner. At least 60 days prior to the start of construction of transmission facilities (or a lesser number of days mutually agree to by the project owner and CBO), the project owner shall submit to the CBO for approval:

a) Design drawings, specifications and calculations conforming with CPUC General Order 95 or NESC, Title 8, Articles 35, 36 and 37 of the "High Voltage Electric Safety Orders", NEC, applicable interconnection standards and related industry standards, for the poles/towers, foundations, anchor bolts, conductors, grounding systems and major switchyard equipment.

b) For each element of the transmission facilities identified above, the submittal package to the CBO shall contain the design criteria, a discussion of the calculation method(s), a sample calculation based on "worst case conditions"[1] and a statement signed and sealed by the registered engineer in responsible charge, or other acceptable alternative verification, that the transmission element(s) will conform with CPUC General Order 95 or NESC, Title 8, California Code of Regulations, Articles 35, 36 and 37 of the, "High Voltage Electric Safety Orders", NEC, applicable interconnection standards, and related industry standards.

c) Electrical one-line diagrams signed and sealed by the registered professional electrical engineer in responsible charge, a route map, and an engineering description of equipment and the configurations covered by requirements **TSE-5** a) through f) above.

d) The 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 2017 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-4 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-5 The project owner shall provide the following notice to the California ISO prior to synchronizing the facility with the California Transmission system:

a) 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

b) 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.

[1] Worst case conditions for the foundations would include for instance, a dead-end or angle pole.

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-6 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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WECC (Western Electricity Coordinating Council) 2006. NERC/WECC Planning Standards, August 2006.

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/ 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.

WASTE MANAGEMENT

Ellie Townsend-Hough

SUMMARY OF CONCLUSIONS

Management of the waste generated during demolition, construction and operation of the proposed amended Carlsbad Energy Center Project (amended CECP), including the closure/decommissioning and demolition of the existing Encina Power Station (EPS), would not generate a significant adverse impact for Waste Management under the California Environmental Quality Act (CEQA) guidelines (Appendix G: Environmental Checklist Section XVI, Utilities and Service Systems). Like the licensed CECP approved by Energy Commission Final Decision on May 31, 2012, there is sufficient landfill capacity for the amended CECP. As with the licensed CECP, the amended CECP would be consistent with the applicable waste management laws, ordinances, regulations, and standards if t staff's proposed conditions of certification are implemented.

Based on staff's analyses of the amended CECP proposed by Carlsbad Energy Center, LLC, (petitioner/project owner), Condition of Certification **WASTE-1** was edited to clarify requirements for the amended CECP and the project owner. Condition of Certification **WASTE-4** was updated to reflect all appropriate agencies and their corresponding responsibilities related to all phases of amended CECP. Condition of Certification **WASTE-5** was also modified to require receipts for recycled materials and demonstrate compliance with construction and demolition recycling regulations. Condition of Certification **WASTE-6** was modified to accurately reflect the requirements of the San Diego County Air Pollution Control District's Asbestos Renovation and Demolition Notice of Intention Form, and associated verification time requirements. Condition of Certification **WASTE-10** was deleted given the Ocean-Water Purification System for the licensed CECP is not part of the project for the amended CECP.

The petitioner would be required to comply with applicable regulations and implement procedures that would mitigate site conditions to ensure no harm to humans or to the environment. Condition of Certification **WASTE-12** is a new condition that requires a Soil Management Plan be provided to the CPM prior to any demolition (Phase I of the project calls begins with removal of above-ground fuel oil storage tanks 1, 2 and 4). Staff proposes Condition of Certification **WASTE-12** to ensure that the petitioner adequately characterizes the project site and completes clean-up as necessary in accordance with the Energy Commission's conditions of certification, as well as applicable LORS

Subsurface soil remediation responsibility is not included as part of amended CECP because that would be part of a subsequent project to develop the EPS site following construction of the power plant, if approved. If the petitioner encounters obvious soil contamination during Phase I or Phase IV demolition activity, Conditions of Certification **WASTE-4** stipulates the method for determining the nature and extent of contamination After Phase IV demolition of EPS, subsurface remediation based on specific, non-power redevelopment plans for the EPS site west of the rail road tracks would begin. This

initiative will be jointly completed with NRG and led by the city of Carlsbad based on future land uses.

In this Preliminary Staff Assessment (PSA) section, staff considers project compliance with CEQA guidelines; applicable waste management laws, ordinances, regulations, and standards; and staff's conditions of certification necessary to ensure that any significant adverse waste management impacts that may occur as a result of project modifications associated with the amended CECP (including demolition of the EPS) are mitigated to a level of less than significant.. No cumulative waste management impacts would occur.

If the Commission certifies the amended CECP, adoption of staff's proposed conditions of certification would ensure that the modifications to the May 31, 2012 licensed CECP Final Decision would not result in any unmitigated, significant, adverse waste management impacts, and that the project would comply with all applicable laws, ordinances, regulations, and standards.

INTRODUCTION

This section presents an analysis of issues associated with wastes generated from the proposed construction and operation of the amended CECP and the closure/decommissioning and demolition of the EPS. The technical scope of this analysis encompasses solid and liquid wastes existing on site and wastes that would likely be generated during the four phases of the amended CECP including facility construction, commissioning, operation, and closure/decommissioning and demolition. Management and discharge of wastewater is addressed in the **SOIL & 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 California Energy Commission (Energy Commission) staff's (hereafter referred to as staff) 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, operation, and closure/decommissioning of the proposed modified project would be managed in an environmentally safe manner.
- the disposal of project wastes would not adversely impact existing waste disposal facilities.
- 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.

METHODOLOGY AND THRESHOLDS FOR DETERMINING ENVIRONMENTAL CONSEQUENCES

In accordance with CEQA guidelines (Appendix G: Environmental Checklist Section XVI, Utilities and Service Systems), staff evaluated project wastes in terms of landfill

capacity and LORS compliance, for both non-hazardous and hazardous wastes. The federal, state, and local environmental LORS listed in **Waste Management Table 1** have been established to ensure the safe and proper management of both non-hazardous and hazardous wastes in order to protect human health and the environment. Bolded portions of the table highlight new LORS that staff evaluated for the amended CECP.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

Waste Management Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable LORS	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 (RCRA) 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 in San Francisco (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 stored and or 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 – Solid Wastes	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 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 a certified 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.
National Emission Standard for Hazardous Air Pollutants (NESHAP), as specified under Rule 40, Code of Federal Regulations (CFR) 61, Subpart M, is enforced locally by the SDAPCD, under authority of Regulation XI, Subpart M Rule 361.145.	This rule requires the *owner* of an establishment set for demolition or the *owner* or *operator* of any equipment used to demolish any structure to submit an **Asbestos Demolition or Renovation Operational Plan** (*Notice of Intention [NOI]*) 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 material**.)
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 & 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 Integrated Waste Management Act of 1989.	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, programs for county waste management plans, 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	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 four-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, CCR , division 2, Subdivision 1, Chapter 3, Subchapter 4,	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.

Title 14, Chapter 9 Division 7 –(AB 939)	AB 939 established the organization, structure, and mission of California Integrated Waste Management Board (CIWMB) in 1989. AB 939 not only mandated local jurisdictions to meet numerical diversion goals of 25% by 1995 and 50% by 2000, but also established an integrated framework for program implementation, solid waste planning, and solid waste facility and landfill compliance. Other elements included encouraging resource conservation and considering the effects of waste management operations. The diversion goals and program requirements are implemented through a disposal-based reporting system by local jurisdictions under CIWMB regulatory oversight. Facility compliance requirements are implemented under a different approach, primarily through local government enforcement agencies. Cal Recycle, formerly known as the CIWMB, is the state's leading authority on recycling, waste reduction, and product reuse, officially known as the Department of Resources Recycling and Recovery.
Title 8, CCR, Division 1, Chapter 4, Section 1532.1	Section applies to all construction work where an employee may be occupationally exposed to lead. Establishes permissible exposure limits (PELs); exposure assessment; compliance methods; respiratory protection; protective clothing and equipment; housekeeping; medical surveillance; medical removal protection (MRP); employee information, training, and certification; signage; record keeping; monitoring; and agency notification
Title 17, CCR, Division 1, Chapter 8, Section 35001	Requirements for lead hazard evaluation and abatement activities, accreditation of training providers, and certification of individuals engaged in lead-based paint activities.
Title 24, CCR, Part 11 2010 Green Building Standards Code (CalGreen)	The code is established to reduce construction waste, make buildings more efficient in the use of materials and energy, and reduce environmental impact during and after construction. Effective January 1, 2011, in jurisdictions without a construction and demolition (C&D) ordinance requiring the diversion of 50 percent of construction waste, the owners/builder of newly constructed buildings within the covered occupancies are required to develop a waste management plan and divert 50 percent of the construction waste materials generated during the project.
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 ten 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.

PROPOSED MODIFIED PROJECT

Waste Management Table 2 below shows what staff previously analyzed in the licensed CECP and the new or additional project elements for the amended CECP. Where new or additional disturbance would occur, there is the potential to impact waste beyond that analyzed in the licensed CECP. Also, where new facilities are added or expanded for the amended CECP, there is potential for waste management issues to exist beyond those analyzed in the licensed CECP.

The amended CECP would be located on a highly disturbed 95-acre brownfield site at 4600 Carlsbad Boulevard, Carlsbad, California (APN 210-01-46). Currently, the major components of the parcel consist of EPS, the Poseidon Carlsbad Seawater Desalination Project (CSDP) currently under construction, and the San Diego Gas & Electric (SDG&E) switchyards. The North County Transit District rail line bisects the 95-acre EPS parcel, north to south, separating the EPS East Tank Farm from the West Tank farm and rest of the site. The amended CECP would be built on a 30-acre footprint on the site of the East Tank Farm, replacing obsolete aboveground storage tanks (ASTs) Nos. 4, 5, 6, and 7. The area including AST No. 4, and the berm between ASTs 4 and 5, would be removed per a modification request of the amended CECP. The additional seven acres beneath AST 4 allows for the power plant facility to be re-configured from two combined-cycle power blocks to six simple-cycle GE LMS 100 turbines. See the **PROJECT DESCRIPTION** for more details on the amended CECP project design. ASTs Nos. 1 and 2 are located in the West Tank Farm, and following demolition would serve as laydown and parking for Phase II construction of the amended CECP power plant. The West Tank Farm also included AST No. 3, which was demolished as part of the Poseidon CSDP project construction. Refer to **Waste Management Figure 1**.

The amended CECP would demolish three obsolete, aboveground fuel oil storage tanks identified as ASTs 1, 2, and 4. Demolition activities would include removing the oily sands from beneath ASTs 1, 2, 4, and associated piping and equipment, and remove the berm separating ASTs 4 and 5, (LL 2014b). The fuel oil tanks were used to store number (No.) 6 fuel oil. The tanks are constructed on top of a six-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 on No 2 fuel oil per cubic yard of sand (LL 2014y, Data Responses 59-1 and 59-2). No. 2 fuel oil, also known as heating oil, is a low viscosity flammable liquid petroleum product used to fuel building heaters or boilers.

When EPS was originally constructed, the steam generators burned No. 6 heavy fuel oil delivered to an offshore oil transfer facility by tanker and piped to ASTs 1 and 2, each with a capacity of 131,000 barrels. The capacity of East Tank Farm AST 4 is 250,000 barrels. All of the ASTS are surrounded by secondary containment riprap earthen berms that have a capacity of 110 percent of the tank volume. Fuel oil was transferred to EPS through below-ground and later through aboveground pipelines. The aboveground portions of these tanks (walls, and metal tank bottoms) and their associated piping and control systems would be removed; no below-grade demolition or removal is proposed. The demolition contractor would conduct abatement (lead and asbestos) activities, as needed, prior to demolition during Phase III decommissioning. ASTs and associated equipment would be removed and structural steel would be salvaged for all demolished

ASTs. Above-ground concrete for AST 4 would be broken up and stored onsite or removed, while the concrete pads beneath ASTs 1 and 2 will remain in place for construction laydown and parking purposes.

Waste Management Table 2
Licensed vs. Amended CECP Features Potentially Impacting Waste Management

Feature	Licensed CECP (558 MW)	Amended CECP (632 MW)
Power production	Two 1-on-1 combined cycle units	Six simple-cycle combustion turbine units with intercoolers
Annual capacity factor	Up to 47 percent (4,100 of 8,760 possible hours)	Estimated 31 percent (approximately 2,700 operating hours)
Project footprint	Approximately 23 acres	Approximately 30 acres
Area of temporary construction laydown	10 acres	19 acres
Site preparation	Demolish East Tank Farm ASTs 5, 6, and 7 for power plant footprint	Demolish East Tank Farm ASTs 4, 5, 6 and 7 for power plant footprint, and ASTs 1 and 2 for construction laydown and parking
Encina Power Station	Retire units 1-3	Retire units 1-5 and demolish all above-ground structures west of the North County Transit District (NCTD) railroad tracks
Length of construction	25 months (from site preparation to CECP plant begin operation)	64 months (from site preparation to EPS plant demolition to site restoration)
Off-site linear facilities	The amended project includes the continued build-out of a new 36 foot reclaimed water pipeline, extending approximately 2,600 feet from Cannon Road along the Aveninda Encintas right-of-way to the project site.	

Source: CEC2012a, LL2014d, LL2014b

After the commercial operation of amended CECP begins, EPS Units 1 through 5 would be shut down and the 12-month Phase III decommissioning period begins. Phase IV demolition of the EPS units, aboveground piping, above-grade building and support structures and systems would be removed to grade over a 22 month period, with a two-month site restoration period of grading and contouring completing the 64-month amended CECP process. The west side of the railroad tracks, except for easements necessary to support site access, transmission and linear services would be available for city of Carlsbad subsurface remediation and redevelopment planning. Subsurface remediation is not included as part of amended CECP, however, if obvious contaminated areas (such as, soil with a strong odor or stained soil), are encountered and soil samples exceed county or state standards, the areas would be cleaned up to industrial clean-up levels.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

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, operation, closure and decommissioning/demolition activities.

PROJECT SITE CONDITIONS AND POTENTIAL FOR CONTAMINATION

For any site in California proposed for the construction of a power plant, the petitioner 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 CEQA 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, 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 under CEQA by staff.

In general, the Phase I Environmental Site Assessment (ESA) process involves a qualified environmental professional who conducts specific on-site inquiries and investigations into past uses and ownership of the property, researches any reported hazardous substance releases and hazardous waste disposal occurrences at the site; and, within a certain distance of the site, visually inspect and observes the property for signs of any potential contamination and possible areas of concern. After conducting all necessary file reviews, interviews, site observations, and creating documentation, the environmental professional then provides the consolidated findings about the environmental conditions at the site. These findings are published and released as an ESA, and may identify Recognized Environmental Conditions (REC), the presence or likely presence of any hazardous substances or petroleum products in, on, or at a property. The ESA would also include documentation and discussion of a Historical Recognized Environmental Condition (HREC), a past release of any hazardous substances or petroleum products that has occurred in connection with the property. Or, the ESA may identify a Controlled Recognized Environmental Condition (CREC), a recognized environmental condition which involves a past release of hazardous substances or petroleum product that has been addressed to the satisfaction of the applicable regulatory authority and that is subject to activity and use limitations. Additional investigation may be needed beyond a Phase I ESA, for example, if there were significant gaps in the information available about the site, if an ongoing release is suspected, and/or, if additional information is necessary to confirm an existing environmental condition.

If such additional investigations are 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 (i.e. soil or other material containing or retaining toxins) to verify the level of contamination and the potential for remediation at the site. For the Encina Power Station, a Phase II ESA was initially conducted in 1998, with a subsequent investigation in 2007.

In conducting its assessment of a proposed project site, staff would first review the Phase I ESA and work with the appropriate oversight agencies responsible for determining and conducting additional site characterization work. Conditions of Certification are added f additional mitigation is necessary to ensure protection of

human health and the environment from hazardous substance releases and on-site contamination,

The EPS Phase I ESA, dated October 17, 2014, was prepared by Source Group Inc. in accordance with the All Appropriate Inquiries Final Rule (CFR 40 Part 312) of the United States Environmental Agency and the American Society for Testing and Materials Standards E-1527-13 for ESAs.

The Source Group, Inc was retained to perform an ESA of the EPS property. The property is located at 4600 Carlsbad Boulevard, Carlsbad, California. As indicated above, SDG&E owned and operated EPS from its original construction commissioning in 1954 until its purchase in 1999 by Cabrillo Power, LLC (a subsidiary of NRG Energy, Inc., the parent company of amended CECP petitioner/project owner Carlsbad Energy Center LLC. The 95-acre EPS property consists of five power generation units, a small gas turbine peaking plant, switchyards, seven aboveground fuel oil storage tanks, an once-through-seawater cooling system, a wastewater treatment facility, and administration, storage, and operations buildings.

The EPS Phase I ESAs were performed in 1998 and 2007. The ESAs identified known releases. Refer to **Waste Management Table 3** for a listing of controlled RECs and known REC's that remain to be addressed. The site has undergone environmental assessments and remediation since the 1990s. There are two open Voluntary Assistance Program VAPs, H13941-004 and -005, cases with SDCDEH. The SDCDEH has closed the files on three VAP cases H13941-001,-002, and -004. See **Waste Management Figure 2** for location of open VAP cases. There are buildings located on the EPS site that were constructed prior to 1980. The Phase I ESA listed asbestos and lead as Recognized Environmental Conditions (RECs) on the project site. The asbestos would come from the unabated areas in the plant, including but not limited to, insulation around tanks, vessels and piping. Flaking or peeling lead-based paint could also be present in facilities to be demolished. The petitioner would comply with Title 17, CCR, Division 1, Chapter 8, Section 35001, to maintain a safe environment for workers. Additional analysis and requirements for LORS compliance related to lead abatement may be found in the **WORKER SAFETY** section of this PSA.

Waste Management Table 3
List of Recognized Environmental Conditions

Controlled Recognized Environmental Conditions
Closed VAP H13941-003
Soil Remediation around Fuel Oil Tank No. 1 and 7
Paved area around Prouts Pond
Area around cutter oil tank
Former Underground diesel tank
Closed VAP H13941-002 gasoline spill in soil
Closed VAP H13941-001
Wastewater Holding Ponds
Recognized Environmental Conditions
Desalination Plant footprint remediation VAP H13941-004
VAP H13941-004 Desalination Plant outside footprint excavation
Area includes: cutter oil tank , Tank No. 3
Three diesel aboveground storage tanks, wastewater treatment system
VAP H13941-005 Transformer Release 2011/2012 in power block Unit 5
Power Plant Building – assessment in area incomplete due to presence of active equipment. Former military reservation and former rubber plant occupied area around Unit 5.
Switchyard PCB bushings
Tanks Nos. 1 and 2 (West Tank Farm)
Tanks 4, 5, and 6 (East Tank Farm
Tank 7 (East Tank Farm)
Building and equipment built prior to 1980
asbestos
Lead paint

Source: LL 2014y Phase I ESA

The EPS site is an impacted brownfield. The southwestern portion of the site was used as a military reservation in 1949 and later for a rubber plant. The power plant began operation in 1952 and is currently operating. The EPS has two fuel oil tank farms. An offshore oil mooring was built to deliver fuel to ASTs 1, 2, and 3 in 1958. The tanks supplied fuel, Bunker C, and later No. 6 fuel oil, to the power blocks through underground piping and later through above ground piping. There were various spills and remedial activities on the EPS site. There are a number of areas that have been subject to investigations and clean-up activities. There are also a substantial number of structures and equipment to be removed from the site where no investigations have been conducted. Contaminated soils may be encountered during demolition in these areas. Similar to the licensed CECP, staff has included Conditions of Certification **WASTE- 3** and **-4** to protect human health and the environment if contaminated conditions are encountered during demolition and construction. **WASTE-3** requires that an experienced and qualified engineer or geologist be available for demolition and consultation. **WASTE-4** lays out the procedures that need to be complied with if contaminated soil is encountered. Condition of Certification **WASTE-4** would change to contact the CPM and SDCDEH and not the Department of Toxic Substance Control.

Staff has also added Condition of certification **WASTE-12** which requires that a Soil Management Plan be provided to the CPM prior to demolition. Staff proposes Condition of Certification **WASTE-12,** to ensure that the petitioner adequately characterizes the

sites and completes clean-up as necessary in accordance with the Energy Commission's conditions of certification as well as applicable LORS.

IMPACTS DURING CECP DEMOLITION, CONSTRUCTION AND OPERATION AND EPS CLOSURE/DECOMMISSIONING/DEMOLITION

As mentioned previously, staff considers project waste management to result in no significant adverse impacts (as defined per CEQA guidelines in Checklist Section XVI) if there is available landfill capacity and if the project complies with LORS. Staff thus reviewed the petitioner's proposed solid and hazardous waste management methods regarding the management of project-related wastes generated during construction, operation, and closure/decommissioning of the proposed modified project to determine whether the methods proposed are consistent with the LORS identified for waste disposal and recycling. Staff then reviewed the capacity available at off-site treatment and disposal sites to determine whether or not the amended CECP waste would impact the available capacity.

The handling and management of waste generated by the amended CECP would follow the hierarchical approach of source reduction, recycling, treatment, and disposal as specified in California Public Resources Code Sections 40051 and 40196. The first priority of the project owner is to use materials that reduce the waste that is generated. The next level of waste management would involve reusing or recycling wastes. For wastes that cannot be recycled, treatment would be used, if possible, to make the waste nonhazardous. Finally, waste that cannot be reused, recycled or treated would be transported off site to a permitted treatment, storage, or disposal facility.

Construction and Demolition Impacts and Mitigation

The assessment, closure, and removal of ASTs 1, 2 and 4 would take six to twelve months (LL 2014y Data Response 59). Engineering controls would be applied to stabilize the area until below-grade assessment and remediation takes place. A temporary liner system would be installed as Best Management Practice for storm water infiltration and runoff mitigation (LL 2014y Data Response 60).

The petitioner would comply with applicable regulations that ensure conditions at the site do not harm humans or the environment. The petitioner would enter into a Voluntary Assistance Program (VAP) with the San Diego County Department of Environmental Health (SDCDEH). SDCDEH staff provides project oversight and technical or environmental reports evaluation on projects pertaining to properties contaminated with hazardous substances. SDCDEH enforces Health & Safety Code Sections 101480-101490, Administration of Public Health, Released Waste. SDCDEH serves as the administering agency on environmental cleanup projects in San Diego County (Health and Safety Code (HSC), section 25260 D) with the ability to issue a Certificate of Completion (HSC Section 25264) indicating the site has been remediated to a level that would ensure no impact to public health and safety.

The petitioner would incorporate the assessment and remediation of ASTs Nos. 1, 2 and 4 as part of VAP HI3941-004. VAP HI341-004 is currently established with SDCDEH on ASTs No. 5, 6, and 7. The initial characterization process will require soil sampling and analysis to depth, to determine complete horizontal and vertical

delineation of potential characterization (LL 2014y Data Response 61). The San Diego Site Assessment and Mitigation Program (SAM) manual outlines the regulatory requirements that should be addressed in the assessment and clean-up of the aboveground fuel oil tank farms. The primary goal of the Site Assessment and Mitigation Program (SAM) is to protect public health, water resources, and the environment from releases of contaminants by providing oversight of assessments and cleanups in accordance with the California Health and Safety Code and the California Code of Regulations. Condition of Certification **WASTE-1** states that in no event shall project construction commence in areas requiring characterization and remediation until SDCDEH and the compliance project manager (CPM) have determined that all necessary remediation has been accomplished. **AQ-SC7** states that the petitioner shall not conduct any on-site remediation of contaminated soils on the project site, other than removal and transport. The petitioner would provide records related to transportation or the disposal of contaminated soil offsite (LL 2014 y Data Response-62). Additional information related to **AQ-SC7** is being covered in the **AIR QUALITY** sections of this document.

Nonhazardous waste from demolition of ASTs 1, 2, and 4 would be recycled where practical and non-recyclable waste would be deposited in a Class III landfill. The petitioner would recycle in accordance with Title 24, CCR, Part 11 2010 Green Building Standards Code (CalGreen)

The petitioner proposes to demolish EPS's Units 1 through 5, a 17-MW combustion "black start" turbine, the enclosure buildings that house Units 1-5, and other existing buildings and support facilities including the 400 ft exhaust stack. **Waste Management Table 4** lists above-grade site features to be demolished (LL2014y, Data Response 64-1). The 22-month Phase IV demolition process would proceed in the following manner (1) preparation of the site laydown and parking area, (2) removal of vessels and equipment associated with hazardous materials and wastes, (3) demolition of structures that would be recycled or disposed of in Class III landfill, and (4) site laydown and stabilization (LL 2014 y Data Response-64-1).

Once EPS is demolished, procedures would be implemented to ensure that historical areas of contamination would not pose a risk to human health or the environment. The petitioner would remove equipment located in the EPS basement and/or vaulted areas. The petitioner would seal below-grade utility conduits, pipe trenches and corridors. Below-grade demolition and remediation would not be a part of this petition. Storm water or groundwater seepage in the below-grade structures would require a National Pollutant Discharge Elimination System (NPDES) waste discharge permit. The petitioner would employ security guards to prevent unauthorized entry into the power block (LL 2014y Data Responses 63 and 64). Signage would be posted around potentially hazardous areas. Inspections would be performed on a regular basis to determine if best management practices (BMPs) in unstable areas have been breached. Additionally, the petitioner would monitor the site for areas that require immediate remedial action and warn workers of proper protective equipment that may be required (LL 2014y Data response 63).

Waste Management Table 4
List of Encina Power Station Items to be Demolished

Power plant building and contents
Powerhouse structures and systems
8-story power plant building
5 simple-cycle gas turbine generators (Units 1 through 5) and steam boilers
400-foot exhaust stack
Turbine lube system
Air emissions-control devices,
Pumps, fans, condensers, fuel oil lines, sumps and three control rooms
Chemistry laboratory, instrumentation, control shops
Five oil-filled transformers
Combustion turbine and structures, east power plant building
Remove emergency/black-start gas turbine generator
ISO phase bus
Water storage tank and structures
Ocean water intake/discharge piping, structures and equipment
Aboveground piping, valves, screens, filters, and other structures would be demolished and removed.
Northwest structures, tanks, and piping
Low Volume Waste Tanks #1 and #2
Extended Waste Tanks #3 and #4
Treated Water Tanks #5 and #6
Tanks piping valves and pumps
Fuel oil Piping and supports
Remaining above-grade fuel oil piping and supports
Southeast corner structures
Machine shop and compressor building
Two domestic water tanks located on SDG&E North Coast Service Center property to be demolished, after which concurrence of the removal of the structures is obtained from Carlsbad Fire Department

Sources: LL 2014y Data Response 64 and LL 2014b page 2-37

Remediation of the EPS below-grade facilities would not take place until an approved non-power Encina Redevelopment Plan is complete. Once the redevelopment plan is finalized, the responsible party would initiate activity in accordance with the SDCDEH VAP for site assessment and subsurface characterization and remediation. The petitioner “anticipates a two- to three-year process to achieve [SDC] DEH-approved closure or certification for the EPS site, exclusive of the amended CECP site which would be addressed under a separate VAP focused on the timely repurposing of [the] tank farm at the eastern portion of the site as defined in the amended CECP.” (LL 2014y Data Response 66)

Nonhazardous waste from EPS demolition would be recycled where practical and non-recyclable waste would be deposited in a Class III landfill. The petitioner would recycle in accordance with Title 24, CCR, Part 11 2010 Green Building Standards Code (CalGreen) The petitioner would generate approximately 81,000 tons of recyclable materials. (LL 2014p Data Response-7). The types and approximate quantities of the stack/power plant building and other structures' demolition waste expected to be recycled on site are as follows: 36,000 tons of concrete and 36,000 tons of metal from stack demolition, and EPS power plant buildings/other structures in addition to recyclable material from the ASTs, and other construction activities.

Similar to the licensed CECP, staff includes Condition of Certification **WASTE-1**, to ensure the project owner adequately characterizes the sites of ASTs 1, 2 and 4, and EPS facilities to complete remediation in accordance with a SDCDEH and Energy Commission approved Correction Action Plan. Condition of Certification **WASTE-2**, requires the project owner to obtain permits from SDCDEH and the city of Carlsbad Fire Department for Hazardous Waste Tank Certification. Prior to demolition and construction, the petitioner would develop, submit, and implement a Demolition and Construction Waste Management Plan, per Condition of Certification **WASTE-5**.

Asbestos is located in various areas throughout the EPS, such as the EPS plant, administration building, maintenance building, machine shop, chemical storage building and the aboveground storage tanks (Phase I ESA DR-59-2). Asbestos may be found in the insulation, concrete, acoustical ceilings, flooring tile and mastic, drywall and plaster, roofing, packing gaskets, and caulking. **WASTE-6** would require the petitioner to submit an Asbestos Notification Form to San Diego Air Pollution Control District[1] and the CPM for approval prior to the Phase III removal and disposal of asbestos located on the proposed site (San Diego Air Pollution Control District Regulation XI, Subpart M – Rule 361.145) before any demolition activity can commence.

The hazardous waste generated during Phase III decommissioning would include asbestos debris, heavy metal dust, used oils, universal wastes, solvents, and empty hazardous waste material containers. 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. The hazardous waste would be disposed in a Class I landfill. A hazardous waste generator number is required to dispose of waste in a Class I landfill. The project owner would be required to obtain and retain a unique hazardous waste generator number for the site prior to starting construction, pursuant to proposed Condition of Certification **WASTE-7**.

Nonhazardous Wastes

Nonhazardous waste would be generated from the demolition of ASTs 1, 2 and 4, EPS Units 1 through 5, and the ancillary equipment for the amended CECP. The amended CECP project would generate approximately 88,573 tons of nonhazardous waste from demolition and 230 tons from construction of the amended CECP power plant (See **Waste Management Table 5**). Nonhazardous waste would consist of wood, glass,

[1] The Asbestos National Emission Standard for Hazardous Air Pollutants (NESHAP), as specified under Rule 40, CFR 61, Subpart M; (enforced locally by the San Diego Air Pollution Control District) .

plastic, paper, scrap metals, concrete, and asphalt. 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.

Waste Management Table 5
Nonhazardous and Hazardous Waste Totals

Project Phase	Phase I	Phase IV	Phase II	(post project)
Waste Types	ASTs1,2,4 & berm (tons)[1]	EPS Demolition(tons)[2]	CECP Construction[2] (tons)	CECP Operation[2] (tons)
Non-Hazardous	4,555	84,018	203	33
Hazardous	1,457	3,803	<1	<1

[1]PTR page 3-13 and Table 3.6-1
[2]PTASource: PTA Section 5.14.2, page 5.14-9, and Tables 5.14-1, Table 5.14-2 and Table 5.14-3

The California Department of Resources Recycling and Recovery (now CalRecycle, formerly California Integrated Waste Management Board (CIWMB)) is responsible for recycling, waste reduction, and product reuse programs in California. CalRecycle also promotes innovation in technology to encourage economic and environmental sustainability. The 2008 California Green Building Standards Code Requires all construction projects to develop a recycling plan to divert and/or recycle at least 50 percent of waste generated during construction, (CalGreen Building Standards Code Section 708 construction Waste Reduction, Disposal and Recycling). Approximately 45,000 tons of concrete and 36,000 tons of metal would be recycled (LL 2014p Data Response 7).

Nonhazardous liquid wastes would also be generated during construction, including sanitary wastes, dust suppression and stormwater drainage, and equipment wash and test water. Sanitary wastes would be collected in portable, self-contained chemical toilets and pumped periodically for disposal at an appropriate facility. Potentially contaminated equipment wash and/or test water would be contained at designated areas, tested to determine if hazardous, and either discharged to the storm water retention basin (if nonhazardous) or transported to an appropriate treatment/disposal facility. Please see the **SOIL & WATER RESOURCES** section of this document for more information on the management of project wastewater.

Hazardous Wastes

An estimated of 5,260 tons of hazardous wastes would be generated during various phases of project demolition and construction activities. Waste would include asbestos waste, electrical equipment, used hydraulic fluids, oils, greases, oily filters, spent selective catalytic reduction catalysts, cleaning solutions and solvents, and batteries. 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.). In addition, spills and unauthorized releases of hazardous materials or hazardous wastes may generate contaminated soils or materials that may require corrective action and management as hazardous waste. Proper hazardous material handling and good housekeeping practices would help keep spill wastes to a minimum. However, to ensure proper

cleanup and management of any contaminated soils or waste materials generated from hazardous materials spills, Condition of Certification **WASTE-11** would require 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 amended CECP are provided in the **HAZARDOUS MATERIALS MANAGEMENT** section of the PSA.

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 the petition section 5.14.2.1.1 and concluded that all wastes would be disposed in accordance with all applicable LORS (LL 2014b and LL 2014p). Should any construction waste management-related enforcement action be taken or initiated by a regulatory agency for the amended CECP, the project owner would be required by Condition of Certification **WASTE-8** to notify the Energy Commission's CPM whenever the owner becomes aware of any such action.

Operation Impacts and Mitigation

The operation of the amended CECP project would produce a variety of mixed wastes, such as but not limited to soil, wood, metal, and concrete, etc. Operation non-hazardous waste would generate approximately 33 tons per year (LL 2014d 5.14-9).

The Ocean Water Purification System would not be included as part of the amended CECP (see the **SOIL & WATER RESOURCES** section). Staff proposes to delete condition of certification **WASTE-10** because the briny waste that would need to be characterized and disposed would no longer be generated.

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. Condition of Certification **WASTE-9** would require the petitioner to submit to the CPM for approval, an Operation Waste Management Plan discussing how the project would generate, divert and dispose of material.

Impact on Existing Waste Disposal Facilities

Non-Hazardous Wastes

The amended CECP facility would generate nonhazardous solid waste that would add to the total waste generated in San Diego County, California. The proposed project would generate 88,573 tons (177,146 cubic yards) of solid waste during Phase I and Phase IV demolition, approximately 203 tons (1,353 [2] cubic yards) of solid waste during Phase II construction, and approximately 33 tons (220 cubic yards) per year would be

[2] The volume estimates (cubic yards) for solid/non-hazardous waste are staff generated numbers based on a conversion factor of approximately 906 pounds per cubic yard (taking into account amount of ferrous metal and cement) and 300 pounds per cubic yard for construction waste (CECP Tables 5.14-1, 5.14-2 and Table 5.14-3). See http://www.calrecycle.ca.gov/lgcentral/library/dsg/apndxi.htm .

produced during ongoing amended CECP operations (LL 2014b and LL 2014d). Nonhazardous waste would be disposed in a California Class III landfill (LL 2014b Section 3.6.1.1.1).

Every three years the California Building Standards Commission adopts new and/or updated model codes. These new codes are known as the California Green Building Standard Code (CALGreen). CALGreen is Part 11 of the California Building Standards code and is the first statewide "green" building code in the U.S. Effective January 1, 2014, CALGreen mandates permitted new residential and non-residential building construction, demolition, and certain additions and alteration projects to recycle and/or salvage for reuse a minimum 50 percent of the nonhazardous C&D debris generated during the project (CALGreen Title 24 Part 11 sections 4.408, 5.408, 301.1.1 and 301.3). New construction and demolition projects with a combined disposal weight of less than four lbs/ft^2 in low rise (three stories or less) new residential structures and two lbs/ft^2 in non-residential and high rise (four stories or more) residential buildings meet the 50 percent minimum diversion requirement.

Additions to non-residential buildings or structures of at least 1,000 square feet or alterations with an estimated construction cost of at least $200,000 shall divert from landfills at least 50 percent of nonhazardous C&D materials. Enforcing agencies can require contractors to develop and maintain a waste management plan and/or utilize a waste management company that certifies a minimum 50 percent waste diversion. The petitioner proposes to recycle 91 percent of the waste generated or 81,000 tons or metal and concrete from the EPS exhaust stack and power plant enclosure building. The petitioner also proposes to recycle metal and concrete from the Phase I AST 1, 2 and 4 demolition. Staff reviewed the petitioner's plans for recycle and anticipates that the petitioner will meet the 50 percent diversion requirement of CALGreen.

Waste Management Table 6 presents details of three non-hazardous (Class III) waste disposal facilities that could potentially take the non-hazardous construction and operation wastes that would be generated but could not be diverted by the amended CECP. Total solid waste disposal in San Diego County in 2013, was 3,360,593 tons[3]. The remaining capacity for the three San Diego County landfills listed in the AFC combined is approximately 82.5 million cubic yards. Eighty-one tons or 162,000 cubic feet of metal and concrete would be recycled. The total amount of non-hazardous waste generated from project demolition, construction, and operation after the material has been diverted to the maximum extent feasible would contribute less than one percent of the available landfill capacity. Staff concludes that disposal of the solid wastes generated by the amended CECP could occur without significantly impacting the capacity or remaining life of any of these facilities.

[3] http://www.calrecycle.ca.gov/SWFacilities/Landfills/Tonnages/.

Waste Management Table 6
Recycling/Disposal Facilities

Landfill	Location	Permitted Capacity	Remaining Capacity	Estimated Closure Date
	City	Cubic yards	Cubic yards	
Class III - Nonhazardous				
Sycamore Sanitary Landfill	San Diego, CA	71 million	42 million	2031
West Miramar Landfill	San Diego, CA	88 million	15 million	2022
Otay Landfill	Chula Vista, CA	61	25.5 million	2028
Class I -Hazardous Waste				
Clean Harbors Buttonwillow (Class I)	Kern, CA	13.1 million	12.8 million	2040

Source: LL 2014b Table 3.6-2 and Section 3.6.1.2.2

Hazardous Waste

The petitioner proposes to dispose of hazardous waste in the Buttonwillow landfill. The landfill has approximately 12.8 million cubic yards of remaining hazardous waste disposal capacity, with up to 25 years of combined remaining operating lifetime (LL 2014b, Table 3.6-2).

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.”

Long-term cumulative impacts are not anticipated with the implementation of the amended CECP and the listed projects because each project is required to comply with CEQA guideline requirements for evaluating potential cumulative impacts, and /or demonstrating conformance to existing CALGreen (Title 24) C&D regulations and ordinances. As proposed, the amount of non-hazardous and hazardous wastes generated during construction and operation of the amended 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 88,809 tons of solid waste during demolition, construction and operation. Approximately 81,000 tons of the waste would be recycled. 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. The amount of hazardous waste generated for the project would use less than one half a percent of the total Buttonwillow Class I capacity, therefore staff concludes there would be no impact to the landfill capacity.

The amended CECP PSA **Executive Summary Table 1 - Cumulative Projects**- lists 32 projects. The projects vary in size and there is no data detailing the amount of waste that would be generated from the various projects, however, all residential, commercial and industrial projects would have to comply with Cal Recycle, Mandatory Commercial

Recycling, Title 14, Division 7, Chapter 9.1.[4] and Title 24 (CALGreen). The implementation of these regulations would reduce solid waste disposal in San Diego County. All of the projects listed would be required to recycle 50 to 75 percent of the waste generated from their project, thus minimizing the amount of waste generated from construction and demolition of new and current projects. In 2013, 2.9 million tons of solid waste was landfilled in San Diego County. The amended 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 modified project would comply with all applicable LORS regulating the management of hazardous and non-hazardous wastes during both facility construction and operation. The petitioner is required to recycle and/or dispose of hazardous and non-hazardous wastes at facilities licensed or otherwise approved to accept the wastes. Because hazardous wastes would be produced during project demolition, construction and operation, the proposed modified project would be required to obtain or maintain the existing hazardous waste generator identification number from U.S. EPA. The proposed modified project 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. Staff concludes the population in the six-mile project buffer constitutes an environmental justice population, as defined by Environmental Justice: Guidance Under the National Environmental Policy Act (**SOCIOECONOMICS** section).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 would be no significant waste management 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 petitioner's proposed waste management procedures, staff concludes that project wastes would be managed in compliance with all applicable waste management LORS. Staff notes that demolition, 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

[4] Regulatory requirements; Businesses and public entities that generate four or more cubic yards of solid waste per week, and multifamily residential dwellings that have five units or more, take action to reuse, recycle, compost or otherwise divert commercial solid waste from disposal.

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 **12**. These conditions would require the project owner to do all of the following:

- Once the petitioner identifies which areas of contamination would be remediated, staff proposes conditions that 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** and **12**).
- Prepare Construction and Demolition Waste Management and Operation Waste Management Plans detailing the types and volumes of wastes to be generated and how wastes would be managed, recycled, and/or disposed of after generation (**WASTE-5** and **9**).
- Report any waste management-related LORS enforcement actions and how violations would be corrected (**WASTE-8**).
- 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-11)**.

2) Existing conditions at the amended 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**, **4**, **6**, **8, 11,** and **12**. 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 amended 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 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 82.5 million cubic yards. The total amount of nonhazardous wastes generated from construction and operation of amended CECP 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 Class I disposal facility that could be used for hazardous wastes generated by the construction and operation of the amended CECP has a remaining capacity of 12.8 million cubic yards. The total amount of hazardous wastes generated by the amended CECP project would contribute less than one percent of the remaining permitted capacity. Therefore, impacts from disposal of amended CECP generated hazardous wastes would also have a less than significant impact on the remaining capacity at Class I landfills.

Staff removed Condition of Certification **WASTE-10**. The Ocean Water Purification System is not included in the amended CECP.

Staff concludes that management of the waste generated during demolition, construction and operation of the amended CECP 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 amended CECP AFC and staff's proposed conditions of certification are implemented.

PROPOSED CONDITIONS OF CERTIFICATION

Staff has proposed modifications to the **WASTE MANAGEMENT** conditions of certification as shown below. (**Note:** Deleted text is in ~~strikethrough~~, new text is **bold and underlined**)

WASTE-1 The project owner shall ensure that the **project** site is properly characterized and remediated as necessary pursuant to the Corrective Action Plan reviewed and approved by the San Diego County Department of Environmental Health (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 **the project owner** and SDCDEH regarding the Corrective Action Plan requirements and activities at the **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 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 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: At least 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 date when all ASTs were removed from the site.

WASTE-3 The project owner shall provide the résumé 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 résumé 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 résumé 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, authorized representatives of ~~**Department of Toxic Substances Control (DTSC), the**~~ SDCDEH, 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 authorized representatives of SDCDEH, and the CPM for guidance and possible oversight.

Verification: The project owner shall submit any final reports filed by the professional engineer or professional geologist to the authorized representatives ~~**of DTSC, the**~~ SDCDEH, and the CPM for approval within five days of their receipt. The project owner shall notify the CPM within 24 hours of any orders issued to halt construction.

WASTE-5 The project owner shall prepare a Demolition and Construction Waste Management Plan for all wastes generated during demolition and construction of the facility and shall submit the plan to the CPM for review and approval. The plan may be submitted in two sections: Demolition activities and Construction activities. Both sections of the plan shall contain, at a minimum, the following:

- a description of all demolition and 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.
- A reuse/recycling Debris Management Plan for demolition and construction materials that meets or exceeds the waste diversion goals established by the Integrated Waste Management Compliance Act (Pub. Resources Code, § 41780 et seq.) and CALGreen Title 24, Part 11sections 4.408, 5.408, 301.1.1 and 301.3.

Verification: The project owner shall submit the demolition section of the Demolition and Construction Waste Management Plan to the CPM for approval at least 30 days prior to the initiation of demolition activities at the site. The project owner shall submit to the ~~Construction section of the Demolition and Construction Waste Management Plan to the CPM for approval at least 30 days prior to the initiation of construction activities at the site.~~ CPM copies of receipts from a construction and demolition recycling facility certified by the city of San Diego.

WASTE-6 Prior to demolition of existing structures, the project owner shall complete and submit a copy of a **San Diego County Air Pollution Control District** ~~SDCDEH~~ Asbestos **Renovation and** Demolition Notification Form to the CPM and the SDCDEH for approval. **~~After receiving approval, the~~The** project owner shall remove all **asbestos-containing material** (ACM) from the site prior to demolition.

Verification: At least **~~60~~** ten days prior to commencement of structure demolition, the project owner shall provide the Asbestos **Renovation and** 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 ten 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;
- all information and reports 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 at least 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 the requirements of California Code of Regulations, Title 22, Section 66262.10, report the findings to the CPM, and ensure that the filter cake is properly transported and deposited at an appropriate disposal facility.~~

~~**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.

WASTE-12 The project owner shall prepare and submit to the CPM and SDCDEH, a Soils Management Plan (SMP) prior to any demolition. The SMP must be prepared by a California Professional Geologist, or a California Registered Civil Engineer with sufficient experience in hazardous waste management. The SMP shall be updated as needed to reflect changes in laws, regulations or site conditions. A SMP summary report, which includes all analytical data and other findings, must be submitted once the earthwork has been completed. Topics covered by the SMP shall include, but not be limited to:

- **Land use history, including description and locations of known contamination.**
- **The nature and extent of previous investigations and remediation at the site.**
- **The nature and extent of unremediated areas at the site.**
- **A listing and description of institutional controls, such as the city's excavation ordinance and other local, state, and federal regulations and laws that will apply to the project.**
- **Names and positions of individuals involved with soils management and their specific role.**
- **An earthwork schedule.**
- **A description of protocols for the investigation and evaluation of historically related chemicals such as DDT and previously unidentified contamination that may be potentially encountered, including any temporary and permanent controls that may be**

required to reduce exposure to onsite workers, visitors, and the public.

- **Hazardous waste determination and disposal procedures for known and previously unidentified contamination.**
- **Requirements for site specific techniques at the site to minimize dust, manage stockpiles, run-on and run-off controls, waste disposal procedures, etc.**
- **Copies of relevant permits or closures from regulatory agencies**

Verification: At least 45 days prior to any earthwork, the project owner shall submit the SMP to the CPM for review and approval. All earthworks at the site shall be based on the SMP. A SMP summary shall be submitted to CPM and SDCDEH within 25 days of completion of any earthwork.

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CEC2014s – California Energy Commission (TN202992). Carlsbad Energy Center Project Amendment (07-AFC-06C), Data Requests Set 2 (#31-58). Submitted 08/27/2014.

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LL2014c – Locke Lord LLP (TN202287-1). Locke Lord Cover letter for Carlsbad Energy Project, Petition to Amend and Petition to Remove, dated May 2, 2014. Submitted 05/02/2014.

LL2014d – Locke Lord LLP (TN202287-2). Petition to Amend Carlsbad Energy Center Project. Submitted 05/02/2014.

LL2014e – Locke Lord LLP (TN202287-3). Petition to Amend Carlsbad Energy Center Project, Part Two, Appendix 2A-5.11A. Submitted 05/02/2014.

LL2014g – Locke Lord LLC (TN202390). Letter Requesting Approval of the Petition to remove separate for the Commission Approval of Petition to Amend. Submitted 05/28/2014.

LL2014j – Locke Lord LLP (TN202683). Pre-Hearing Brief in Favor of the Commission Processing the Petition to Remove Separately from the Petition to Amend. Submitted 07/11/2014.

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LL2014n – Locke Lord LLP (TN202886). Objections to Data Request Set 1 and Request for Time Extension. Submitted 08/05/2014.

LL2014p – Locke Lord LLP (TN202938). Project Owner's Response to Data Requests in Set 1 (#1-30). Submitted 08/15/2014.

LL2014s – Locke Lord LLP (TN203021). Request for Response Time Extension to Power of Vision's Data Request Set 1, Submitter Dee Hutchinson, dated September 2, 2014. Submitted 09/03/2014.

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LL2014v – Locke Lord LLP (TN203082). Petition to Remove, Staff Information Request – Traffic & Transportation, dated September 18, 2014. Submitted 09/18/2014.

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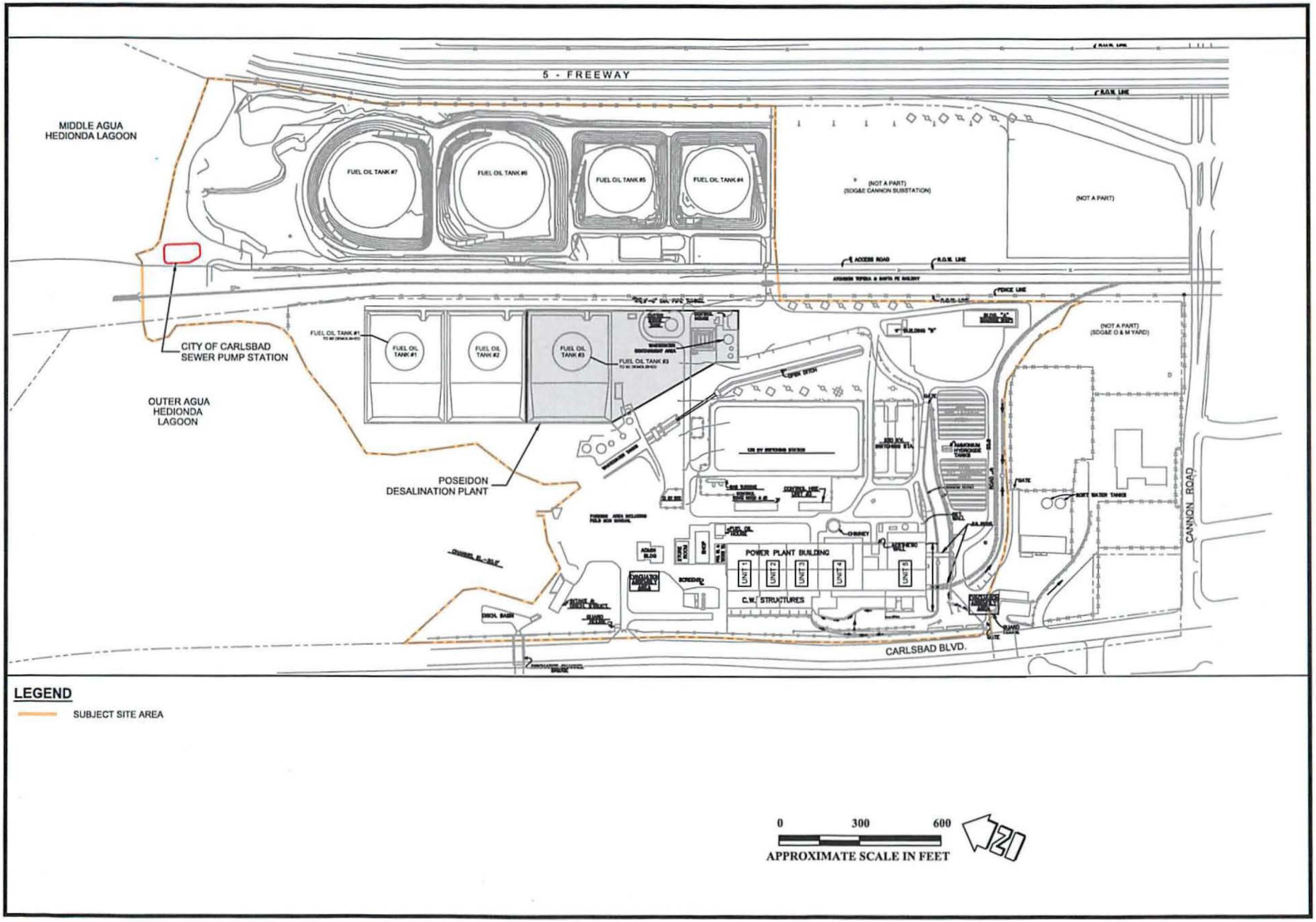
LL2014dd – Locke Lord LLP (TN203148) – Status Report 1, dated October 2, 2014. Submitted 10/02/2014.

WASTE MANAGMENT - FIGURE 1

Carlsbad Energy Center Project Amendment - Site Layout Map

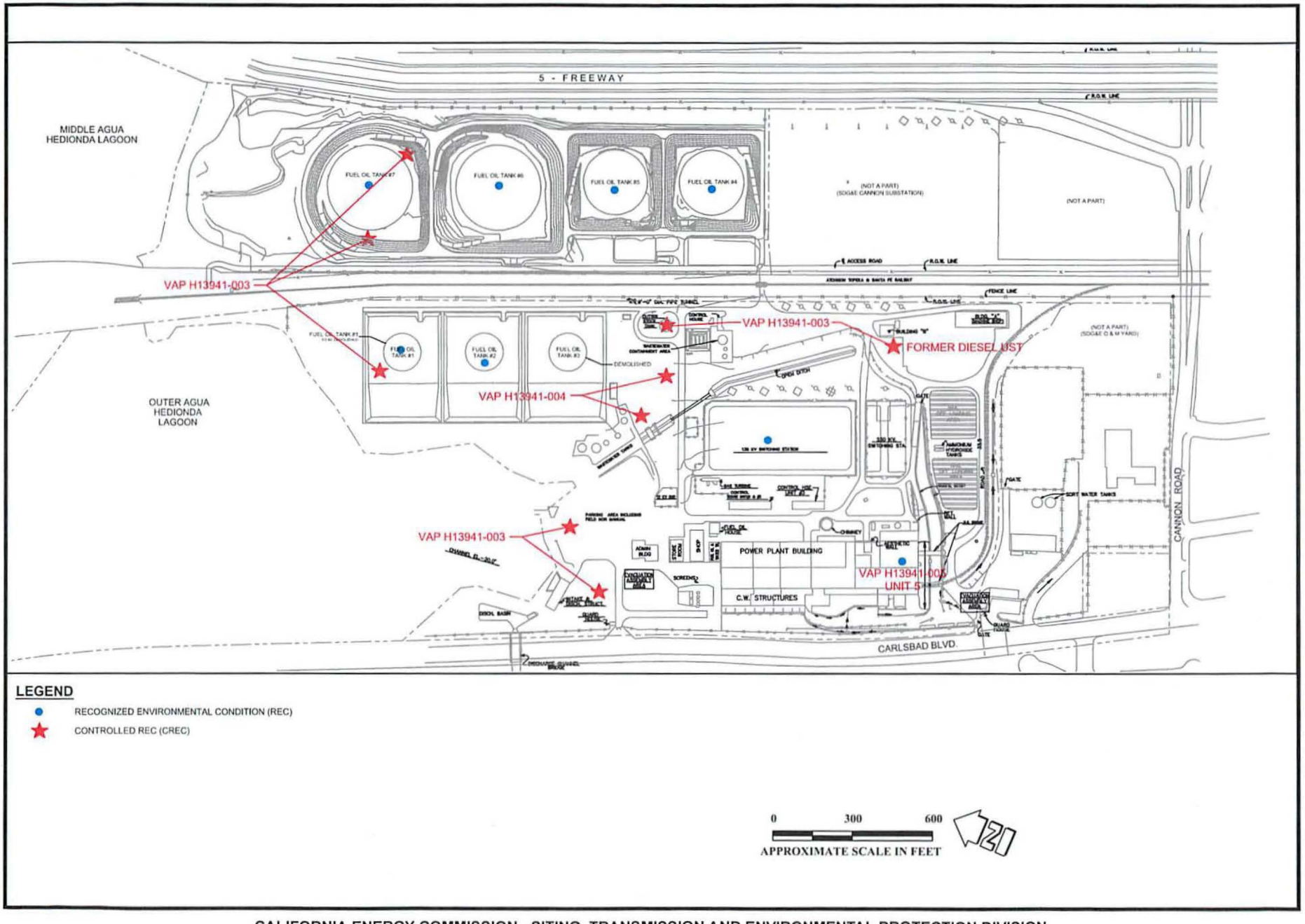


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: 2014 Environmental Site Assessment Figure 3

WASTE MANAGMENT - FIGURE 2

Carlsbad Energy Center Project Amendment - Areas with Controlled & Current Recognized Environmental Conditions



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: 2014 Environmental Site Assessment Figure 5

WORKER SAFETY & FIRE PROTECTION

Alvin Greenberg, Ph.D.

SUMMARY

Energy Commission Staff (staff) concludes that the amended Carlsbad Energy Center Project (amended CECP), would incorporate sufficient measures to ensure adequate levels of industrial safety and comply with applicable laws, ordinances, regulations, and standards. The amended CECP includes tank demolition, construction and operation of the amended CECP, and the closure/decommissioning and demolition of the Encina Power Station (EPS). Staff recommends that the project owner provide a Project Construction Safety and Health Program, a Project Operations and Maintenance Safety and Health Program, and a Demolition 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 **-12**.

The proposed conditions of certification provide assurance that a Construction Safety and Health Program, and Operations and Maintenance Safety and Health Program, and a Demolition Safety and Health Program would be reviewed by the appropriate agencies and the Energy Commission compliance project manager before implementation. The conditions also require verification that the proposed plans adequately assure worker safety and fire protection and comply with applicable laws, ordinances, regulations, and standards. Staff recommends that existing Condition of Certification **WORKER SAFETY-8** be deleted as it is no longer necessary to require operations personnel to be on-site when the power plant is operating. The amended CECP would have the control room on-site.

The Carlsbad Fire Department (CFD) has stated that its ability to supply emergency services (fire, rescue, EMS, and hazmat spill response) during all phases of tank removal, construction, and operation of the amended CECP, during demolition of the EPS, as well as during a major area-wide crisis, would not be impacted by the operation of this power plant. The CFD Fire Marshall has stated that the present configuration with a below-ground bowl and with the currently-aligned fire lanes would provide adequate access for emergency response personnel and equipment and also be safe for fire fighters. Staff has determined that the proposed modified project as described in the petition would not have a direct incremental or cumulative impact on the fire department's ability to respond to a fire or other emergency under unique catastrophic circumstances and thus mitigation is not required. Please see the **SOCIOECONOMICS** section of this Preliminary Staff Report (PSA) for more information on impacts the amended CECP would have on public safety resources.

INTRODUCTION

As discussed in detail in the **PROJECT DESCRIPTION** of this PSA, the amended CECP would be different than the licensed CECP approved by the Energy Commission on May 31, 2012. For that reason, an evaluation of impacts, including the potential for changes or additions to the licensed CECP conditions of certification is required. The

amended CECP proposes implementing the following general changes and modifications to the licensed CECP:

1. Add the demolition of three additional above-ground fuel oil storage tanks (AST's 1, 2 and 4), associated piping and equipment, removal of oily sands from under ASTs 1, 2, and 4, and removal of a an earthen berm between ASTs 4 and 5.
2. Change in generation equipment and technology from Siemens fast response, combined-cycle to six natural gas-fired GE LMS 100 simple-cycle turbines with approximately 632 MW net output of electrical generating capacity.
3. Add retirement and demolition of Encina Power Station (EPS). Units 1 through 5 would be retired and all above-grade elements of the EPS power and support buildings would be demolished and removed.

See the **PROJECT DESCRIPTION** section of this PSA for more details.

LAWS, ORDINANCES, REGULATIONS, AND STATUTES

The amended CECP would continue to comply with all currently applicable worker safety and fire protection laws, ordinances, regulations, and standards (LORS). The proposed activities would not trigger any additional worker safety or fire protection LORS. However, the city of Carlsbad adopted the most recent version of the California Fire Code as its city fire code in 2014 and staff added to this analysis for emphasis a Cal-OSHA regulation regarding elevated work platforms. The following federal, state, and local laws and policies as described in the Decision (CEC2012a) continue to apply to the protection of public health and hazardous materials management. Staff has updated this table to reflect the new fire code and to emphasize safe work practices for elevated platforms. See items 8 Cal Code Regs 3642 and Carlsbad Municipal Code Chapter 17.04 Carlsbad City Ordinance No. CS-246 adopted 4/22/14.

Worker Safety & Fire Protection Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable LORS	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.
Title 8, Cal Code Regs 3642	This Cal-OSHA regulation requires that elevating work platforms – including mast climbing platforms – have certain specified safety devices and be operated in a specific safe manner.
Title 24, Cal Code Regs. section 3, et seq.	This section incorporates the current edition of the International Building Code.
Health and Safety Code section 25500, et seq.	This section presents Risk Management Plan requirements for threshold quantities of listed acutely hazardous materials at a facility.
Health and Safety Code sections 25500 to 25541	These sections require a Hazardous Material Business Plan detailing emergency response plans for hazardous materials emergency at a facility.
Local (or locally enforced)	
Carlsbad Municipal Code Chapter 17.04 Carlsbad City Ordinance No. CS-246 adopted 4/22/14	The city of Carlsbad adopted the 2013 California Fire Code in April 2014. 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, including NFPA 850. Enforced by the Carlsbad Fire Department.

SETTING

The amended CECP 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. There are a total of six fire stations within the city of Carlsbad. The closest station to the amended 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 six minutes (CECP 2007a, § 5.16.4.5). The

next closest station would be Station #4, located at 6885 Batiqutos Drive, about 3.7 miles away, which would respond within seven to eight minutes (CFD 2008).

The CFD would also be the first responder to incidents involving hazardous materials, with backup support provided by 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 are trained paramedics (CFD 2008).

ASSESSMENT OF IMPACTS

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 would 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 for use 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 modified 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 AND CUMULATIVE IMPACTS

Industrial environments are potentially dangerous during construction and operation of facilities. Workers at the proposed amended 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 amended 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 would be adequately protected from health and safety hazards.

Staff reviewed and evaluated the petitioner's proposed activities and has the following findings:

- Staff has determined that the requested removal of existing former above-ground oil storage tanks – ASTs 1, 2, and 4, associated piping, a berm between ASTs 4 and 5, and oily sands from under ASTs 1, 2, and 4 – are reasonable and that no additional worker safety and fire protection impacts are anticipated beyond those discussed in the licensed CECP Commission (Final Decision) (CEC 2012a) as a result of the additional proposed tank demolition and other activities.

- Staff concludes that the petition (LL 2014d) along with the responses to staff's data requests (LL 2014x and LL 2014cc) provide adequate information for staff to review and assess potential worker safety and fire protection impacts associated with the requested activities. Staff proposes that prior to the start of demolition and removal of the ASTs, the project owner prepare and then implement a Demolition and Construction Safety and Health Program consisting of three parts: One part addressing tank demolition activities and the demolition and removal of the EPS, and a second part addressing power plant construction activities (see Condition of Certification **WORKER SAFETY-1)**. It is the intent of staff that the Demolition Safety and Health Program part be specific to and apply to both the removal of the ASTs and the demolition and removal of the EPS.

- Staff has determined that the 400-ft. tall stack of the EPS is a stack within a stack and that the demolition and removal of the stack and the adjoining power station buildings and units, as described in the "*Encina Power Station Demolition Plan*" (LL 2014cc, attachment to DR64-1) would provide a sound basis for safely removing the stack with minimal impact to the surrounding off-site community. Staff finds that inclusion of this plan in proposed revised Condition of Certification **WORKER SAFETY-1** would enhance safety and assure that the risks to workers and the off-site public during the demolition and removal of the EPS are less than significant.

- Staff has determined that during demolition activities (including the demolition and removal of the EPS), construction, and operation of the proposed amended CECP, there is the potential for both small fires and major structural fires. Staff reviewed the information 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 modified project's impact on fire protection services in the area. CFD has stated that its ability to supply emergency services

(fire, rescue, EMS, and hazmat spill response) during all phases of tank removal, construction, and operation of the amended CECP and during demolition of the EPS, as well as during a major area-wide crisis would not be impacted by the operation of this power plant. The CFD Fire Marshall stated that the present licensed configuration with a below-ground bowl, the currently-aligned fire lanes, the upper "ring" road, and the existing upper fire water loop and hydrants, would provide adequate access for emergency response personnel and equipment, adequate fire water, and also be safe for fire fighters. Staff has therefore determined that the proposed project would not have a direct incremental or cumulative impact on the fire department's ability to respond to a fire or other emergency under unique catastrophic circumstances and thus mitigation is not required. Additionally, compliance with all LORS would be adequate to assure protection from all fire hazards.

- In the petition (LL 2014d), it is stated that a new compressor building would be located in the North East corner of the facility. The proposed natural gas compressors would need to be enclosed to mitigate noise. However, enclosing these compressors poses the potential for explosion if leakage of natural gas were to occur. The accumulation of natural gas in the enclosure can create a flammable and potentially explosive mixture of fuel and air. The potentially applicable codes with regard to appropriate fire protection measures for compressor enclosures within power plants can be found in NFPA 850. Instead of treating the enclosure as an occupied building with an occupancy class requiring a water deluge system – a method that is ineffective to prevent conditions that potentially can lead to a fire fueled by natural gas that is leaking outside of the enclosure, i.e. flare type fire - NFPA 850 treats the enclosure as an industrial enclosure. Yet, NFPA 850 does not specify fire suppression requirements. Staff believes NFPA 850 provides the proper designation, because an industrial enclosure is neither normally occupied nor near occupied buildings, but NFPA 850 does not adequately address fire protection measures.

  Staff proposes Condition of Certification **WORKER SAFTY-12** to address this oversight. This proposed condition of certification treats the compressor enclosure as an industrial enclosure and requires compliance with 40 CFR 192 Sections 163 through171 which describe fire protection measures. 40 CFR normally would not be applicable, as these provisions normally apply only to compressor enclosures along a natural gas pipeline. However, staff recommends the provisions and protection afforded by compliance to 40 CFR. These requirements mandate a system of continuous measurement of natural gas levels in the enclosure with a mechanism for automatic ventilation if the concentrations of natural gas approach a small fraction of the combustible limit. This system is necessary to maintain natural gas concentrations well below the combustible limit of the mixture of fuel and air in the event of low levels of leakage. 40 CFR requirements also mandate the ability to shut off the supply of natural gas from the transmission pipeline through double block and bleed valves in the event of a larger release of fuel. This requirement provides a means of controlling a release of fuel that exceeds the capability of the forced draft protections to control for combustible conditions. Staff believes that this approach provides the most effective fire and explosion mitigation and provides the most effective protection of both workers and the public.

- Staff has determined that emergency access to the site would be slightly different for the amended CECP as compared to the licensed CECP. The amended CECP would continue to have both a primary and secondary access route but these would be slightly modified. The project owner and the Carlsbad Fire Department have developed a mutually agreeable, revised, fire access route through the proposed power plant property (Cabrillo Parcel) that is designed to allow access to each of the six units, onsite appurtenances, and support facilities at the amended CECP. These routes are shown in Figure 2.2.4 of the petition and include an east–west connecting road within the Cabrillo Parcel and an increased turning radius on the northern end of the parcel. The revised secondary fire access route would enter from Cannon Road and follow north on a dirt road adjacent to the existing railroad tracks to the southwest corner of the amended CECP boundary. The revised fire access routes would comply with Condition of Certifications **WORKER SAFETY-6** and **WORKER SAFETY-9**, contained in the Final Decision. Staff agrees with this approach and finds that site access is enhanced.
- Staff has determined that the petitioner's proposal to use raw water for firefighting that would be stored in an approximately 500,000-gallon aboveground storage tank (LL 2014d; section 5.15.3.2) and ocean water as a backup is not appropriate. Despite the proposal to use both a newly-installed fire loop in the bowl and the existing rim area hydrants for firefighting, it is staff's position that potable water from the city of Carlsbad as previously approved in the licensed CECP is the preferable source of water. Therefore, staff does not agree with the petitioner's proposal to revise existing Condition of Certification **WORKER SAFETY-11**.
- Staff remains concerned about the safety of workers and critical power plant equipment when the future expansion of Interstate-5 occurs. Staff finds that continued adherence to existing Condition of Certification **WORKER SAFETY-7** would not only provide for worker safety against runaway vehicles crashing the I-5 fence line and falling into the amended CECP site but would also protect against damage to critical infrastructure and blockage of fire access roads. Therefore, staff continues to support this condition.
- Staff agrees with the Carlsbad Fire Marshall that the present configuration with a below-ground bowl with sloped walls and with the currently-aligned fire lanes would provide adequate access for emergency response personnel and equipment and also be safe for fire fighters should they need to exercise emergency evacuation procedures. Therefore, staff would oppose any suggestion to change this configuration without proper mitigation.

Cumulative Impacts and Mitigation

Staff reviewed the potential for the construction and operation of the amended CECP combined with existing industrial facilities and expected new facilities, including the existing adjacent Encina Power Station and Carlsbad Poseidon Desalination Project, to result in a significant cumulative impact on the fire and emergency service capabilities of the CFD. A significant cumulative fire protection impact is defined as the simultaneous emergency at multiple locations that would require the concurrent response for rescue; firefighting, hazardous materials spill control, and/or EMS response. Existing locations that would likely need emergency response, or locations where such facilities might likely be built, were both considered.

Table 1 of the **EXECUTIVE SUMMARY** of this PSA provides a list of more than 32 projects located within six miles of the amended CECP site that are built, under construction, or are reasonably expected to be built. With the exception of the existing Encina Power Plant and the Carlsbad Poseidon Desalination Project (currently under construction between the amended CECP site and the existing EPS), all the remaining existing or planned projects in the vicinity of the proposed amended CECP would not present any unique or significant hazard warranting an extraordinary emergency fire, rescue, hazmat spill, or EMS response that may have a potential cumulative impact. Since the EPS would cease operations as soon as the amended CECP starts commissioning cumulative impacts from this facility are not expected to occur.

According to the Environmental Impact Report (EIR) for the Carlsbad Poseidon Desalination Project (Carlsbad 2005), the desalination facility would have the potential for fire, hazmat spills, and EMS response. However, the Poseidon EIR found that "*The proposed project will be required to comply with all of the standards and design requirements of the Carlsbad Fire Department, which include adequate emergency access, installation of fire sprinklers and maintenance of fire suppression equipment. The Carlsbad Fire Department currently has the facilities and personnel to accommodate the project, and it is not anticipated that any adverse impacts to service delivery would result from implementation of the project, and impacts are less than significant* (Carlsbad 2005, section 4.11-3).

The amended CECP project owner would develop and implement a fire protection program independent of any other projects considered for potential cumulative impacts, as would the desalination facility. Staff believes that the amended CECP, as proposed by the petitioner and with the additional mitigation measures proposed by staff, poses an insignificant risk of fire, need for rescue, hazmat spill, and EMS response that could result in significant direct or cumulative impacts to the CFD. It is unlikely that the need for emergency response that has very low probability of occurrence would independently occur at the amended CECP site and another facility at the same time. Furthermore, given the CFD's opinion that it has the ability to respond to a need for emergency services at the amended CECP, staff concludes that no mitigation is required.

COMPLIANCE WITH LORS

Staff concludes that demolition of the ASTs, construction and operation of the amended CECP modified project, and the demolition and removal of the EPS would be in compliance with all applicable laws, ordinances, regulations, and standards (LORS) regarding long-term and short-term modified project impacts in the area of worker safety and fire protection of the existing conditions of certification are maintained and staff's proposed revisions and proposed new conditions are adopted.

CONCLUSIONS AND RECOMMENDATIONS

Staff concludes that if all the existing conditions of certification are maintained and staff's proposed revised and new conditions of certification are adopted, the requested activities described in the petition consisting of removal of existing former above ground oil storage tanks ASTs 1, 2, and 4, associated piping, a berm between ASTs 4 and 5, and oily sands from under ASTs 1, 2, and 4, and other requested activities consisting of the construction and operation of the modified CECP and the demolition of the existing EPS be approved. Staff also concludes that if the petition is approved along with staff's recommended revisions and additions to the conditions of certification, the project would continue to comply with all applicable LORS.

Staff additionally 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

~~Strikethrough~~ is used to indicate deleted language and **bold underline** is proposed for new language.

One new Condition of Certification is proposed along with minor revisions to existing Conditions to reflect demolition activities, time-line, and verification schedule.

WORKER SAFETY-1 The project owner shall submit to the compliance project manager (CPM) a copy of the Project **Demolition and** Construction Safety and Health Program containing the following:

1. a **Demolition and** Construction Personal Protective Equipment Program;
2. a **Demolition and** Construction Exposure Monitoring Program;
3. a **Demolition and** Injury and Illness Prevention Program;
4. a **Demolition and** Emergency Action Plan; and
5. a **Demolition and** Fire Prevention Plan.
6. **an Encina Power Station Demolition 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 **Demolition and** Construction Emergency Action Plan, ~~and~~ **the Demolition and Construction** Fire Prevention Plan**, and an Encina Power Station Demolition 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 tank **demolition** ~~construction~~, the project owner shall submit to the CPM for review and approval a copy of the Project

Demolition and 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 **Demolition and** Construction Fire Prevention Plan and Emergency Action Plan.

At least 30 days prior to the start of the demolition of the Encina Power Station, the project owner shall submit to the CPM for review and approval a copy of the Encina Power Station Demolition Plan. The project owner shall provide a copy of a letter to the CPM from the Carlsbad Fire Department (CDF) stating the fire department's comments on the Encina Power Station Demolition 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 approval 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 **Demolition Safety Supervisor (DSS) and a** Construction Safety Supervisor (CSS) who, by way of training and/or experience, ~~is~~ **are** knowledgeable of **tank demolition**, power plant construction activities, and relevant laws, ordinances, regulations, and standards; ~~is~~ **are** capable of identifying workplace hazards relating to the **demolition and/or** construction activities; and have authority to take appropriate action to assure compliance and mitigate hazards. The **DSS or** CSS shall:

1. have overall authority for coordination and implementation of all occupational safety and health practices, policies, and programs;

2. assure that the safety program for the project complies with Cal/OSHA and federal regulations related to power plant projects;

3. assure that all **demolition**, construction and commissioning workers and supervisors receive adequate safety training;

4. complete accident and safety-related incident investigations and emergency response reports for injuries and inform the CPM of safety-related incidents; and

5. assure that all the plans identified in Conditions of Certification **Worker Safety-1** and **-2** are implemented.

Verification: At least **30** ~~60~~ days prior to the start of **tank demolition** ~~site mobilization~~, the project owner shall submit to the CPM the name and contact information for the **Demolition Safety Supervisor (DSS) and the** Construction Safety Supervisor (CSS). The contact information of any replacement **DSS or** CSS shall be submitted to the CPM within one business day.

The **DSS and** CSS shall submit in the Monthly Compliance Report a monthly safety inspection report to include:

1. record of all employees trained for that month (all records shall be kept on site for the duration of the project);

2. summary report of safety management actions and safety-related incidents that occurred during the month;

3. report of any continuing or unresolved situations and incidents that may pose danger to life or health; and

4. 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 **and shall do this during the period of tank demolition/removal, construction of the CECP, and demolition/removal of the EPS.**

Verification: At least **30** ~~60~~ days prior to the start of **tank demolition** ~~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 tank **demolition,** construction and operations, **and demolition/removal of the EPS** 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 **demolition of the tanks and the EPS**, 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 **Demolition** or Construction Project Manager or delegate, the **Demolition or** 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 30 ~~60~~ days prior to the start of tank **demolition** ~~site mobilization~~, the project owner shall submit to the CPM a letter stating 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 percent grade) are constructed as per the dimensions shown in **Worker Safety Figure 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 access roads, below-grade perimeter road, and ramps shall be no less than 28 feet wide. The project owner shall guarantee that the two fire access ramps down into the project site and the fire lane around the perimeter of the below-grade site are free and clear of all vehicles, equipment, or any other object (mobile or stationary) at all times and that the boundaries or curbs of the ramps and lanes are painted red and contain signage to indicate that they are fire roads and lanes on which parking is not allowed. 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. 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 **30** ~~60~~ days prior to the start of tank **demolition** ~~site mobilization~~, the project owner shall submit a copy of the final site blueprints to the Carlsbad Fire Department for review and comment 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.

At least 60 days prior to the start of commissioning or the arrival on-site of any liquid fuel, natural gas, or hazardous material, whichever occurs first, the project owner shall submit to the CBO for information, to the Carlsbad Fire Department for review and comment, and to the CPM for review and approval, a signed declaration along with photographic evidence that the access ramps and fire lanes are guaranteed to always be clear and unobstructed and that signs and red paint have been placed in the appropriate locations.

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 I-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 tank **demolition** ~~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. When the units are dispatched from a shutdown condition, the project owner shall send the two workers to the site while commencing startup; and those two workers shall proceed directly to the site. 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 fence line 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 **30** ~~60~~ days prior to the start of tank **demolition** ~~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.

WORKER SAFETY-10 The project owner shall prepare a Transformer Fire Protection Plan which shall evaluate any feasible methods that can be used to prevent, contain, and/or control a transformer fire, including the use of new dielectric fluids, pressure sensors with shut-down capability, dissolved gas analyzers, use of compressed-air-foam for fire suppression, on-site storage of suppressants, and sub-surface vaults to contain spilled/leaked dielectric fluids. The project owner shall submit this Plan to the CBO for information, to the Carlsbad Fire Department for review and comment, and to the CPM for review and approval.

Verification: At least 60 days before the arrival of a transformer on site, the project owner shall submit a copy of the Transformer Fire Protection Plan to the CBO for information, to the Carlsbad Fire Department for review and comment, and to the CPM for review and approval.

Not later than 30 days after submitting the Plan for review, the project owner shall submit a final plan that incorporates comments/suggestions from the CPM and the CFD to the CPM for approval. If no comments are received from the CFD, the project owner shall submit a letter to the CPM stating so.

WORKER SAFETY-11 The project owner shall ensure that the primary source of fire protection water is the city of Carlsbad water system and that the on-site 250,000 gallon storage tank is the back-up supply.

Verification: At least 60 days before commencing commissioning, the project owner shall submit to the Carlsbad Fire Department for review and comment, and to the CPM for review and approval engineering drawings showing the source and piping of the primary and back-up fire protection water supplies and a statement that the primary supply is the city of Carlsbad water system.

WORKER SAFETY-12 The owner shall ensure that the compressor building at the modified amended CECP will comply with NFPA requirements for compressor enclosures and that it will also comply with the requirement set forth in 40 CFR Sections 163 through 171 regarding fire and explosion protection systems.

Verification: At least 30 days prior to the start of construction mobilization, the project owner shall submit to the CPM and the CFD for review and for approval by the CPM, documentation of plans for the compressor enclosure at the modified amended CECP demonstrating compliance with the condition described above.

REFERENCES

Carlsbad 2005. Precise Development Plan and Desalination Plant Project Environmental Impact Report.

CEC 2012a – California Energy Commission (TN66185). Commission Decision on the Carlsbad Energy Center Project Application for Certification, dated June 1, 2012. Submitted July 11, 2012.

CECP 2007a - Carlsbad Energy Center Project (TN42299). Application for Certification for the Carlsbad Energy Center Project, 09/11/2007.

CECP 2007d, - Carlsbad Energy Center Project (TN42303). Application for Certification (AFC), Appendix 5.4A Representative Seismic Geological Report Data, 09/11/2007.

LL 2014b – Locke Lord LLP (TN202267). Petition to Remove Obsolete Facilities to Support Construction of the Carlsbad Energy Project. Submitted 04/29/2014.

LL 2014d – Locke Lord LLP (TN202287-2). Petition to Amend Carlsbad Energy Center Project. Submitted 05/02/2014.

LL2014e – Locke Lord LLP (TN202287-3). Petition to Amend Carlsbad Energy Center Project, Part Two, Appendix 2A-5.11A. Submitted 05/02/2014.

LL2014x – Locke Lord LLP (TN203094). Responses to Data Request Set 2 (Nos. 40-57), dated September 23, 2014. Submitted 09/24/2014.

LL2014cc – Locke Lord LLP (TN203143). Response to Data Request Set 2A (No.64), dated October 1, 2014. Submitted 10/01/2014.

Compliance Conditions and Compliance Monitoring Plan

COMPLIANCE CONDITIONS
AND
COMPLIANCE MONITORING PLAN

Joseph Douglas

INTRODUCTION

The Carlsbad Energy Center Project (CECP) Compliance Conditions of Certification, including a Compliance Monitoring Plan (Compliance Plan), are established as required by Public Resources Code section 25532. The Compliance Plan provides a means for assuring that the facility is constructed, operated, and closed in compliance with public health and safety and environmental law; all other applicable laws, ordinances, regulations, and standards (LORS); and the conditions adopted by the Energy Commission and specified in the Commission's written Decision on the project's 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 or operator (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 contingency planning, facility non-operation protocols, and closure requirements; and
- establish a tracking method for the technical area conditions of certification that contain measures required to mitigate potentially adverse project impacts associated with construction, operation, and closure below a level of significance; each technical condition of certification also includes one or more verification provisions that describe the means of assuring that the condition has been satisfied.

KEY PROJECT EVENT DEFINITIONS

The following terms and definitions help determine when various conditions of certification are implemented.

Project Certification

Project certification occurs on the day the Energy Commission dockets its Decision after adopting it at a publically noticed Business Meeting or hearing. At that time, all Energy Commission conditions of certification become binding on the project owner and the proposed facility.

Site Assessment and Pre-Construction Activities

The below-listed site assessment and pre-construction activities may be initiated or completed prior to the start of construction, subject to the CPM's approval of the specific site assessment or pre-construction activities.

Site assessment and pre-construction activities include the following, but only to the extent the activities are minimally disruptive to soil and vegetation and shall not affect listed or special-status species or other sensitive resources:

1. the installation of environmental monitoring equipment;

2. a minimally invasive 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 minimally invasive work to provide safe access to the site for any of the purposes specified in 1-4, above.

Site Mobilization and Construction

When a condition of certification requires the project owner to take an action or obtain CPM approval prior to the start of construction, or within a period of time relative to the start of construction, that action must be taken, or approval must be obtained, prior to any site mobilization or construction activities, as defined below.

Site mobilization and construction activities are those necessary to provide site access for construction mobilization and facility installation, including both temporary and permanent equipment and structures, as determined by the CPM.

Site mobilization and construction activities include, but are not limited to:

1. ground disturbance activities like grading, boring, trenching, leveling, mechanical clearing, grubbing, and scraping;

2. site preparation activities, such as access roads, temporary fencing, trailer and utility installation, construction equipment installation and storage, equipment and supply laydown areas, borrow and fill sites, temporary parking facilities, and chemical spraying and controlled burns; and

3. permanent installation activities for all facility and linear structures, including access roads, fencing, utilities, parking facilities, equipment storage, mitigation and landscaping activities, and other installations, as applicable.

System Commissioning and Decommissioning

Commissioning activities are designed to test the functionality of a facility's installed components and systems to ensure safe and reliable operation. Although decommissioning is often synonymous with facility closure, specific decommissioning

activities also systematically test the removal of such systems to ensure a facility's safe closure. For compliance monitoring purposes, commissioning examples include interface connection and utility pre-testing, "cold" and "hot" electrical testing, system pressurization and optimization tests, grid synchronization, and combustion turbine "first fire." Decommissioning activity examples include utility shut down, system depressurization and de-electrification, structure removal, and site reclamation.

Start of Commercial Operation

For compliance monitoring purposes, "commercial operation" or "operation" begins once commissioning activities are complete, the certificate of occupancy has been issued, and the power plant has reached reliable steady-state electrical production. At the start of commercial operation, plant control is usually transferred from the construction manager to the plant operations manager. Operation activities can include a steady state of electrical production, or, for "peaker plants," a seasonal or on-demand operational regime to meet peak load demands.

Non-Operation and Closure

Non-operation is time-limited and can encompass part or all of a facility. Non-operation can be a planned event, usually for minor equipment maintenance or repair, or unplanned, usually the result of unanticipated events or emergencies.

Closure is a facility shutdown with no intent to restart operation. It may also be the cumulative result of unsuccessful efforts to re-start over an increasingly lengthy period of non-operation, condemned by inadequate means and/or lack of a viable plan. Facility closures can occur due to a variety of factors, including, but not limited to, irreparable damage and/or functional or economic obsolescence.

ROLES AND RESPONSIBILITIES

Provided below is a generalized description of the compliance roles and responsibilities for Energy Commission staff (staff) and the project owner for the construction and operation of the CECP.

COMPLIANCE PROJECT MANAGER RESPONSIBILITIES

The CPM's compliance monitoring and project oversight responsibilities include:

1. ensuring that the design, construction, operation, and closure of the project facilities are in compliance with the terms and conditions of the Decision;

2. resolving complaints;

3. processing post-certification project amendments for changes to the project description, conditions of certification, ownership or operational control, and requests for extension of the deadline for the start of construction (see **COM-10** for instructions on filing a Petition to Amend or to extend a construction start date);

4. documenting and tracking compliance filings; and

5. ensuring that compliance files are maintained and accessible.

The CPM is the central contact person for the Energy Commission during project pre-construction, construction, emergency response, operation, and closure. The CPM shall consult with the appropriate responsible parties when handling compliance issues, disputes, complaints, and amendments.

All project compliance submittals are submitted to the CPM for processing. Where a submittal requires CPM approval, the approval shall involve appropriate Energy Commission technical staff and management. All submittals must include searchable electronic versions (.pdf, MS Word, or equivalent 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. These meetings are used to assist the Energy Commission and the project owner's technical staff in the status review of all required pre-construction or pre-operation conditions of certification, and take proper action if outstanding conditions remain. In addition, these meetings ensure, to the extent possible, that the Energy Commission's conditions of certification do not delay the construction and operation of the plant due to last-minute unforeseen issues or a compliance oversight. 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 maintains the following documents and information as public records, in either the Compliance files or Dockets files, for the life of the project (or other period as specified):

- all documents demonstrating compliance with any legal requirements relating to the construction, operation, and closure of the facility;
- all Monthly and Annual Compliance Reports (MCRs, ACRs) filed by the project owner;
- all project-related complaints of alleged noncompliance filed with the Energy Commission; and
- all petitions for project or condition of certification changes and the resulting staff or Energy Commission action.

CHIEF BUILDING OFFICIAL DELEGATION AND AGENCY COOPERATION

Under the California Building Code Standards, while monitoring project construction and operation, staff acts as, and has the authority of, the Chief Building Official (CBO). Staff may delegate some CBO responsibility to either an independent third-party contractor or a local building official. However, staff retains CBO authority when selecting a delegate CBO, including the interpretation and enforcement of state and local codes and the use of discretion, as necessary, in implementing the various codes and standards.

PROJECT OWNER RESPONSIBILITIES

The project owner is responsible for ensuring that all conditions of certification in the CECP Decision are satisfied. The project owner shall submit all compliance submittals to the CPM for processing unless the conditions specify another recipient. The Compliance conditions regarding post-certification changes specify measures that the project owner must take when modifying the project's design, operation, or performance requirements, or to transfer ownership or operational control. Failure to comply with any condition of certification may result in a correction order, an administrative fine, certification revocation, or any combination thereof, as appropriate. A summary of the Compliance conditions of certification are included as **Compliance Conditions Table 1** at the end of this Compliance Plan.

COMPLIANCE ENFORCEMENT

The Energy Commission's legal authority to enforce the terms and conditions of its Decision are specified in Public Resources Code sections 25534 and 25900. The Energy Commission may amend or revoke a project certification and may impose a civil penalty for any significant failure to comply with the terms or conditions of the Decision. The Energy Commission's actions and fine assessments would take into account the specific circumstances of the incident(s).

PERIODIC COMPLIANCE REPORTING

Many of the conditions of certification require submittals in the MCRs and ACRs. All compliance submittals assist the CPM in tracking project activities and monitoring compliance with the terms and conditions of the CECP Decision. During construction, the project owner or an authorized agent shall submit compliance reports on a monthly basis. During operation, compliance reports are submitted annually, except as otherwise required. These reports, and the requirements for an accompanying compliance matrix, are described below.

NONCOMPLIANCE COMPLAINT PROCEDURES

Any person or agency may file a complaint alleging noncompliance with the conditions of certification. Such a complaint shall be subject to review by the Energy Commission pursuant to Title 20, California Code of Regulations, section 1237, but, in many instances, the issue(s) can be resolved by using an informal dispute resolution process. Both the informal and formal complaint procedures, as described in current state law and regulations, are summarized below. Energy Commission staff shall follow these provisions unless superseded by future law or regulations. The California Office of Administrative Law provides on-line access to the California Code of Regulations at http://www.oal.ca.gov/.

Informal Dispute Resolution Process

The following informal procedure is designed to resolve code and compliance interpretation disputes stemming from the project's conditions of certification and applicable LORS. The project owner, the Energy Commission, or any other party, including members of the public, may initiate the 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 formal complaint and investigation procedure specified in Title 20, California Code of Regulations, section 1237, but is not intended to be a prerequisite or substitute for it. This informal procedure may not be used to change the terms and conditions of certification in the Decision, although the agreed-upon resolution may result in a project owner proposing an amendment. The informal dispute resolution process encourages all parties to openly discuss the conflict and reach a mutually agreeable solution. 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 specified in Title 20, California Code of Regulations, section 1237.

Request for Informal Investigation

Any individual, group, or agency may request that the CPM conduct an informal investigation of alleged noncompliance with the Energy Commission's conditions of certification.. The CPM shall evaluate the request and, if the CPM determines that further investigation is necessary, shall ask the project owner to promptly conduct a formal inquiry into the matter and provide within seven days a written report of the investigation results, along with corrective measures proposed or undertaken. Depending on the urgency of the matter, the CPM may conduct a site visit and/or request that the project owner provide an initial verbal report within 48 hours.

Request for Informal Meeting

In the event that either the requesting party or Energy Commission staff are not satisfied with the project owner's investigative report or corrective measures, either party may submit a written request to the CPM for a meeting with the project owner. The request shall be made within 14 days of the project owner's filing of the required investigative report. Upon receipt of such a request, the CPM shall attempt to:

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; and

3. conduct the meeting in an informal and objective manner so as to encourage the voluntary settlement of the dispute in a fair and equitable manner.

After the meeting, the CPM shall promptly prepare and distribute copies to all parties, and to the project file, of a summary memorandum that fairly and accurately identifies the positions of all parties and any understandings reached. If no agreement was reached, the CPM shall direct the complainant to the formal complaint process provided under Title 20, California Code of Regulations, section 1237.

Formal Dispute Resolution Procedure

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 provided in Title 20, California Code of Regulations, section 1237.

POST-CERTIFICATION CHANGES TO THE ENERGY COMMISSION DECISION

The project owner must petition the Energy Commission pursuant to Title 20, California Code of Regulations, section 1769, to modify the design, operation, or performance requirements of the project and/or the linear facilities, or 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 approval may result in an enforcement action including civil penalties in accordance with Public Resources Code, section 25534.

Below is a summary of the criteria for determining the type of approval process required, reflecting the provisions of Title 20, California Code of Regulations, section 1769, at the time this Compliance Plan was drafted. If the Energy Commission modifies this regulation, the language in effect at the time of the requested change shall apply. Upon request, the CPM can provide sample formats of these submittals.

Amendment

The project owner shall submit a Petition to Amend the Energy Commission Decision, pursuant to Title 20, California Code of Regulations, section 1769 (a), when proposing modifications to the design, operation, or performance requirements of the project and/or the linear facilities. If a proposed modification results in an added, changed, or deleted condition of certification, or makes changes causing noncompliance with any applicable LORS, the petition shall be processed as a formal amendment to the Decision, triggering public notification of the proposal, public review of the Energy Commission staff's analysis, and consideration of approval by the full Energy Commission.

Change of Ownership and/or Operational Control

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).

Staff-Approved Project Modification

Modifications that do not result in additions, deletions, or changes to the conditions of certification, that are compliant with the applicable LORS, and that do not have significant environmental impacts, may be authorized by the CPM as a staff-approved

project modification pursuant to section 1769 (a) (2). Once the CPM files a Notice of Determination of the proposed project modifications, any person may file an objection to the CPM's determination within 14 days of service on the grounds that the modification does not meet the criteria of section 1769 (a) (2). If there is an objection to the CPM's determination, the petition must be processed as a formal amendment to the Decision and must be considered for approval by the full Commission at a publically noticed Business Meeting or hearing.

Verification Change

Each condition of certification (except for the Compliance Conditions) has one or more means of verifying the project owner's compliance with the provisions of the condition. These verifications specify the actions and deadlines by which a project owner demonstrates compliance with the Energy Commission-adopted conditions. Verification may be modified by the CPM without requesting a Decision amendment if the change does not conflict with any condition of certification, does not violate any LORS, and provides an effective alternative means of verification.

EMERGENCY RESPONSE CONTINGENCY PLANNING AND INCIDENT REPORTING

To protect public health and safety and environmental quality, the conditions of certification include contingency planning and incident reporting requirements to ensure compliance with necessary health and safety practices. A well-drafted contingency plan avoids or limits potential hazards and impacts resulting from serious incidents involving personal injury, hazardous spills, flood, fire, explosions or other catastrophic events and ensures a comprehensive timely response. All such incidents must be reported immediately to the CPM and documented. These requirements are designed to build from "lessons learned," limit the hazards and impacts, anticipate and prevent recurrence, and provide for the safe and secure shutdown and re-start of the facility.

FACILITY CLOSURE

The Energy Commission cannot reasonably foresee all potential circumstances in existence when a facility permanently closes. Therefore, the closure conditions provided herein strive for the flexibility to address circumstances that may exist at some future time. Most importantly, facility closure must be consistent with all applicable Energy Commission conditions of certification and the LORS in effect at that time.

Although a non-operational facility may intend to resume operations, if it remains non-operational for longer than one year and the project owner does not present a viable plan to resume operation, the Energy Commission can conclude that closure is imminent and direct the project owner to commence closure preparations. Should the project owner effectively abandon a facility, the Energy Commission can access the required financial assurance funds to begin closure, but the owner remains liable for all associated costs.

Prior to submittal of the facility's Final Closure Plan to the Energy Commission, the project owner and the CPM will hold a meeting to discuss the specific contents of the plan. In the event that significant issues are associated with the plan's approval, the

CPM will hold one or more workshops and/or the Commission may hold public hearings as part of its approval procedure.

With the exception of measures to eliminate any immediate threats to public health and safety or to the environment, facility closure activities cannot be initiated until the Energy Commission approves the Final Closure Plan and Cost Estimate and the project owner complies with any requirements the Commission may incorporate as conditions of approval of the Final Closure Plan.

COMPLIANCE CONDITIONS OF CERTIFICATION

For the CECP, staff proposes the Compliance conditions of certification below.

COM-1: **Unrestricted Access**. The project owner shall take all steps necessary to ensure that the CPM, responsible Energy Commission staff, and delegated agencies or consultants have unrestricted access to the facility site, related facilities, project-related staff, and the records maintained to facilitate audits, surveys, inspections, and general or closure-related site visits. Although the CPM shall 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, whether such visits are by the CPM in person or through representatives from Energy Commission staff, delegated agencies, or consultants.

COM-2: **Compliance Record.** The project owner shall maintain electronic copies of all project files and submittals on-site, or at an alternative site approved by the CPM, for the operational life and closure of the project. The files shall also contain at least one hard copy of:

1. the facility's Application(s) for Certification;
2. all amendment petitions and Energy Commission orders;
3. all site-related environmental impact and survey documentation;
4. all appraisals, assessments, and studies for the project;
5. all finalized original and amended structural plans and "as-built" drawings for the entire project;
6. all citations, warnings, violations, or corrective actions applicable to the project; and
7. the most current versions of any plans, manuals and training documentation required by the conditions of certification or applicable LORS.

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.

COM-3: Compliance Verification Submittals. Verification lead times associated with the start of construction or closure may require the project owner to file submittals during the AFC process, particularly if construction is planned to commence shortly after certification. The verification procedures, unlike the conditions, may be modified as necessary by the CPM.

A cover letter from the project owner or an 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, cite the appropriate condition of certification number(s), and give a brief description of the subject of the submittal**. When submitting supplementary or corrected information, the project owner shall reference the date of the previous submittal and the condition(s) of certification applicable.

All reports and plans required by the project's conditions of certification shall be submitted in a searchable electronic format (.pdf, MS Word, or Excel, etc.) and include standard formatting elements such as a table of contents, identifying by title and page number each section, table, graphic, exhibit, or addendum. All report and/or plan graphics and maps shall be adequately scaled and shall include a key with descriptive labels, directional headings, a bar scale, and the most recent revision date.

The project owner is responsible for the content and delivery of all verification submittals to the CPM, whether the actions required by the verification were satisfied by the project owner or an agent of the project owner. All submittals shall be accompanied by an electronic copy on an electronic storage medium, or by e-mail, as agreed upon by the CPM. If hard-copy submittals are required, please address as follows:

Compliance Project Manager
Carlsbad Energy Center Project (07-AFC-6C)
California Energy Commission
1516 Ninth Street (MS-2000)
Sacramento, CA 95814

COM-4: Pre-Construction Matrix and Tasks Prior to Start of Construction. Prior to start of construction, the project owner shall submit to the CPM a compliance matrix including only those conditions that must be fulfilled before the start of construction. The matrix shall be included with the project owner's first compliance submittal or prior to the first pre-construction meeting, whichever comes first, and shall be submitted in a format similar to the description below.

Site mobilization and construction activities shall not start until all of the following occur: the project owner has submitted the pre-construction matrix and all submittals required by compliance verifications pertaining to all pre-construction conditions of certification, and the CPM has issued an authorization-to-construct letter to the project owner. The deadlines for submitting various compliance verifications to the CPM allow sufficient staff time to review and comment on,

and if necessary, allow the project owner to revise the submittal in a timely manner. These procedures help ensure that project construction proceeds according to schedule. Failure to submit required compliance documents by the specified deadlines may result in delayed authorizations to commence various stages of the project.

If the project owner anticipates site mobilization immediately following project certification, it may be necessary for the project owner to file compliance submittals prior to project certification. In these instances, compliance verifications can be submitted in advance of the required deadlines and the anticipated authorizations to start construction. The project owner must understand that submitting compliance verification requirements prior to these authorizations is at the owner's own risk. Any approval by Energy Commission staff prior to project certification is subject to change based upon the Commission Decision, or amendment thereto. Early staff compliance approvals do not imply that the Energy Commission will certify the project for actual construction and operation.

COM-5: Compliance Matrix. The project owner shall submit a compliance matrix to the CPM with each MCR and ACR. The compliance matrix provides the CPM with the status of all conditions of certification in a spreadsheet format. The compliance matrix shall identify:

1. the technical area (e.g., biological resources, facility design, etc.);
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., sixty (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 CBO, CPM, or delegate agency, if applicable;
7. the compliance status of each condition (e.g., "not started," "in progress," or "completed" (include the date); and
8. if the condition was amended, the updated language and the date the amendment was proposed or approved.

The CPM can provide a template for the compliance matrix upon request.

COM-6: Monthly Compliance Reports and Key Events List. The first MCR is due one (1) month following the docketing of the project's Decision unless otherwise agreed to by the CPM. The first MCR 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 Compliance Plan).

During project pre-construction, construction, or closure, the project owner or authorized agent shall submit an electronic searchable version of the MCR within ten (10) business days after the end of each reporting month, unless otherwise specified by the CPM. MCRs shall be clearly identified for the month being reported. The searchable electronic copy may be filed on an electronic storage medium or by e-mail, subject to CPM approval. The compliance verification submittal condition provides guidance on report production standards, and the MCR 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 MCR; each of these items shall be identified in the transmittal letter, as well as the conditions they satisfy, and submitted as attachments to the MCR;

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 the conditions of certification;

7. a list of any filings submitted to, and 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 list 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 actions taken to date to resolve the issues; and the status of any unresolved actions.

COM-7: Annual Compliance Reports. After construction is complete, the project owner must submit searchable electronic ACRs instead of MCRs. ACRs are due for each year of commercial operation and may be required for a

specified period after decommissioning to monitor closure compliance, as specified by the CPM. The searchable electronic copies may be filed on an electronic storage medium or by e-mail, subject to CPM approval. Each ACR must include the AFC number, identify the reporting period, and 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 ACR; each of these items shall be identified in the transmittal letter with the condition it satisfies and submitted as an attachment to the ACR;

4. a cumulative list of all post-certification changes approved by the Energy Commission or 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 list of filings submitted to, and permits issued by, other governmental agencies during the year;

7. a projection of project compliance activities scheduled during the next year;

8. a list of the year's additions to the on-site compliance file;

9. an evaluation of the Site Contingency Plan, including amendments and plan updates; and

10. a list of complaints, notices of violation, official warnings, and citations received during the year, a description of how the issues were resolved, and the status of any unresolved matters.

COM-8: **Confidential Information.** Any information that the project owner designates as confidential shall be submitted to the Energy Commission's Executive Director with an application for confidentiality, pursuant to Title 20, California Code of Regulations, section 2505 (a). Any information deemed confidential pursuant to the regulations shall remain undisclosed, as provided in Title 20, California Code of Regulations, section 2501.

COM-9: **Annual Energy Facility Compliance Fee.** Pursuant to the provisions of section 25806 (b) of the Public Resources Code, the project owner is required to pay an annually adjusted compliance fee. Current compliance fee information is available on the Energy Commission's website at http://www.energy.ca.gov/siting/filing_fees.html. The project owner may also

contact the CPM for the current fee information. The initial payment is due on the date the Energy Commission dockets its final Decision. All subsequent payments are due by July 1 of each year in which the facility retains its certification.

COM-10: Amendments, Staff-Approved Project Modifications, Ownership Changes, and Verification Changes. The project owner shall petition the Energy Commission, pursuant to Title 20, California Code of Regulations, section 1769, to modify the design, operation, or performance requirements of the project or linear facilities, or to transfer ownership or operational control of the facility. The CPM will determine whether staff approval will be sufficient, or whether Commission approval will be necessary. **It is the project owner's responsibility to contact the CPM to determine if a proposed project change triggers the requirements of section 1769.** Section 1769 details the required contents for a Petition to Amend an Energy Commission Decision. The only change that can be requested by means of a letter to the CPM is a request to change the verification method of a condition of certification.

Implementation of a project modification without first securing Energy Commission, or Energy Commission staff, approval may result in an enforcement action, including civil penalties, in accordance with section 25534 of the Public Resources Code. If the Energy Commission's rules regarding amendments are revised, the rules in effect at the time the change is requested shall apply.

COM-11: Reporting of Complaints, Notices, and Citations. Prior to the start of construction or decommissioning, the project owner shall send a letter to property owners within one (1) 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 twenty-four (24) hours per day, it shall include automatic answering with a date and time stamp recording.

The project owner shall respond to all complaints within twenty-four (24) hours or the next business day. The project owner shall post the telephone number at the project site and make it easily visible to passersby during construction, operation, and closure. The project owner shall provide the contact information to the CPM who will post it on the Energy Commission's web page at http://www.energy.ca.gov/sitingcases/carlsbad/

The project owner shall report any disruption to the contact system or telephone number change to the CPM promptly, to allow the CPM to update the Energy Commission's facility webpage accordingly.

In addition to including all complaints, notices, and citations with the MCRs and ACRs, within ten (10) days of receipt, the project owner shall report, and provide copies to the CPM, of all complaints, including noise and lighting complaints, notices of violation, notices of fines, official warnings, and

citations. Complaints shall be logged and numbered. Noise complaints shall be recorded on the form provided in the Noise and Vibration conditions of certification. All other complaints shall be recorded on the complaint form (Attachment A) at the end of this Compliance Plan.

COM-12: Emergency Response Site Contingency Plan. No less than sixty (60) days prior to the start of commercial operation (or other date agreed to by the CPM), the project owner shall submit for CPM review and approval, an Emergency Response Site Contingency Plan (Contingency Plan). The Contingency Plan shall evidence a facility's coordinated emergency response and recovery preparedness for a series of reasonably foreseeable emergency events. The CPM may require the updating of the Contingency Plan over the life of the facility. Contingency Plan elements include, but are not limited to:

1. a site-specific list and direct contact information for persons, agencies, and responders to be notified for an unanticipated event;

2. a detailed and labeled facility map, including all fences and gates, the windsock location (if applicable), the on- and off-site assembly areas, and the main roads and highways near the site;

3. a detailed and labeled map of population centers, sensitive receptors, and the nearest emergency response facilities;

4. a description of the on-site, first response and backup emergency alert and communication systems, site-specific emergency response protocols, and procedures for maintaining the facility's contingency response capabilities, including a detailed map of interior and exterior evacuation routes, and the planned location(s) of all permanent safety equipment;

5. an organizational chart including the name, contact information, and first aid/emergency response certification(s) and renewal date(s) for all personnel regularly on-site;

6. a brief description of reasonably foreseeable, site-specific incidents and accident sequences (on- and off-site), including response procedures and protocols and site security measures to maintain twenty-four-hour site security;

7. procedures for maintaining contingency response capabilities; and

8. the procedures and implementation sequence for the safe and secure shutdown of all non-critical equipment and removal of hazardous materials and waste (see also specific conditions of certification for the technical areas of **Public Health**, **Waste Management**, **Hazardous Materials Management**, and **Worker Safety**).

COM-13: Incident-Reporting Requirements. Within one (1) hour after it is safe and feasible, the project owner shall notify the CPM or compliance office

manager, by telephone and e-mail, of any incident at the power plant or appurtenant facilities that results, or could result, in any of the following:

1. health and safety impacts on the surrounding population;
2. property damage off-site;
3. response by off-site emergency response agencies;
4. serious on-site injury;
5. serious environmental damage; or
6. emergency reporting to any federal, state, or local agency.

The notice shall describe the circumstances, status, and expected duration of the incident. If warranted, as soon as it is safe and feasible, the project owner shall implement the safe shutdown of any non-critical equipment and removal of any hazardous materials and waste that pose a threat to public health and safety and to environmental quality (also, see specific conditions of certification for the technical areas of **Hazardous Materials Management** and **Waste Management**).

Within one (1) week of the incident, the project owner shall submit to the CPM a detailed incident report, which includes, as appropriate, the following information:

1. a brief description of the incident, including its date, time, and location;
2. a description of the cause of the incident, or likely causes if it is still under investigation;
3. the location of any off-site impacts;
4. description of any resultant impacts;
5. a description of emergency response actions associated with the incident;
6. identification of responding agencies;
7. identification of emergency notifications made to federal, state, and/or local agencies;
8. identification of any hazardous materials released and an estimate of the quantity released;
9. a description of any injuries, fatalities, or property damage that occurred as a result of the incident;
10. fines or violations assessed or being processed by other agencies;

11. name, phone number, and e-mail address of the appropriate facility contact person having knowledge of the event; and

12. corrective actions to prevent a recurrence of the incident.

The project owner shall maintain all incident report records for the life of the project, including closure. After the submittal of the initial report for any incident, the project owner shall submit to the CPM copies of incident reports within twenty four (24) hours of a request.

COM-14: Non-Operation. If the facility ceases operation temporarily, either planned or unplanned, for longer than one (1) week, but less than three (3) months (or other CPM-approved date), the project owner shall notify the CPM (by telephone and e-mail), interested agencies, and nearby property owners. Notice of planned non-operation shall be given at least two (2) weeks prior to the scheduled date. Notice of unplanned non-operation shall be provided no later than one (1) week after non-operation begins.

For any non-operation, a Repair/Restoration Plan for conducting the activities necessary to restore the facility to availability and reliable and/or improved performance shall be submitted to the CPM within one (1) week after notice of non-operation is given. If non-operation is due to an unplanned incident, temporary repairs and/or corrective actions may be undertaken before the Repair/Restoration Plan is submitted. The Repair/Restoration Plan shall include:

1. identification of operational and non-operational components of the plant;
2. a detailed description of the repair or restoration activities;
3. a proposed schedule for completing the repair or restoration activities;
4. an assessment of whether or not the proposed activities would require changing, adding, and/or deleting any conditions of certification, and/or would cause noncompliance with any applicable LORS; and
5. planned activities during non-operation, including any measures to ensure continued compliance with all conditions of certification and LORS.

The CPM will determine if CBO oversight or compliance site monitoring is required.

Written updates to the CPM for non-operational periods, until operation resumes, shall include:

1. progress relative to the schedule;
2. developments that delayed or advanced progress or that may delay or advance future progress;
3. any public, agency, or media comments or complaints; and
4. projected date for the resumption of operation.

During non-operation, all applicable conditions of certification and reporting requirements remain in effect. If, after one (1) year from the date of the project owner's last report of productive Repair/Restoration Plan work, the facility does not resume operation or does not provide a plan to resume operation, the Executive Director may assign suspended status to the facility and recommend commencement of permanent closure activities. Within ninety (90) days of the Executive Director's determination, the project owner shall do one of the following:

1. If the facility has a closure plan, the project owner shall update it and submit it for Energy Commission review and approval.
2. If the facility does not have a closure plan, the project owner shall develop one consistent with the requirements in this Compliance Plan and submit it for Energy Commission review and approval.

COM-15: Facility Closure Planning. To ensure that a facility's eventual permanent closure and long-term maintenance do not pose a threat to public health and safety and/or to environmental quality, the project owner shall coordinate with the Energy Commission to plan and prepare for eventual permanent closure.

A. Provisional Closure Plan and Estimate of Permanent Closure Costs
To assure satisfactory long-term site maintenance and adequate closure for "the whole of a project," the project owner shall submit a Provisional Closure Plan and Cost Estimate for CPM review and approval within sixty (60) days after the start of commercial operation. The Provisional Closure Plan and Cost Estimate shall consider applicable final closure plan requirements, and reflect the use of an independent third party to carry out the permanent closure.

The Provisional Closure Plan and Cost Estimate shall provide for a phased closure process and include but not be limited to:

1. comprehensive scope of work and itemized budget;
2. closure plan development costs;
3. dismantling and demolition;
4. recycling and site clean-up;
5. mitigation and monitoring direct, indirect, and cumulative impacts;
6. site remediation and/or restoration;
7. interim and long term operation monitoring and maintenance, including long-term equipment replacement costs; and
8. contingencies.

The project owner shall include an updated Provisional Closure Plan and Cost Estimate in every fifth-year ACR for CPM review and approval. Each updated Provisional Closure Plan and Cost Estimate shall reflect the most current regulatory standards, best management practices, and applicable LORS.

B. Final Closure Plan and Cost Estimate

At least three (3) years prior to initiating a permanent facility closure, the project owner shall submit for Energy Commission review and approval, a Final Closure Plan and Cost Estimate, which includes any long-term, post-closure site maintenance and monitoring. Final Closure Plan and Cost Estimate contents include, but are not limited to:

1. a statement of specific Final Closure Plan objectives;
2. a statement of qualifications and resumes of the technical experts proposed to conduct the closure activities, with detailed descriptions of previous power plant closure experience;
3. identification of any facility-related installations not part of the Energy Commission certification, designation of who is responsible for these, and an explanation of what will be done with them after closure;
4. a comprehensive scope of work and itemized budget for permanent plant closure and site maintenance activities, with a description and explanation of methods to be used, broken down by phases, including, but not limited to:
    a. dismantling and demolition;
    b. recycling and site clean-up;
    c. impact mitigation and monitoring;
    d. site remediation and/or restoration and;
    e. any contingencies.
5. a revised/updated Final Cost Estimate for all closure activities, by phases, including site monitoring and maintenance costs, and long-term equipment replacement;
6. a schedule projecting all phases of closure activities for the power plant site and all appurtenances constructed as part of the Energy Commission-certified project;
7. an electronic submittal package of all relevant plans, drawings, risk assessments, and maintenance schedules and/or reports, including an above- and below-ground infrastructure inventory map and registered engineer's or delegate CBO's assessment of demolishing the facility; additionally, for any facility that permanently ceased operation prior to submitting a Final Closure Plan and Cost Estimate and for which only minimal or no maintenance has been done since, a comprehensive condition report focused on identifying potential hazards;
8. all information additionally required by the facility's conditions of certification applicable to plant closure;
9. an equipment disposition plan, including:
    a. recycling and disposal methods for equipment and materials; and

b. identification and justification for any equipment and materials that will remain on-site after closure;

10. a site disposition plan, including but not limited to:
    a. proposed rehabilitation, restoration, and/or remediation procedures, as required by the conditions of certification and applicable LORS; and
    b. site maintenance activities.
11. identification and assessment of all potential direct, indirect, and cumulative impacts and proposal of mitigation measures to reduce significant adverse impacts to a less-than-significant level; potential impacts to be considered shall include, but not be limited to:
    a. traffic
    b. noise and vibration
    c. soil erosion
    d. air quality degradation
    e. solid waste
    f. hazardous materials
    g. waste water discharges
    h. contaminated soil
12. identification of all current conditions of certification, LORS, federal, state, regional, and local planning efforts applicable to the facility, and proposed strategies for achieving and maintaining compliance during closure;
13. updated mailing list or listserv of all responsible agencies, potentially interested parties, and property owners within one (1) mile of the facility;
14. identification of alternatives to plant closure and assessment of the feasibility and environmental impacts of these; and
15. description of and schedule for security measures and safe shutdown of all non-critical equipment and removal of hazardous materials and waste (see conditions of certification for **Public Health**, **Waste Management**, **Hazardous Materials Management**, and **Worker Safety**).

If implementation of an Energy Commission-approved Final Closure Plan and Cost Estimate is not initiated within one (1) year of its approval date, it shall be updated and re-submitted to the Commission for supplementary review and approval. If a project owner initiates but then suspends closure activities, and the suspension continues for longer than one (1) year, or subsequently abandons the facility, the Final Closure Plan and Cost Estimate shall be resubmitted to the Commission for supplementary review and approval. The project owner remains liable for all costs of contingency planning and closure.

KEY EVENTS LIST

PROJECT: _____

DOCKET #: _____

COMPLIANCE PROJECT MANAGER: _____

EVENT DESCRIPTION	DATE
Certification Date	
Obtain Site Control	
On-line Date	
POWER PLANT SITE ACTIVITIES	
Start Site Assessment/Pre-construction	
Start Site Mobilization/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 ConditionsTable 1:
Summary of Compliance Conditions of Certification

CONDITION NUMBER	SUBJECT	DESCRIPTION
COM-1	Unrestricted Access	The project owner shall grant Energy Commission staff and delegate agencies or consultants unrestricted access to the power plant site.
COM-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.
COM-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.
COM-4	Pre-construction Matrix and Tasks Prior to Start of Construction	Construction shall not commence until all of the following activities/submittals have been completed: • Project owner has submitted a pre-construction matrix identifying conditions to be fulfilled before the start of construction; • Project owner has completed all pre-construction conditions to the CPM's satisfaction; and • CPM has issued a letter to the project owner authorizing construction.
COM-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 current status of all compliance conditions of certification.
COM-6	Monthly Compliance Reports and Key Events List	During construction, the project owner shall submit Monthly Compliance Reports (MCRs) which include specific information. The first MCR is due 1 month following the docketing of the Energy Commission's Decision and shall include an initial list of dates for each of the events identified on the Key Events List.
COM-7	Annual Compliance Reports	After construction ends and throughout the life of the project, the project owner shall submit Annual Compliance Reports (ACRs) instead of Monthly Compliance Reports.
COM-8	Confidential Information	Any information the project owner designates as confidential shall be submitted to the Energy Commission's Executive Director with a request for confidentiality.
COM-9	Annual Fees	Required payment of the Annual Energy Facility Compliance Fee.
COM-10	Amendments, Staff-Approved Project Modifications, Ownership Changes, and Verification Changes	The project owner shall petition the Energy Commission to delete or change a condition of certification, modify the project design or operational requirements, and/or transfer ownership or operational control of the facility.

Compliance Table 1:
Summary of Compliance Conditions of Certification

CONDITION NUMBER	SUBJECT	DESCRIPTION
COM-11	Reporting of Complaints, Notices, and Citations	Prior to the start of construction, the project owner shall provide all property owners within a 1-mile radius a telephone number to contact project representatives with questions, complaints or concerns. The project owner shall respond to all recorded complaints within 24 hours. Within 10 days of receipt, the project owner shall report to the CPM all notices, complaints, violations, and citations.
COM-12	Site Contingency Plan	No less than 60 days prior to the start of commercial operation the project owner shall submit an on-site Contingency Plan to ensure protection of public health and safety and environmental quality during a response to an unanticipated event or emergency.
COM-13	Incident-Reporting Requirements	The project owner shall notify the CPM within 1 hour of an incident and submit a detailed incident report within 30 days, maintain records of incident report, and submit public health and safety documents with employee training provisions.
COM-14	Non-Operation	No later than 2 weeks prior to a facility's planned non-operation, or no later than 2 weeks after the start of unplanned non-operation, the project owner shall notify the CPM, interested agencies and nearby property owners of this status. During non-operation, the project owner shall provide written updates to the CPM.
COM-15	Facility Closure Planning	Within 60 days after initiating commercial operation, the project owner shall submit a Provisional Closure Plan and Cost Estimate for permanent closure. At least 3 years prior to closing, the project owner shall submit a Final Closure Plan and Cost Estimate.

ATTACHMENT A
COMPLAINT REPORT and RESOLUTION FORM

COMPLAINT LOG NUMBER:_____ DOCKET NUMBER:_____

PROJECT NAME:_____

COMPLAINANT INFORMATION

NAME:_____ PHONE NUMBER:_____

ADDRESS:_____

COMPLAINT

DATE COMPLAINT RECEIVED:_____ TIME COMPLAINT RECEIVED:_____

COMPLAINT RECEIVED BY: _____ ☐ TELEPHONE ☐ IN WRITING (COPY ATTACHED)

DATE OF FIRST OCCURRENCE:_____

DESCRIPTION OF COMPLAINT (INCLUDING DATES, FREQUENCY, AND DURATION):_____

FINDINGS OF INVESTIGATION BY PLANT PERSONNEL:_____

DOES COMPLAINT RELATE TO VIOLATION OF A CEC REQUIREMENT? ☐ YES ☐ NO

DATE COMPLAINANT CONTACTED TO DISCUSS FINDINGS:_____

DESCRIPTION OF CORRECTIVE MEASURES TAKEN OR OTHER COMPLAINT RESOLUTION:_____

DOES COMPLAINANT AGREE WITH PROPOSED RESOLUTION? ☐ YES ☐ NO

IF NOT, EXPLAIN:_____

CORRECTIVE ACTION

IF CORRECTIVE ACTION NECESSARY, DATE COMPLETED:_____

DATE FIRST LETTER SENT TO COMPLAINANT (COPY ATTACHED):_____

DATE FINAL LETTER SENT TO COMPLAINANT (COPY ATTACHED):_____

OTHER RELEVANT INFORMATION:_____

"This information is certified to be correct."

PLANT MANAGER SIGNATURE:_____ DATE:_____

(ATTACH ADDITIONAL PAGES AND ALL SUPPORTING DOCUMENTATION, AS REQUIRED)

Preparation Team

CARLSBAD ENERGY CENTER PROJECT
(07-AFC-06C)
PRELIMINARY STAFF ASSESSMENT

PREPARATION TEAM

Executive Summary ..... Jon Hilliard

Introduction ..... Mike Monasmith

Project Description ..... Mike Monasmith

Environmental Assessment

Air Quality ..... Will Walters

Alternatives ..... Steven Kerr\ Jeanine Hinde

Biological Resources ..... Carol Watson

Cultural Resources ..... Melissa Mourkas\Matthew Braun

Hazardous Materials Management ..... Alvin Greenberg

Land Use ..... Mike Baron

Noise & Vibration ..... Shahab Khoshmashrab\Joseph Hughes\Ed Brady

Public Health ..... Alvin Greenberg

Socioeconomics ..... Lisa Worrall

Soil & Water Resources ..... Mike Conway\Marylou Taylor

Traffic & Transportation ..... Andrea Koch\James Adams\William Walters

Transmission Line Safety & Nuisance ..... Obed Odoemelam

Visual Resources ..... William Kanemoto

Engineering Assessment

Facility Design ..... Edward Brady/Shahab Khoshmashrab

Geology & Paleontology ..... Casey Weaver

Power Plant Efficiency ..... Edward Brady/Shahab Khoshmashrab

Power Plant Reliability ..... Shahab Khoshmashrab/Jacquelyn Record

Transmission System Engineering ..... Ajoy Guha\Mark Hesters

Waste Management ..... Ellie Townsend-Hough

Worker Safety & Fire Protection ..... Alvin Greenberg

Compliance Conditions and Compliance Monitoring Plan ..... Joseph Douglas