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Petition to Amend

Huntington Beach Energy Project

(12-AFC-02C)

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Submitted by

AES

the power of being global

With Technical Assistance from

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Contents

Section			Page

Appendixes

Tables

Section **Page**

Figures

Acronyms and Abbreviations

°F	degrees Fahrenheit
µg/L	microgram(s) per liter
µg/m^3	microgram(s) per cubic meter
ADT	average daily traffic
AERMOD	American Meteorological Society/EPA Regulatory Model
AES	AES Southland Development, LLC
AFC	Application for Certification
AFY	acre-feet per year
ARB	California Air Resources Board
BACT	best available control technology
BOE	State Board of Equalization
Btu/kWh	British thermal unit(s) per kilowatt-hour
CAAQS	California ambient air quality standards
CAISO	California Independent System Operator
CAS	Chemical Abstracts Service
CBC	California Building Code
CCGT	combined-cycle gas turbine
CDFW	California Department of Fish and Wildlife
CEC	California Energy Commission
CEDD	California Employment Development Department
CEQA	California Environmental Quality Act
CGT	combustion gas turbine
CH_4	methane
CHRIS	California Historical Resources Information System
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
COC	Condition of Certification
COD	commercial operation date
CTG	combustion turbine generator
DOF	California Department of Finance

dscf	dry standard cubic feet
EAF	equivalent availability factor
EDR	Environmental Data Resources
EPA	U.S. Environmental Protection Agency
EPC	Engineer-Procurement-Construction
GHG	greenhouse gas
gpm	gallon(s) per minute
HBEP	Huntington Beach Energy Project
HRA	health risk assessment
HRSG	heat recovery steam generator
I-405	Interstate 405
km	kilometer(s)
KOP	key observation point
kV	kilovolt(s)
lb/hr	pound(s) per hour
lb CO2e/MWh	pound(s) of CO2e per megawatt-hour
LCR RFO	Local Capacity Requirements Request for Offers
LHV	lower heating value
LORS	laws, ordinances, regulations, and standards
LOS	level of service
m/s	meter(s) per second
MD	Metropolitan District
MEIR	maximum exposed individual resident
MEIW	maximum exposed individual worker
mg/m^3	milligram(s) per cubic meter
mm	millimeter(s)
MMBtu/hr	million Btu per hour
mph	miles per hour
MSA	Metropolitan Statistical Area
MW	megawatt(s)
N_2O	nitrous oxide
NA	not applicable
NAAQS	National Ambient Air Quality Standards
NFPA	National Fire Protection Association
NO_2	nitrogen dioxide

NO_X	oxides of nitrogen
NPDES	National Pollutant Discharge Elimination System
NWI	National Wetlands Inventory
O_2	oxygen
OEHHA	Office of Environmental Health Hazard Assessment
PAH	polyaromatic hydrocarbons
PCE	Passenger Car Equivalents
PCE	perchloroethylene
PM_{10}	particulate matter with aerodynamic diameter less than or equal to 10 microns
$PM_{2.5}$	particulate matter with aerodynamic diameter less than or equal to 2.5 microns
PMI	point of maximum impact
ppb	part(s) per billion
ppm	part(s) per million
ppmv	part(s) per million by volume
ppmvd	part(s) per million by volume, dry basis
PSD	Prevention of Significant Deterioration
PTC	Permit to Construct
PTE	potential to emit
PVMRM	AERMOD Plume Volume Molar Ratio Method
RECLAIM	Regional Clean Air Incentives Market
RMP	Risk Management Plan
RTCs	RECLAIM trading credits
RV	recreational vehicle
SCAQMD	South Coast Air Quality Management District
SCE	Southern California Edison
SCGT	simple-cycle gas turbine
SCR	selective catalytic reduction
SF_6	sulfur hexafluoride
SIL	significance impact level
SMMAAT	site monthly maximum average ambient temperature
SO_2	sulfur dioxide
SoCalGas	Southern California Gas Company
SPSAT	site peak summer ambient temperature
STG	steam turbine generator
TAC	toxic air contaminant

T-BACT	best available control technology for toxics
tpy	ton(s) per year
USFWS	United States Fish and Wildlife Service
UTM	Universal Transverse Mercator
V/C	volume/capacity
VOC	volatile organic compound

SECTION 1.0

Introduction

This section contains background information regarding the Amended Huntington Beach Energy Project (HBEP)[1], a description of the proposed modification of the Licensed HBEP and its necessity, a summary of potential environmental impacts of the Amended HBEP, and a discussion of the consistency of the proposed modification with the currently Licensed HBEP.

1.1 Background

On October 29, 2015, the California Energy Commission (CEC) granted a license to AES Southland Development, LLC, to construct and operate HBEP, Docket Number 12-AFC-02. As licensed, HBEP is a 939-megawatt (MW) power plant consisting of two independently operating, three-on-one, combined-cycle gas turbine power blocks. Each power block consists of three-gas-fired combustion turbine generators (CTG), three supplemental-fired heat recovery steam generators (HRSG), one steam turbine generator (STG), an air-cooled condenser, and related ancillary equipment. The project site is located in the City of Huntington Beach, in Orange County, California.

After the CEC issued the HBEP Final Decision, Southern California Edison (SCE) publicly announced that AES Southland had been selected in the 2013 Local Capacity Requirements Request for Offers (LCR RFO) to provide 644 MW of nominal capacity at the Huntington Beach site. Thus, the project configuration selected by SCE necessitates a modification to the HBEP license as described herein. However, although the Licensed HBEP will require a modification, the modification described in this Petition will not result in any new or increased significant effects, or the need to include new or newly feasible mitigation measures, or a consideration of alternatives not addressed in the original Application for Certification (AFC) proceeding.

1.2 Description of Proposed Project Modification

The Amended HBEP is a natural-gas-fired, combined-cycle and simple-cycle, air-cooled electrical generating facility that will replace, and be constructed on the site of, the AES Huntington Beach Generating Station, an existing and operating power plant in Huntington Beach, California. The Project Owner proposes the following modifications to the HBEP license:

- Replace Block 1 as licensed, with a two-on-one combined-cycle gas turbine (CCGT) configuration consisting of two General Electric (GE) Frame 7FA.05 gas turbines and two HRSGs without supplemental firing, a STG, an air-cooled condenser, and related ancillary equipment, with nominal summer capacity of 644 MWs (net).
- Replace Block 2 as licensed with two GE LMS-100 PB simple-cycle gas turbines (SCGT) units with a nominal capacity of 200 MWs.
- To support the CCGT power block, use a natural-gas-fired auxiliary boiler.
- Use a set of natural gas compressors in each power block.
- Construct other equipment and facilities to be shared by both power blocks, including water treatment facilities, emergency services, and administration and maintenance buildings.
- Construct the project on 30 acres within the footprint of the existing Huntington Beach Generating Station. This area includes the licensed 28.6-acre site plus an additional 1.4 acres of paved area previously evaluated as temporary construction parking that the Project Owner has acquired from SCE.

[1] The Amended HBEP is also referred to herein as the "project."

- Add an additional area for temporary construction laydown and construction worker parking at the former Plains All-American Tank Farm property to the southeast of the licensed site. The Licensed HBEP included 1.9 acres of construction parking on the Plains site. As part of this Amendment, a total of 22 acres of combined construction parking and construction laydown is proposed at the Plains All-American site.

The expected commercial operation date (COD) for the Amended HBEP CCGT power block is May 2020, with the SCGT power block COD in the third quarter of 2023. Similar to the HBEP Block 1, construction of the Amended HBEP CCGT power block will require the demolition of Huntington Beach Generating Station retired Unit 5 (former gas turbine generator) and 2 former fuel oil tanks. Similar to HBEP Block 2, construction of the Amended HBEP SCGT units will require the retirement and demolition of existing Units 3 and 4.

A comprehensive project description is provided in Section 2.0 (Project Description) of this Petition.

1.3 Necessity of Proposed Modification

Sections 1769 (a)(1)(A), (B), and (C) of the CEC Siting Regulations require a discussion of the necessity for the proposed modification to the HBEP and whether the modification is based on information known by the petitioner during the certification proceeding.

Information and technology included in the HBEP AFC proceeding represented AES's best commercial assumptions for the generating technology type and quantity that would be required by SCE to maintain electric reliability beyond the year 2020. Well over a year after the AFC was filed, SCE issued the 2013 LCR RFO for generating capacity in the Western Los Angeles Basin. AES responded to SCE’s RFO with various thermal technology configurations, including HBEP as licensed, to ensure that AES could meet the needs of the utility in the competitive solicitation process. Ultimately, SCE selected a configuration that does not reflect the type of generating technology licensed in the Final Decision. Although the selected configuration is still combined-cycle generating technology, it is of less electric generating capacity than what was licensed.

As explained above, the modification proposed herein is necessary to align the Licensed HBEP with the project configuration selected by SCE. Given the schedule and documented necessity for the Amended HBEP, and that the Amended HBEP will not result in any new or increased significant effects, the Project Owner requests that this Petition to Amend (PTA) be expedited through the CEC process. The Project Owner has been working since November 2014 to develop a project that will meet SCE requirements, and support the integration of renewables by providing efficient, fully dispatchable, quick-start, air-cooled generation that will also rely on certain infrastructure already associated with the Huntington Beach Generating Station facility.

1.4 Summary of Environmental Impacts

Section 1769 (a)(1)(E) of the CEC Siting Regulations requires that an analysis be conducted to address impacts a proposed modification may have on the environment and proposed measures to mitigate any significant adverse impacts. Section 1769 (a)(1)(F) requires a discussion on whether the proposed modification affects the facility’s ability to comply with applicable laws, ordinances, regulations, and standards (LORS).

Although the Licensed HBEP will require a modification, the modification described in this Petition will not result in any new or increased significant effects, or new or newly feasible mitigation measures, or alternatives not addressed in the original AFC proceeding. Based on the foregoing and the project modification discussed herein, the only issue areas where supplementation of the previous Environmental Impact Report-equivalent documents may be necessary pursuant to Section 15162 of the California Environmental Quality Act Guidelines are the areas of Air Quality and Public Health. Yet even in those issue areas, the project as amended will not have any new or increased significant effects. For all other issue areas where the Project Owner has determined that no supplemental environmental analysis is necessary, the environmental analysis that is provided in the 2014 Decision still applies, as do the Conditions of Certification (COC) included in the Licensed HBEP license. However, for all issue areas—including those where new environmental analysis is not required—since the LORS analysis is not subject to Section 15162, each environmental issue area in Section 5.0 (Environmental Information) herein includes an updated LORS analysis to the extent necessary to analyze the compliance of the Amended HBEP with applicable LORS.

The HBEP modification addressed in the PTA will not result in an increase in environmental impacts beyond those previously analyzed during the licensing of the project. Furthermore, the proposed project modification is consistent with LORS and the COCs included in the Licensed HBEP. Section 5.0 of this Petition provides an environmental analysis of the proposed project modifications and its consistency with LORS.

1.5 Consistency of Modification with License

Section 1769 (a)(1)(D) of the CEC Siting Regulations requires a discussion of the consistency of the proposed project modification with the assumptions, rationale, findings, or other basis of the Final Decision and whether the modification is based on new information that changes or undermines the basis of the final decision. Also required is an explanation of why the modification should be permitted. The proposed modification of the Licensed HBEP does not undermine the assumptions, rationale, findings, or other basis of the Final Decision for the project. Additionally, the proposed modification of HBEP is in keeping with the original intent of the project as a fully dispatchable, high-efficiency, quick-start facility able to meet the current and projected electric reliability needs and market demands of the West Los Angeles Basin. As documented in this Petition, the project modification has impacts that are less than or the same as those impacts that were analyzed for the original project. In addition, as documented in this Petition, the proposed project modification is consistent with LORS and with the COCs included in the Licensed HBEP, with slight modifications to several conditions.

SECTION 2.0

Project Description

The Amended Huntington Beach Energy Project (HBEP) is a nominal 844-megawatt (MW) (net) electrical generating facility that will replace, and be constructed on the site of, the AES Huntington Beach Generating Station, an existing and operating power plant in Huntington Beach, California. The Amended HBEP will use natural-gas-fired, combined-cycle, and simple-cycle turbine technologies to provide high-efficiency, fast-start, and responsive generation to a critical location for local area electrical reliability. The Amended HBEP will consist of a 644-MW (net) two-on-one combined-cycle gas turbine (CCGT) with General Electric (GE) Frame 7FA.05 gas turbines, two unfired heat recovery steam generators (HRSG), a steam turbine generator (STG), an air-cooled condenser, and related ancillary equipment; and two GE LMS-100 PB simple-cycle gas turbine (SCGT) generators, each with a nominal capacity of 100 MWs.

As part of the fast start, flexible design of the CCGT power block, the project will use a natural-gas-fired auxiliary boiler to provide startup steam. Each power block will have a set of electrically powered natural gas compressors. Other equipment and facilities to be constructed and shared by both power blocks include water treatment facilities, emergency services, and administration and maintenance buildings. The project will be constructed on 30 acres, which includes the 28.6 acres of the Licensed HBEP within the existing Huntington Beach Generation Station plus an additional 1.4 acres the Project Owner has acquired from Southern California Edison (SCE) that is contiguous to the Licensed HBEP site and immediately adjacent to the footprint of the existing Huntington Beach Generating Station as shown on Figure 2.1-1. As part of the Amended HBEP, the Project Owner will initiate a lot line adjustment with SCE and coordinate with the City of Huntington Beach to include the additional 1.4 acres into the legal HBEP parcel before construction begins. This 1.4-acre area was previously evaluated during the HBEP AFC proceedings as a construction worker parking area, though it is now part of the permanent HBEP site.

The expected commercial operation date (COD) for the Amended HBEP CCGT power block is May 2020, with the SCGT power block COD at the third quarter of 2023. Construction of the Amended HBEP CCGT power block will require the demolition of Huntington Beach Generating Station retired Unit 5 (former gas turbine generator) and two former fuel oil tanks and associated fuel oil pipelines and containment berms. Construction of the Amended HBEP SCGT units will require the retirement and demolition of existing Units 3 and 4 (see below for overview of demolition of exiting Units 3 and 4). Existing Huntington Beach Generating Station Unit 1 will be retired in the fourth quarter of 2019 to provide interconnection capacity for the new CCGT units and Unit 2 will be retired either after commercial operation of the HBEP SCGT or at the final compliance deadline for once-through-cooling intake structures as determined by the State Water Resources Control Board, after which demolition of Huntington Beach Generating Station Units 1 and 2 will commence.

Existing Huntington Beach Generating Station Units 3 and 4 are licensed through the California Energy Commission (CEC; 00-AFC-13C). Demolition of these units is authorized under that license and will proceed irrespective of the Amended HBEP. Therefore, demolition of existing Huntington Beach Generating Station Units 3 and 4 is not part of the Amended HBEP project definition. However, to ensure a comprehensive review of potential project impacts, the demolition of existing Huntington Beach Generating Station Units 3 and 4 is included as a cumulative project. Removal/demolition of existing Huntington Beach Generating Station Units 3 and 4 will occur in advance of the construction of the Amended HBEP SCGT power block.

HBEP will reuse existing onsite potable water, natural gas, stormwater, process wastewater, and sanitary pipelines, fire protection systems, and electrical transmission facilities. No offsite linear developments are proposed as part of the project. HBEP will continue to use potable water, provided by the City of Huntington Beach, for construction, operational process, and sanitary uses, but at substantially lower volumes than historically used by the existing generating units at the Huntington Beach Generating Station. The Amended

HBEP will also use less water than the Licensed HBEP. As with the Licensed HBEP, for the Amended HBEP's operations, stormwater and process wastewater will be discharged to a retention basin and then ultimately to the Pacific Ocean via an existing outfall. Sanitary wastewater will be conveyed to the Orange County Sanitation District via the existing City of Huntington Beach sewer connection. Two 230-kilovolt (kV) transmission interconnections will connect both Amended HBEP power blocks to the existing SCE 230-kV substation located on a separate parcel within the existing Huntington Beach Generating Station site.

2.1 Facility Description, Design, and Operation

HBEP has been designed using commercially proven technology equipped with monitoring, protection, and safety systems to provide safe and reliable operation over a minimum 30-year operating life.

The HBEP CCGT power block will include the following principal combined design elements:

- Two GE Frame 7FA.05 combustion turbine generators (CTGs) with a nominal rating of 230 MW each.[2] The CTGs will be equipped with evaporative coolers on the inlet air filtering system and dry low oxides of nitrogen (NOx) combustors.
- The GE 7FA.05 CTGs each will have a corresponding, unfired HRSG characterized by horizontal, triple-pressure with reheat. The HRSG has an emission reduction system consisting of a selective catalytic reduction (SCR) unit to control NOx stack emissions, and an oxidation catalyst to control carbon monoxide (CO) and volatile organic compounds (VOC) emissions in the outlet ductwork.
- One triple-pressure, reheat side exhaust condensing STG with totally enclosed hydrogen-cooled generator.
- One air-cooled condenser and one closed-loop air-cooled heat exchanger.
- One 230-kV interconnection to the existing onsite SCE 230-kV substation.
- One 72 million British thermal unit (MMBtu) gas-fired auxiliary boiler equipped with SCR.
- Electric driven natural gas compressors.

The GE LMS-100 PB simple-cycle power block will include the following principal combined design elements:

- Two GE Energy LMS-100 natural-gas-fired CTGs with a nominal rating of 100 MW each.
- Each CTG is equipped with SCR equipment containing catalysts to further reduce NOx emissions, and an oxidation catalyst to reduce CO emissions.
- Auxiliary equipment associated with each CTG will include an inlet air filter house with evaporative cooler, turbine inter-cooler, a fin fan heat exchanger with associated circulating water pumps, generator step-up transformers and auxiliary transformers.
- Electric gas compressors.
- One 230-kV interconnection to the existing onsite SCE 230-kV substation.

As with the Licensed HBEP, the two Amended HBEP power blocks will share the following design elements:

- Direct connection with the existing onsite Southern California Gas Company (SoCalGas) natural gas 16-inch-diameter gas main (see Section 2.1.8 Fuel System).
- Connection to an existing onsite 8-inch-diameter potable water line.

[2] All facility capabilities for the site are based on historical ambient weather data from Santa Ana, California (John Wayne–Orange County airport). Nominal CTG only output at site ambient air temperature conditions.

- Connection to an existing City of Huntington Beach 4-inch-diameter combined sanitary and process forced main sewer line.

2.1.1 Site Arrangement and Layout

As with the Licensed HBEP, primary access to the Amended HBEP will be provided via the existing Huntington Beach Generating Station entrance off Newland Street, just north of the intersection of the Pacific Coast Highway (Highway 1). Secondary and emergency access to the site is provided via an entrance off Edison Drive on the north side of the Huntington Beach Generating Station site. Figure 2.1-2 shows the facility site plan and general arrangement. Figures 2.1-3a, 2.1-3b, 2.1-3c, and 2.1-3d show typical elevation views of the project.

The HBEP site is bounded to the west by a manufactured home/recreational vehicle park; to the north by an out-of-service tank farm that will become the site of the proposed Poseidon desalination plant (the tank farm is AES property which will be leased to Poseidon) and the Huntington Beach Channel (a facility operated by the Orange County Flood Control District); to the southeast by Huntington Beach Wetland Preserve/Magnolia Marsh wetlands and the Plains All American Tank Farm, and to the south and southwest by the Pacific Coast Highway, Huntington State Beach, and the Pacific Ocean.

2.1.1.1 Huntington Beach Generating Station

AES's Huntington Beach Generating Station currently has four operating generating units (Units 1, 2, 3, and 4). Units 1 and 2 remain fully operational as steam generators. Existing Units 3 and 4 have been permanently modified and now operate as synchronous condensers with their natural gas connection terminated and their operational air permits retired. The Huntington Beach Generating Station was originally constructed in the late 1950s and 1960s by SCE. Major upgrades to Units 1 and 2 occurred in 1995 and upgrades to Units 3 and 4 occurred in 2001. The existing Huntington Beach Generating Station has various ancillary facilities that will remain in use to support HBEP. These facilities include the administration/warehouse/maintenance shop building, SoCalGas natural gas pipeline interconnection and site of the existing metering station, City of Huntington Beach potable water connection, and the City of Huntington Beach sanitary sewer system.

2.1.1.2 Fire Water

The primary source of fire protection water for the project will be the same as for the existing generating station: it will be supplied via the existing connection to the City of Huntington Beach 8-inch potable water distribution system. The existing fire water distribution system, including two emergency diesel-fired fire water pumps, and the process water distribution and storage systems will be reused to the greatest extent possible, but with some modifications to the onsite conveyance systems to accommodate the newly constructed facilities.

2.1.1.3 Pipelines and Transmission Interconnection

The facility will use the following existing onsite pipeline interconnections:

- Natural gas supply pipeline
- Potable water supply pipeline
- Wastewater discharge pipeline

Natural Gas Supply Pipeline. Natural gas is delivered to the existing Huntington Beach Generating Station by SoCalGas via an existing 16-inch-diameter line to an existing gas metering station. As with the Licensed HBEP, SoCalGas will construct two new metering stations on the site of the existing Huntington Beach Generating Station gas yard as part of the Amended HBEP. As evaluated for Licensed HBEP, the natural gas will flow from the new SoCalGas metering station to a new gas pressure control station and gas scrubber/filtering equipment that will be constructed by the Project Owner as part of the project.

Potable Water Supply Pipeline. As with the Licensed HBEP, potable water for the Amended HBEP will be supplied from an existing 8-inch pipeline from the City of Huntington Beach.

Wastewater Discharge Pipeline. As with the Licensed HBEP, sanitary wastewater generated by Amended HBEP will be discharged to the City of Huntington Beach existing sewer main that services the existing Huntington Beach Generating Station. Similar to the Licensed HBEP, process wastewater and stormwater from Amended HBEP will be collected in an onsite retention basin and then discharged to an existing ocean outfall for the existing Huntington Beach Generating Station.

Transmission Interconnection. As with the Licensed HBEP, each power block will interconnect to the SCE onsite 230-kV substation via generator tie (gen-tie) lines. These gen-ties will be located entirely within the Huntington Beach Generating Station. Figure 2.1-4 presents a one-line diagram for the gen-ties.

2.1.2 Process Description

As discussed previously, the Amended HBEP CCGT Block will consist of the following equipment: GE 2x1 7FA.05 combined-cycle gas turbines and associated HRSGs, SCR systems for NO_x emissions control, and oxidation catalyst equipment to control CO and VOC emissions; one STG; one air-cooled condenser; and associated support equipment.

The Amended HBEP SCGT power block will consist of two GE LMS-100 PB gas turbines with ancillary equipment as outlined above.

2.1.2.1 Combined-cycle Process

CTG combustion air will flow through the inlet air filters, evaporative inlet air coolers, associated air inlet ductwork, and silencers before being compressed in the CTG compressor section and then entering the CTG combustion sections. Natural gas will be mixed with the compressed air prior to being introduced to the combustion sections and ignited. The hot combustion gases will expand through the power turbine section of the CTGs, causing them to rotate and drive the electric generators and CTG compressors. The hot combustion gases will exit the turbine sections and enter the HRSG. The HRSG will heat water (feed water), converting it into superheated steam. High-pressure, intermediate-pressure, and low-pressure steam will be delivered to the steam turbine. As the steam expands when it passes through the steam turbine, the thermal energy is converted to mechanical energy as the turbine rotates and then is converted to electrical energy as the turbine turns a generator. The low-pressure steam existing the steam generator will enter the air-cooled condenser, which will remove heat from the low-pressure steam (causing the steam to condense to water) and release the heat to the ambient air. The condensed water, or condensate, will be returned to the HRSG feed water system for reuse.

The CTG exhaust gases of approximately 1100 degrees Fahrenheit (°F) will be used to generate steam in the HRSGs. The HRSG will employ a triple pressure design reheat system. Steam from the HRSG will be admitted to a STG. The STG will produce approximately 225 MW (gross). The generating units are expected to have an overall annual availability of approximately 98.4 percent.

The heat balances for the project’s modes of operation are shown in Figures 2.1-5a and 2.1-5b for the site ambient air temperature conditions[3] with no evaporative cooling of the CTG inlet air. The use of the evaporative coolers is not intended as power augmentation, but rather will be employed to mitigate CTG ambient condition degradation and to maintain the facility at or near the nominal generating capacity. The predicted net electrical output of the CCGT power block under the summer condition is approximately 650 MW at a heat rate of approximately 6118 British thermal units per kilowatt-hour (Btu/kWh) on a lower heating value (LHV) basis. This corresponds with a thermal efficiency of approximately 56 percent on a LHV basis.

The combustion turbines will include the use of best available control technology (BACT) to limit emissions of criteria pollutants and hazardous air pollutants. NO_x will be controlled to 2.0 parts per million by volume, dry basis (ppmvd), corrected to 15 percent oxygen through the use of dry low-NO_x combustors and SCR. An

[3] Site average ambient temperature is 65.8°F (Dry Bulb) and 56.8°F (Wet Bulb) and relative humidity of 57%.

oxidation catalyst will also be used to control CO emissions to 2.0 ppmvd at 15 percent oxygen and VOCs emissions to 2.0 ppmvd at 15 percent oxygen. BACT for particulate matter (with a diameter less than 10 and 2.5 microns [PM_{10} and $PM_{2.5}$]) and sulfur dioxide (SO_2) will be the exclusive use of natural gas with a sulfur content not to exceed 0.75 grains per 100 standard cubic feet of natural gas. Emissions of excess ammonia (ammonia slip) not used in the SCR process will be limited to 5.0 ppmvd at 15 percent oxygen.

2.1.2.2 Simple-cycle Process

The Amended HBEP simple-cycle power block will consist of the following equipment: GE LMS-100 PB simple-cycle intercooled gas turbines each with dry low NOx combustors and SCR systems for NO_x emissions control, and oxidation catalyst equipment to control CO and VOC emissions; two fin fan heat exchangers (one per CTG); and associated support equipment.

The combustion turbine subsystems include inlet air filtration and evaporative inlet cooling system, intercooling system, generator and excitation systems, and turbine control and instrumentation. CTG combustion air will flow through the inlet air filters, evaporative inlet air coolers, and associated air inlet ductwork before being compressed in the CTG compressor section and then entering the CTG combustion sections. Natural gas will be mixed with the compressed air prior to being introduced to the combustion sections and ignited. The hot combustion gases will expand through the power turbine section of the CTGs, causing them to rotate and drive the electric generators and CTG compressors. The hot combustion gases will exit the turbine sections and enter the SCR and the oxidation catalysts. The LMS-100 PB is a 3-spool gas turbine prime mover that uses an intercooler between the Low-Pressure Compressor (LPC) and the High-Pressure Compressor (HPC). Intercooling provides significant benefits to the Brayton cycle by reducing the work of compression for the HPC. This allows for higher-pressure ratios, thus increasing overall efficiency. The reduced inlet temperature for the HPC allows increased mass flow resulting in higher specific power.

The heat balances for the project's modes of operation are shown in Figures 2.1-5a and 2.1-5b for the site ambient air temperature conditions[4] with no evaporative cooling of the CTG inlet air or supplemental firing. The predicted net electrical output of the HBEP simple-cycle power block under these conditions is approximately 190 MW at a heat rate of approximately 8,290 British thermal units per kilowatt-hour (Btu/kWh) on a LHV basis. This corresponds with a thermal efficiency of approximately 41 percent on a LHV basis.

The combustion turbines will include the use of BACT to limit emissions of criteria pollutants and hazardous air pollutants. NO_x will be controlled to 2.5 parts per million by volume, dry basis (ppmvd), corrected to 15 percent oxygen through the use of dry low-NO_x combustors and SCR. An oxidation catalyst will also be used to control CO emissions to 4.0 ppmvd at 15 percent oxygen and VOCs emissions to 2.0 ppmvd at 15 percent oxygen. BACT for particulate matter (with a diameter less than 10 and 2.5 microns [PM_{10} and $PM_{2.5}$]) and sulfur dioxide (SO_2) will be the exclusive use of natural gas with a sulfur content not to exceed 0.75 grains per 100 standard cubic feet of natural gas. Emissions of excess ammonia (ammonia slip) not used in the SCR process will be limited to 5.0 ppmvd at 15 percent oxygen.

2.1.3 Major Generating Facility Components—CCGT Power Block

The following paragraphs describe the major components of the two Amended HBEP power blocks.

2.1.3.1 Combustion Turbine Generators

Natural gas combustion in the CTGs will produce thermal energy, which is converted into mechanical energy required to drive the combustion turbine compressors and electrical generators. Each CTG system will contain supporting systems and associated auxiliary equipment.

Each combustion turbine will drive a hydrogen cooled synchronous generator. Each CTG will be equipped with the following systems and components:

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[4] Site average ambient temperature is 65.8°F (Dry Bulb) and 56.8°F (Wet Bulb) and relative humidity of 57%.

- Inlet air filters, inlet silencers, and evaporative coolers
- Metal acoustical enclosure
- Lubrication oil system for the combustion turbine and the generator
- Dry low-NOx combustion system
- Compressor wash system
- Fire detection and protection system (using either carbon dioxide or water mist spray)
- Fuel gas system, including flow meter, strainer, and duplex coalescing filter
- Static Starter system
- Turbine controls
- Hydrogen-cooled synchronous generator
- Generator controls, protection, excitation, power system stabilizer, and automatic generation control

The CTGs and accessory equipment will be contained in acoustical enclosures for noise reduction.

2.1.3.2 Heat Recovery Steam Generators

The HRSGs will transfer heat from the exhaust gases of the CTGs to the feedwater to produce, high-pressure, intermediate pressure, and low-pressure steam. Each HRSG is a triple pressure, reheat, natural circulation horizontal unit equipped with inlet and outlet ductwork, insulation, lagging, SCR/CO catalyst assemblies and exhaust stack. The HRSGs will not employ duct burners.

Condensate will be pumped from the air-cooled condenser receiver tank through the HRSG low temperature economizer to the LP evaporator and then to the LP steam drums. Steam from the LP drum will flow through superheater sections and then enter the LP section of the steam turbines.

The LP drums will provide suction to the feedwater pumps, which will provide feedwater to the HP and IP sections of the HRSG. The HP and IP sections each contain economizer sections, evaporator sections, drums and superheater sections. HP superheated steam is furnished to the HP section of the steam turbine. HP turbine exhaust steam, called cold reheat, is sent back to the HRSG where it is reheated in the HRSG reheater section and then combined with the HRSG superheater IP steam and then is sent to the steam turbine IP section. Attemperation will be provided upstream of all final HRSG superheater sections to control the steam temperature to the steam turbine.

The HRSGs are equipped with two (2) emission control systems located in the HRSG evaporator region. The first system is an oxidation catalyst to control CO and VOC emissions. The second is an SCR emission control system that uses 19 percent aqueous ammonia in the presence of a catalyst to reduce the NO_x concentration in the exhaust gases. Ammonia is injected into the exhaust gas stream through a grid of nozzles located upstream of the SCR catalyst module. The subsequent chemical reaction will reduce almost all of the NO_x to nitrogen and water.

2.1.3.3 Steam Turbine System

The steam turbine system consists of a condensing steam turbine, gland steam seal system, lubricating oil system, hydraulic control system, and steam admission/induction valves.

The steam turbine is a triple pressure, reheat, side exhaust turbine with a totally enclosed water to air-cooled generator. Turbine configuration is a single combined high-pressure/intermediate pressure casing and a single double flow low-pressure turbine. Steam is admitted through a combined main steam stop/control valve and a combined reheat stop/control valve. A separate LP steam induction point is also provided. Standard acoustical enclosures are provided for the HP/IP section and the generator.

2.1.4 Major Generating Facility Components—Simple-Cycle Power Block

2.1.4.1 Combustion Turbine Generators

Natural gas combustion in the CTGs will produce thermal energy, which is converted into mechanical energy required to drive the combustion turbine compressors and electrical generators. Each CTG system will contain supporting systems and associated auxiliary equipment.

The combustion turbine will drive an air-cooled, 2-pole synchronous generator.

The CTGs will be equipped with the following systems and components:

- Inlet air filters, and evaporative coolers
- Intercooler
- Weather proof acoustical enclosure
- Lubrication oil system for the combustion turbine and the generator
- Dry low-NOx combustion system
- Compressor wash system
- Fire detection and protection system (using carbon dioxide)
- Fuel gas system, including strainer, and duplex filter
- Starter system
- Fire Protection System
- Turbine controls
- Generator controls, protection, excitation, power system stabilizer, and automatic generation control for each turbine

The CTGs and accessory equipment will be contained in acoustical enclosures for noise reduction.

2.1.5 Major Electrical Equipment and Systems CCGT Power Block

The bulk of the electric power produced by Amended HBEP CCGT and simple-cycle blocks will be transmitted to the electrical grid through 230-kV gen-tie lines connecting each power block to the existing onsite SCE 230-kV substation. A small amount of electric power will be used onsite to power auxiliary equipment such as natural gas compressors, pumps and fans, control systems, and general facility loads including lighting, heating, and air conditioning. Station battery systems will also be used to provide direct current voltage as backup power for control systems and other emergency pump motors. Transmission and auxiliary uses are discussed in the following subsections. These electrical subsystems will be similar in design to the Licensed HBEP.

2.1.6 Fuel System

As with the Licensed HBEP, the Amended HBEP power blocks will only combust natural gas. For the CCGT power block, the natural gas requirement during operation at average ambient conditions is approximately 4,100 MMBtu/hr (LHV basis, total for two CTGs).For the simple-cycle power block the natural gas requirements will be 1,585 MMBtu/hr (LHV basis for a total of 2 CTGs) at average ambient conditions.

As with the Licensed HBEP, fuel for the Amended HBEP will be delivered via an existing SoCalGas 16-inch-diameter low-pressure gas main immediately adjacent to the project site. As part of the Licensed HBEP, SoCalGas confirmed its system has sufficient capacity to supply HBEP at this location.

Consistent with the Licensed HBEP, natural gas will be supplied to the Amended HBEP via the existing 16-inch-diameter, high-pressure pipeline that currently serves the Huntington Beach Generating Station. The existing natural gas pipeline and existing natural gas metering and valve station is owned and operated by SoCalGas. The pipeline operates at a nominal 145 pounds per square inch, and enters the existing Huntington Beach Generating Station on the northwest side of the facility near Newland Street.

As with the Licensed HBEP, the natural gas for the Amended HBEP will flow through a flow-metering station, a gas pressure control station, gas compression equipment, and gas scrubber/filtering equipment housed in separate buildings to attenuate noise. The natural gas for the building heating systems will flow through the flow-metering station and gas pressure control station, but will not require compression, filtering, or heating.

As with the Licensed HBEP, for the Amended HBEP the existing SoCalGas metering station will remain in service temporarily during construction of Amended HBEP for continued operation of existing Huntington Beach Generating Station Units 1 and 2. Similar to the Licensed HBEP, SoCalGas will construct two new gas metering stations in the existing gas yard to support the Amended HBEP facility and will demolish the existing metering station. Construction of the new gas metering station is considered part of the Licensed HBEP and the potential environmental impacts associated with the construction of the new gas metering station are included as part of construction impacts of the Licensed HBEP, and there is no change to these impacts for the Amended HBEP.

As with the Licensed HBEP, Amended HBEP construction activities related to the new SoCalGas metering station will include grading a pad and installing aboveground and belowground gas piping; metering equipment; and gas conditioning, pressure regulation, and possibly pigging facilities. A distribution power line also will be installed to provide power for metering station operation lighting and communication equipment. A chain-link fence will be installed around the gas metering station for security.

2.1.7 Plant Cooling Systems

2.1.7.1 CCGT Plant Cooling

The steam turbine cycle heat rejection system will consist of an air-cooled condenser, which will eliminate the need for ocean water for power plant cooling, which is the system currently used at the existing Huntington Beach Generating Station. The heat rejection system will receive exhaust steam from the low-pressure section of the steam turbine and condense it to water (condensate) for reuse. The condenser will be designed to operate at a pressure of approximately 6.6-inch Hg absolute. It will transfer approximately 1,310 MMBtu/hr to the ambient air as a result of condensing steam at these operating conditions.

Balance of plant systems will be cooled by a common plant closed-loop fluid cooler utilizing water. CTG, STG, gas compressors, and other balance of plant auxiliary equipment requiring cooling will be integrated into the closed-loop cooling water system.

2.1.7.2 SCGT Plant Cooling

The simple-cycle heat rejection system will consist of one air-cooled closed loop fluid cooler per CTG to reject waste heat from the intercooler and other gas turbine auxiliaries. Each cooler will reject approximately 109 MMBtu/hr to the ambient air.

2.1.8 Water Supply and Use

As with the Licensed HBEP, Amended HBEP will use water provided by the City of Huntington Beach for process and potable uses. HBEP will access this water through an existing 8-inch-diameter potable water line serving the existing Huntington Beach Generating Station.

Figures 2.1-6a and 2.1-6b provide the water balances for Amended HBEP representing two operating conditions. Figure 2.1-6a represents operation under site monthly maximum average ambient temperature (SMMAAT) conditions[5] with the CTGs at 100 percent load and CTG inlet air evaporative cooling operating. Figure 2.1-6b represents operation at site peak summer ambient temperature (SPSAT)[6] conditions with the CTGs operating at 100 percent load and CTG inlet evaporative cooling operating.

[5] SMMAAT is 85°F (dry bulb) and 69.7°F (wet bulb) and 45.75 percent relative humidity

[6] SPSAT conditions of 110°F dry bulb and 7 percent relative humidity.

2.1.8.1 CCGT Water Requirements

The estimated water demand was determined by assessing the water demand for the Amended HBEP CCGT power block while operating at average conditions, at a sustained maximum consumption rate, and at the peak consumption rate (two CTGs at 100 percent load with inlet air evaporative cooling operating). Table 2.1-1 presents the estimated water demand.

TABLE 2.1-1
Estimated Daily and Annual Water Use for Amended HBEP CCGT Operations

Water Use	Average Daily Use Rate (gpm)	Maximum Sustained Use Rate (gpm)	Peak Use Rate (gpm)
Potable water	54	90	194

gpm = gallons per minute

2.1.8.2 SCGT Water Requirements

The estimated theoretical water need was determined by assessing the water demand for the Amended HBEP SCGT power block while operating at average ambient conditions, at a sustained maximum consumption rate, and at the peak consumption rate (two CTGs at 100 percent load with inlet air evaporative cooling operating). Table 2.1-2 presents these estimates.

TABLE 2.1-2
Estimated Daily and Annual Water Use for Amended HBEP Operations

Water Use	Average Daily Use Rate (gpm)	Maximum Sustained Use Rate (gpm)	Peak Use Rate (gpm)
Potable water	16	43	91

2.1.8.3 Amended HBEP Water Requirements

The Amended HBEP will use a maximum of 120 acre-feet per year of fresh water supplied by the City of Huntington Beach. Table 2.1-3 presents the estimated average daily, maximum sustained, and maximum annual water use.

TABLE 2.1-3
Estimated Daily and Annual Water Use for Amended HBEP Operations

Water Use	Average Daily Use Rate (gpm)	Maximum Sustained Use Rate (gpm)	Maximum Annual Use[a] (acre feet per year)
Potable water	70	133	120

[a] Assumes operation at various temperature conditions in accordance with dispatch assumptions.

The Amended HBEP water use is less than the Licensed HBEP maximum water use of 134 acre-feet per year. The City of Huntington Beach supplies the process and potable water for the existing Huntington Beach Generating Station’s units.

2.1.8.4 HBEP Wastewater Requirements

As the water supply and water treatment system of the Amended HBEP are the same as the Licensed HBEP, the wastewater quality will be similar to the wastewater quality analyzed in the Licensed HBEP. The Amended HBEP will generate fewer megawatts overall and less of that generation is combined-cycle generation. Therefore, the expected wastewater volume for the Amended HBEP will be less than the Licensed HBEP.

Actual annual discharge volumes to the existing ocean outfall are expected to be similar or less than the Licensed HBEP and will depend on the actual operating profile and annual service factor of the Amended HBEP in any given year.

Sanitary wastewater discharge from the Amended HBEP will be to the existing 4-inch sewer line that connects to the existing City of Huntington Beach sewer line located in the north corner of the site near Newland Street.

2.1.8.5 Water and Wastewater Treatment

Makeup water for the Amended HBEP will be produced from the existing Huntington Beach Generating Station water treatment plant, which will remain in service. Contaminants are removed (demineralized) by passing the service water through treverse osmosis system followed by a continuous electrodeionization process. The various water streams are as follows:

- The demineralized water will be sent to a 100,000-gallon storage tank. It will provide approximately 100 hours of storage for HBEP. Demineralized water is used for feedwater makeup for the steam cycle and for combustion turbine wash water.
- The reject water stream from the reverse osmosis system will be discharged to the existing outfall.
- Feedwater makeup water will be fed to the condensate receiver, tank deaerator which is part of the air-cooled condensing unit package.
- Blowdown (condensate removed from the HRSGs to reduce water contaminants) will be discharged to an atmospheric flash tank, where the flash steam will be vented to the atmosphere and the condensate will be cooled prior to being discharged to the existing outfall.
- Wastewater from combustion turbine water washes will be collected in combustion turbine drain tanks and then trucked offsite for disposal. Service water will be used for makeup to the combustion turbine evaporative coolers, equipment washdown, and other miscellaneous plant uses.
- Blowdown from the combustion turbine evaporative coolers will be either recycled onsite or discharged to the outfall.
- Wastewater from process areas that could potentially include oil or other lubricants will be directed to an oil-water separator for removal of accumulated oil that may result from equipment leakage or small spills and large particulate matter that may be present from equipment washdowns. The oil-free stormwater from the process areas and from the pavement areas will be collected in the retention basins and will be discharged to the existing ocean outfall. The residual oil containing sludge will be collected via vacuum truck and disposed appropriately by a licensed transporter.

2.1.8.6 CCGT Air-cooled Condenser System

Exhaust steam from the STG will be condensed in an air-cooled condenser. The use of an air-cooled condenser will eliminate the significant water demand required for condensing STG exhaust steam in a conventional surface condenser/cooling tower arrangement. To condense steam in an air-cooled condenser, large fans will blow ambient air across finned tubes through which the low-pressure steam flows. The low-pressure steam will cool until it reaches the temperature at which it is condenses back into water (condensate). The condensate collects in a receiver tank located under the air-cooled condenser. Condensate pumps will then return the condensate from the receiver tank back to the HRSGs for reuse.

2.1.8.7 Closed-loop Cooling Fluid Cooler

Each power block will include a closed-loop cooling system to provide cooling water for various plant equipment such as the generator coolers, gas compressors, lubrication oil coolers, air compressors, and

HRSG feedwater pumps. The primary means of heat rejection for these closed-loop systems will be an air-cooled heat exchanger. The air-cooled heat exchanger will use fans to blow ambient air across finned tubes through which the closed-loop cooling water will flow. The air-cooled heat exchanger will consume no water.

2.1.9 Emission Control and Monitoring

Air emissions from Amended HBEP's combustion of natural gas in the CTGs will be controlled using pre- and post-combustion controls. The precombustion controls include dry low NOx combustions on the combustion turbines with post-combustion controls including aqueous ammonia-based selective catalytic reduction for NOx control and oxidation catalyst for CO and VOC control. To ensure that these emission control systems perform correctly, continuous emission monitoring will be performed on the stack exhaust flow rate, temperature, oxygen, NO_x and CO levels, as well as on the natural gas heat input, generator output, and ammonia injection rate into the pollution control system. Section 5.1, Air Quality, includes additional information on emission control and monitoring.

2.1.10 Waste Management

The operational waste generated by the Amended HBEP will be of similar composition and volume to the waste analyzed for the Licensed HBEP.

2.1.11 Management of Hazardous Materials

The management of operational hazardous materials at the Amended HBEP will be of similar in nature and volume to those analyzed for the Licensed HBEP. A list of the chemicals anticipated to be used at the HBEP and their storage locations is provided in Section 5.5, Hazardous Materials Handling. The list identifies each chemical by type, intended use, and estimated quantity to be stored onsite.

2.1.12 Fire Protection

The existing fire protection system at the existing Huntington Beach Generating Station will be modified to meet all LORS for the HBEP while reusing existing equipment to the maximum extent possible. Existing fire pumps, storage tanks, and piping will remain in service as part of the newly modified fire protection system. The system design will protect personnel and limit property loss and plant downtime in the event of a fire. The primary source of fire protection water will be supplied via the existing Huntington Beach Generating Station's connection to the City of Huntington Beach's 8-inch potable water distribution system. The secondary source of fire protection water will be supplied from a new 650,000-gallon onsite fire/service water storage tank, which will be configured in accordance with National Fire Protection Association (NFPA) guidelines to provide minimum 2 hours of protection for the onsite worst-case single fire.

Fire protection water from the City connection and onsite fire/service water storage tank will be provided to a dedicated underground fire loop piping system. The fire hydrants and the fixed suppression systems will be supplied from the fire water loop. Fire water pressure in the fire-water loop will be maintained with a jockey pump. Fixed fire suppression systems will be installed at determined fire risk areas. Sprinkler systems also will be installed in the administration/maintenance building as required by NFPA and local code requirements. The CTG units will be protected by a carbon dioxide and/or water mist fire protection system. Hand-held fire extinguishers of the appropriate size and rating will be located in accordance with NFPA 10 throughout the facility. Two existing emergency diesel fire water pumps currently installed at the Huntington Beach Generating Station will remain in service for the HBEP.

Section 5.5, Hazardous Materials Handling, includes additional information on fire and explosion risk, and Section 5.10, Socioeconomics, provides information on local fire protection capability.

2.1.13 Plant Auxiliaries

The plant auxiliaries, including lighting, grounding, distributed control system, cathodic protection, and service/instrument air, will be designed consistent with the Licensed HBEP.

2.2 Demolition Activities

Demolition of certain existing Huntington Beach Generating Station support structures and equipment will be completed to facilitate construction and operation of the Amended HBEP. Construction of the CCGT block and the SCGT block is expected to take approximately 36 and 24 months respectively, with the CCGT block construction scheduled to occur from the second quarter of 2017 through the second/third quarter of 2020, and the SCGT block construction scheduled to occur from the first quarter of 2022 through to the first quarter of 2024. Removal/demolition of existing Huntington Beach Generating Station Units 1 and 2 is not specifically required for HBEP but will be completed voluntarily by AES. Demolition of these units is scheduled to occur from the first quarter of 2024 through the fourth quarter of 2025 and will involve demolition of the units and their ancillary mechanical and electrical equipment down to the concrete super structure or turbine deck level. The existing reverse osmosis/electrodeionization tanks that currently serve the existing Huntington Beach Generating Station will remain in service as part of the Licensed HBEP.

Existing Huntington Beach Generating Station Units 3 and 4 were licensed through the CEC (00-AFC-13C). Demolition of these units is authorized under that license and will proceed irrespective of the HBEP. Therefore, demolition of existing Huntington Beach Generating Station Units 3 and 4 is not part of the HBEP project definition. However, to ensure a comprehensive review of potential project impacts, the demolition of existing Huntington Beach Generating Station Units 3 and 4 is included in the cumulative impact assessment. Removal/demolition of existing Huntington Beach Generating Station Units 3 and 4 will be in advance of the construction of the SCGT power block.

Initial demolition activities to support HBEP construction and operation include the demolition of the remaining portions of the decommissioned existing Huntington Beach Generating Station's Unit 5 peaker and the removal of the east fuel oil tank and fuel storage tank. These initial activities will include demolition of the foundations, building, small auxiliary mechanical and electrical equipment associated with the Unit 5 peaker, and removal of the fuel storage tanks per the requirements of a Department of Toxic Substances Control Removal Action. These demolition activities will occur in conjunction with the initial site preparation construction activities for HBEP Block 1 that include removing the tanks' associated berm and establishing final grades and roads.

2.2.1 Demolition Workforce

A typical crew size has been assumed for this discussion. The demolition workforce loads will vary depending on the specific activities being performed. Various skill sets will be required for equipment operation, truck driving, asbestos and lead abatement, dismantling of structures, health and safety monitoring, sampling, general housekeeping, and other activities. It is anticipated that the maximum number of demolition personnel during any specific demolition activity will be approximately 50, with an overall average demolition workforce of 40 personnel. Professional labor for the demolition will include project management, construction management, planning and permitting specialists, health and safety specialist, quality assurance/quality control engineers, project controls engineers, accounting and procurement specialists, and administrative specialists. See Appendix 5.10B for the workforce requirements for demolition.

2.2.2 Demolition Equipment

Equipment anticipated to be used for the demolition of the existing Huntington Beach Generating Station includes the following; however, the actual equipment may vary depending on the selected demolition contractor:

- 35-ton and 75-ton rubber-tired cranes
- Excavators with shear attachments
- Backhoes
- Paving breaker attachments for the excavators or backhoes
- Front-end loaders

- 10-wheeled dump trucks for transporting materials
- Truck tractor driven end-dumps for transporting wastes to appropriate disposal facilities
- Fork lifts
- Compactors
- Bulldozers
- Various support vehicles such water trucks (dust control), fueling/service vehicles, and pickup trucks

During peak demolition activities at the site, an estimated maximum of 15 tractor-trailer units will leave the site each day to transport waste and debris offsite for salvage, recycling or disposal. See Appendix 2A for a list of the equipment requirements for demolition.

2.2.3 Demolition Schedule

Table 2.2-1 lists HBEP major schedule milestones, including demolition start dates. Figure 2.2-1 provides an integrated schedule for the demolition of existing Huntington Beach Generating Station's Unit 5 Peaker and Tank Area, the separately licensed cumulative demolition of existing Huntington Beach Generating Station's Units 3 and 4, and the demolition of existing Huntington Beach Generating Station's Units 1 and 2.

It is anticipated that demolition activities will be conducted during a normal 10-hour day and 6 day a week schedule utilizing a single shift. However, during critical demolition activities, it may be necessary to work longer shifts and additional days. These additional hours can be managed by crew rotations.

TABLE 2.2-1
HBEP Major Milestones

Activity	Date
Initiate Demolition of Unit 5 Peaker and East Oil Tank	First Quarter 2016
Soil investigation/remediation, site preparation and grading	Fourth Quarter 2016
Begin Construction of CCGT	Second Quarter 2017
Commercial Operation of Block 1	First/Second Quarter 2020
Initiate Demolition of Units 3 and 4	First/Second Quarter 2020
Begin Construction of SCGT	First Quarter 2022
Commercial Operation of SCGT	First Quarter 2024
Initiate Demolition of Units 1 and 2	First Quarter 2024

2.3 Project Construction

Construction of the CCGT power block from final engineering design and planning to COD is anticipated to require approximately 36 months. Actual onsite physical construction from site preparation to completion of all mechanical, electrical, and balance of plant equipment is expected to take 34 months. The COD for the CCGT power block is scheduled for the first quarter of 2022. The construction and power block commissioning of HBEP SCGT power block from site preparation to COD is anticipated to require approximately 24 months. The COD for the SCGT power block is scheduled for the fourth quarter of 2023.

2.3.1 Construction Schedule and Workforce

The construction plan is based on a single 10-hour shift/6 days per week. Overtime and additional shift work may be used to maintain or enhance the construction schedule. Construction will most typically take place between the hours of 7:00 a.m. and 8:00 p.m., Monday through Saturday; however, additional hours may be necessary to maintain schedule or to complete critical construction activities (such as large concrete pours). During the commissioning and startup phase of each of the power blocks, the schedule will be based on a single shift, 10-hour/6-day work week; however, during this time, some activities may continue 24 hours per day, 7 days per week.

An estimated peak of 306 craft and professional personnel is anticipated between the fourth quarter of 2018 and the second quarter of 2019 during construction of the CCGT power block, and an estimated peak of 165 craft and professional personnel is anticipated in the first quarter of 2023 for the SCGT power block.

Temporary construction offices for owner, contractor, and subcontractor personnel will be provided in temporary trailer units to be located on the Huntington Beach Generating Station site.

2.3.2 Construction Plans

An Engineer-Procurement-Construction (EPC) contractor will be selected for the engineering, procurement, and construction of the facility. Subcontractors will be selected by the EPC.

2.3.2.1 Mobilization

The EPC contractor will mobilize after full notice to proceed. Initial site work will include site grading and stormwater control. A rock aggregate will be used for temporary roads, laydown, work areas, and onsite construction parking areas.

2.3.2.2 Construction Parking

The construction of HBEP will require both onsite and offsite parking for construction workers. Construction worker parking for the construction HBEP and the demolition of the existing units at Huntington Beach Generating Stations is provided by a combination of onsite parking and offsite parking. As with the Licensed HBEP, a maximum of 330 parking spaces will be required during construction and demolition activities. As shown in Figure 2.3-1 (HBEP Construction Parking Areas), offsite construction/demolition parking options include the following:

- Approximately 1.5 acres onsite at the Huntington Beach Generating Station (approximately 130 parking stalls)
- Approximately 3 acres of existing paved/graveled parking located adjacent to the HBEP across Newland Street (approximately 300 parking stalls)
- Approximately 2.5 acres of existing paved parking located at the corner of Pacific Coast Highway and Beach Boulevard (approximately 215 parking stalls)
- An additional 20 acres beyond the 1.9 acres identified in the Final Decision at the former Plains All American Tank Farm site located adjacent to the HBEP site for construction laydown and construction worker parking (see Figure 2.3-1). Thus, the analysis herein includes 22 acres of the former Plains All American Tank Farm site for construction laydown and construction worker parking (approximately 330 parking stalls.)

Ample space is available to accommodate the maximum of 330 parking spaces needed for construction and demolition activities associated with the project, as well as the construction laydown area for the Amended HBEP on the Plains All American site. To facilitate use of the Plains All American site for construction parking and construction laydown, a new entrance (two lanes in each direction) to the site will be constructed by the Project Owner at the existing Magnolia and Banning signalized intersection. This intersection is currently controlled by an existing three-way traffic signal. The Project Owner will modify the intersection to a 4-way traffic signal in coordination with the City of Huntington Beach. The new entrance will cut through the existing earthen landscaped berm on the Plains All American site that parallels Magnolia Avenue. The Project Owner will coordinate with the City of Huntington Beach engineering and planning departments to design and modify the intersection and new entrance to the City's specifications. Construction workforce parking at the Plains site will walk to the HBEP site via an existing bridge over the Huntington Beach Channel and walking path. The bridge and walking path will be fenced with temporary construction fencing for safety and to avoid impacts to the adjacent wetlands.

Construction workers will arrive at the onsite or offsite construction parking areas in private vehicles using various routes to the access the sites. For parking areas without pedestrian access to the construction site, shuttles will be used transport construction workers to and from the project site from offsite parking areas. Figure 2.3-1 shows the shuttle routes to and from each of the potential offsite construction worker parking areas to the HBEP site. In combination with the onsite construction parking area, the offsite parking areas being considered will provide adequate parking for construction workers and visitors during construction of HBEP.

2.3.2.3 Construction Laydown and Storage

Approximately 22 acres of construction laydown will be required, with approximately 6 acres at the Huntington Beach Generating Station used for a combination of laydown and construction parking, and up to 16 acres at the former Plains All American Tank Farm site (see Figure 2.3-1).

As discussed above for construction workers parking, the Plains All American Tank Farm is a 22-acre parcel located adjacent to the HBEP site, across the Huntington Beach Channel. The site currently includes three large former petroleum storage tanks within secondary containment berms and ancillary facilities. The owner of the site has received a permit from the City of Huntington Beach to remove the storage tanks and grade the site for future, undisclosed development. As discussed above, the Project Owner proposes to use the site for construction parking and equipment laydown and will install a new signalized site access road at the intersection of Magnolia Avenue and Banning Street. A gravel surface will also be installed on the portion of the site used for equipment laydown and parking to minimize dust and manage stormwater. Construction equipment will be moved from the Plains site to HBEP via Magnolia Avenue, the Pacific Coast Highway, and Newland Street.

Construction access will generally be from Newland Street via Pacific Coast Highway. A secondary access off of Edison Drive may also be used for small vehicles. Large or heavy equipment, such as the turbines, generators, generator step-up transformers, and HRSG modules will be delivered to site by truck/trailer following specific requirements of “oversize/heavy load” permits from appropriate agencies (California Department of Transportation, City of Huntington Beach, and/or County of Orange). Large and heavy components of the generating units (e.g., turbines, HRSG components and other large components) will arrive by ship or rail at the Port of Long Beach. From the Port of Long Beach, the large components of the generating units will be hauled directly to the HBEP site for immediate installation. In the event heavy equipment arrives but cannot be transported and transferred directly into its final position at the HBEP, it will be hauled to the Plains All American Tank Farm (see Figure 2.3-1). See Section 5.12 (Transportation and Traffic) for information on the heavy haul route from the Port of Long Beach to the construction laydown area at the Plains All American Tank Farm site, and from the Plains All American Tank Farm site to the HBEP site. When the components stored at the offsite laydown area are ready for installation at HBEP, they will be hauled to project site using the specific heavy haul route. Additional storage space for heavy haul deliveries is also available at the AES Alamitos generating station as described in the Licensed HBEP.

Onsite construction laydown will be within existing site boundaries, primarily on the land around existing Units 3 and 4. These areas include the parking lot and the open areas directly adjacent to Units 3 and 4. Construction access will be generally from Newland Street. Large or heavy equipment, such as the turbines, generators, generator step-up transformers, and HRSG modules, will be delivered to the site by oversize/heavy haul truck/trailer following specific requirements of any permits that are required.

2.3.2.4 Emergency Facilities

Emergency services will be coordinated with the local fire agencies (Huntington Beach Fire Department), the Hunting Beach Police Department, and local hospitals. An urgent care facility will be contacted to arrange for nonemergency physician referrals. First aid kits will be provided around the site and will be regularly maintained. At least one person trained in first aid will be part of the construction crew.

In addition, the EPC will have a Construction Safety Supervisor. Construction foremen and supervisors will be have first aid and CPR training, and will be trained in the use of a portable automatic external defibrillator, which will be available onsite at all times during construction.

Fire extinguishers will be located throughout the site at strategic locations at all times during construction.

2.3.2.5 Construction Utilities

During construction, existing, onsite utility lines will be used for the construction offices, laydown area, and the project site.

Temporary construction power will be obtained from SCE. Area lighting will be provided and strategically located for safety and security.

Construction water will be potable water from the City of Huntington Beach potable water supply system that is connected to the existing Huntington Beach Generating Station.

For the construction of the CCGT power block, average daily use of potable water is expected to be approximately 18,000 gallons. During the commissioning period, when activities such as hydrostatic testing, cleaning and flushing, and steam blows of the HRSGs and steam cycles will be conducted, average water usage is estimated at 24,000 gallons per day with a maximum daily use of 130,000 gallons. Hydrostatic test water and cleaning water will be tested and disposed in accordance with applicable LORS.

For the SCGT power block average daily use of potable water is expected to be approximately 18,000 gallons. During the 60-day commissioning period, when activities such as hydrostatic testing and cleaning and flushing, will be conducted, average water usage is estimated at 40,000 gallons per day with a maximum daily use of gallons. Hydrostatic test water and cleaning water will be tested and disposed in accordance with applicable LORS. Portable toilets will be provided throughout the site.

2.3.2.6 Site Services

The following site services will be provided by the EPC contractor:

- Environmental health and safety training
- Site security
- Site first aid
- Construction testing (e.g., nondestructive examination, hydrostatic testing)
- Fire protection including extinguisher maintenance
- Furnishing and servicing of sanitary facilities
- Trash collection and disposal
- Disposal of hazardous materials and waste in accordance with local, state, and federal regulations

2.3.2.7 Construction Materials and Equipment

Construction equipment will be at the project site from shortly after an EPC contractor is selected through commissioning and startup of the each of the power blocks. The type of equipment on site will coincide with the erection work being performed. Appendix 2A lists the equipment anticipated to be used on the project site. Materials such as concrete, pipe, wire and cable, fuels, reinforcing steel, and small tools and consumables will be delivered to the site by truck. Some of the heavy equipment items will be transported by rail then heavy haul truck. Rail deliveries will be offloaded in the Vanco Rail Siding area and transported by truck to the site. Appendix 2B shows the anticipated number of truck deliveries to the project site. Truck deliveries of construction materials and equipment will generally occur on weekdays between 6:00 a.m. and 6:00 p.m.

The delivery of fill material required to build the CCGT power block is expected to occur over a 10-month period. An average of 10 trucks per day is expected during the 10-month period and these could be delivered to the project site during the 10-hour workday, 6 days per week period. For the SCGT power block, delivery of fill material is expected to occur during the first 6 months of the demolition of existing Huntington Beach Generating Station’s Units 3 and 4 and over a 4-month period at the beginning of the SCGT power block construction schedule. Six trucks per day are expected to be delivered during the 6-month period. Site access will be controlled for personnel and vehicles.

For the CCGT power block, there will be an average and peak workforce of approximately 180 and 306, respectively, of craft people, supervisory, support, and construction management personnel onsite during construction. For the SCGT power block, there will be an average and peak workforce of approximately 85 and 165, respectively, of craft people, supervisory, support, and construction management personnel onsite during construction (see Appendix 5.10B).

2.3.2.8 Construction Noise

Typically, noisy construction will be scheduled to occur between 7:00 a.m. and 8:00 p.m. Monday through Saturday. Additional hours may be necessary to make up schedule deficiencies or to complete critical construction activities (for example, pouring concrete at night during hot weather, working around time-critical shutdowns and constraints). During some construction periods and during the startup phase of the project, some activities will continue 24 hours per day, 7 days per week. See Section 5.7, Noise, for a discussion and analysis of construction and demolition noise.

2.3.2.9 Construction Lighting

As with the Licensed HBEP, lighting will be required to facilitate Amended HBEP night construction and commissioning activities. Construction lighting will, to the extent feasible and consistent with worker safety codes, be directed toward the center of the construction site and shielded to prevent light from straying offsite. Task-specific construction/commissioning lighting will be used to the extent practical while complying with worker safety regulations. Typically, construction will be scheduled to occur between 7:00 a.m. and 8:00 p.m., Monday through Saturday. Additional hours may be necessary to make up schedule deficiencies or to complete critical construction activities (for example, pouring concrete at night during hot weather, working around time-critical shutdowns and constraints). During some construction periods and during the commissioning/startup phase of the project, some activities will continue 24 hours per day, 7 days per week. During periods when nighttime construction/commissioning activities take place, illumination that meets state and federal worker safety regulations will be required. To the extent possible, the nighttime construction/commissioning lighting will be erected pointing toward the center of the site where activities are occurring and will be shielded. Task-specific lighting will be used to the extent practical while complying with worker safety regulations. Despite these measures, there may be limited times during the construction/commissioning period when the project site may appear as a brightly lit area as seen in close views and from distant hillside residential areas.

2.4 Facility Operations

The Amended HBEP will be capable of dispatch throughout the year and will have annual availability of 98.4 percent for each power block. Plant availability could exceed 99 percent for a given 12-month period.

The HBEP CCGT will employ a staff of 23, including plant operators, supervisors, administrative personnel, mechanics, engineers, chemists, and electricians (Table 2.4-1), in three rotating shifts. Eleven operators, mechanics, and controls specialists will be added to the staff. With the addition of the SCGT power block, the facility will be capable of operating 24 hours per day, 7 days per week.

TABLE 2.4-1
Typical Combined-cycle Gas Turbine Plant Operation Workforce

Classification	Number
Plant Manager	1
Operations Leader	1
Maintenance Leader	0
Environmental Engineer	1
Maintenance Planner	1

TABLE 2.4-1
Typical Combined-cycle Gas Turbine Plant Operation Workforce

Classification	Number
Power Plant Operators	9
Controls Specialty	5
Mechanic	3
Admin	2
Total	**23**

The HBEP CCGT power block is designed as a multistage generator, to serve both peak and intermediate loads with the added capabilities of rapid startup, moderate turndown capability (ability to turn down to a low load), and steep ramp rates, (10 percent per minute when operating above minimum gas turbine turndown capacity) and high efficiency. Because the combined-cycle configuration will be more efficient than many of the existing gas-fired steam generation facilities in southern California and will provide much needed flexible operating characteristics for integrating renewable energy into the electrical grid and providing fast response load following service, the HBEP is expected to have an annual capacity factor of between 45 and 75 percent. It is expected the CCGT will average 12 to 15 hours of operation per gas turbine start. The SCGT power block is designed as a fast-starting, low-turndown, and steep ramp rate peaking asset and is expected to average 3 to 6 hours per gas turbine start with an annual capacity factor of approximately 10 percent.

Because HBEP will be dispatched as an as-needed generating asset for meeting local area electrical reliability needs, peak energy demands, and load-following service, the annual service factor (percent of time generating power regardless of load rate) for HBEP is expected to be considerably higher than the annual capacity factor. The expected operating profile of the HBEP will see the facility dispatched at full, intermediate, and minimum loads, which makes the design of the HBEP multistage generating technology the best available in terms of thermal efficiency, greenhouse gas emissions, and criteria pollutant emissions. The actual capacity factor for HBEP in any month or year will depend on local reliability area needs, weather-related customer demand, load growth, renewable energy supplies, generating unit retirements and replacements, the level of generating unit and transmission outages, and other factors. The exact operational profile of the HBEP will ultimately depend on electrical grid needs at the time and dispatch decisions made by the off-taker or load-serving entity contracted with AES to buy and distribute the power generated and the California Independent System Operator.

2.5 Facility Reliability

This section discusses the expected facility availability, equipment redundancy, fuel availability, water availability, and project quality control measures.

2.5.1 Facility Availability

HBEP is designed to operate between approximately 12 and 100 percent of rated capacity to support dispatch service in response to customer demands for electricity. HBEP is designed for a minimum operating life of 30 years. Reliability and availability projections are based on this operating life. Operation and maintenance procedures will be consistent with industry standard practices to maintain the useful life status of plant components.

The percent of time that a combined-cycle power plant is projected to be operated is defined as the “service factor.” The service factor considers the amount of time that a unit is operating and generating power, whether at full or partial load. The projected service factor for the combined-cycle power block, which considers projected percent of time of operation, differs from the equivalent availability factor (EAF), which considers the projected percent of energy production capacity achievable.

The EAF may be defined as a weighted average of the percent of full energy production capacity achievable. The projected equivalent availability factor for the HBEP is estimated to be approximately 98 percent. The EAF differs from the "availability of a unit," which is the percent of time that a unit is available for operation, whether at full load, partial load, or standby.

2.5.2 Redundancy of Critical Components

The following subsections identify equipment redundancy as it applies to HBEP availability. Specifically, redundancy in the combined-cycle power block and in the balance-of-plant systems that serve it is described. The combined-cycle power block will be served by the following balance-of-plant systems: fuel supply system, distributed control system, boiler feed water system, condensate system, demineralized water system, power cycle makeup and storage, steam condensing system, closed-cycle cooling water system, and compressed air system. Major equipment redundancy is summarized in Table 2.5-1.

2.5.2.1 Power Block

The each power block consists of two separate power generation trains that operate in parallel within the power block. Each train will be powered by a CTG. Each CTG will provide approximately 33 percent of the total combined-cycle power block output (assuming both trains operating) and 50 percent of the total for the simple-cycle power block.

The heat input from the exhaust gas from each combined-cycle CTG will be used in the steam generation system to produce steam. Thermal energy in the steam from the steam generation system will be converted to mechanical energy and then to electrical energy in the STG subsystem. The expanded steam from the STG will be condensed and recycled to the feed water system. Power from the STG system will contribute approximately 33 percent of the total combined-cycle power block output (assuming both CTG/HRSG trains operating). Major equipment redundancy is summarized in Table 2.5-1.

TABLE 2.5-1
Major Equipment Redundancy

Description	Number Per Power Block	Notes
Combustion Turbines	2– 50% trains	Combined-cycle power block includes two HRSG trains.
Combined-cycle Power Block STG	1 – 100%	—
Combined-cycle HRSG Feedwater Pumps	2–100% per HRSG unit	—
Combined-cycle Condensate Pumps	3 – 50%	—
Combined-cycle Air-Cooled Condenser	1 – 100%	Condenser must be in operation for plant to operate; however, it will include approximately 30 cells. Thus there is a level of redundancy in fans, gearboxes, and motors.
Combined-cycle Auxiliary Cooling Water Pumps	2 – 100%	—
Closed-loop Cooling Fluid Air-cooled Heat Exchanger (Auxiliary Cooling Water and LMS-100 Intercooler)	1 – 100%	—
Service Air Compressors (per power block)	2 – 100%	—
Combined-cycle Fuel Gas Compressors (each power block)	2 operating, 1 on standby	There will be a total of three electrically driven gas compressors with 100% block flow rate capacity. Two gas compressors are expected to operate at 50% block flow rate with one 100% block flow rate available at all times.

TABLE 2.5-1
Major Equipment Redundancy

Description	Number Per Power Block	Notes
Simple-cycle Fuel Gas Compressors (each power block)	2 operating, 1 on standby	There will be a total of three electrically driven gas compressors with 100% block flow rate capacity. Two gas compressors are expected to operate at 50% block flow rate with one 100% block flow rate available at all times.
Simple-cycle power block intercooler	2	—

2.6 Electric Production and Thermal Efficiency

The net annual electrical production of the HBEP cannot be accurately forecasted at this time because of uncertainties in the system load-dispatching model and the associated uncertainties in load forecasts. However, because of the efficiency of the plant with operating characteristics as described above, it is expected to have a gross plant capacity factor above 60 percent. The maximum annual generation possible from the facility is estimated to be approximately 4,697 gigawatt-hours per year (based on an annual average facility base load rating of 681.7 MW for the combined-cycle power block, 189.7 MW for the simple-cycle power block, 98.4 percent availability, 6,612 hours per year for the combined-cycle power block, and 1,401 hours per year for the simple-cycle power block).

2.6.1 Thermal Efficiency CCGT

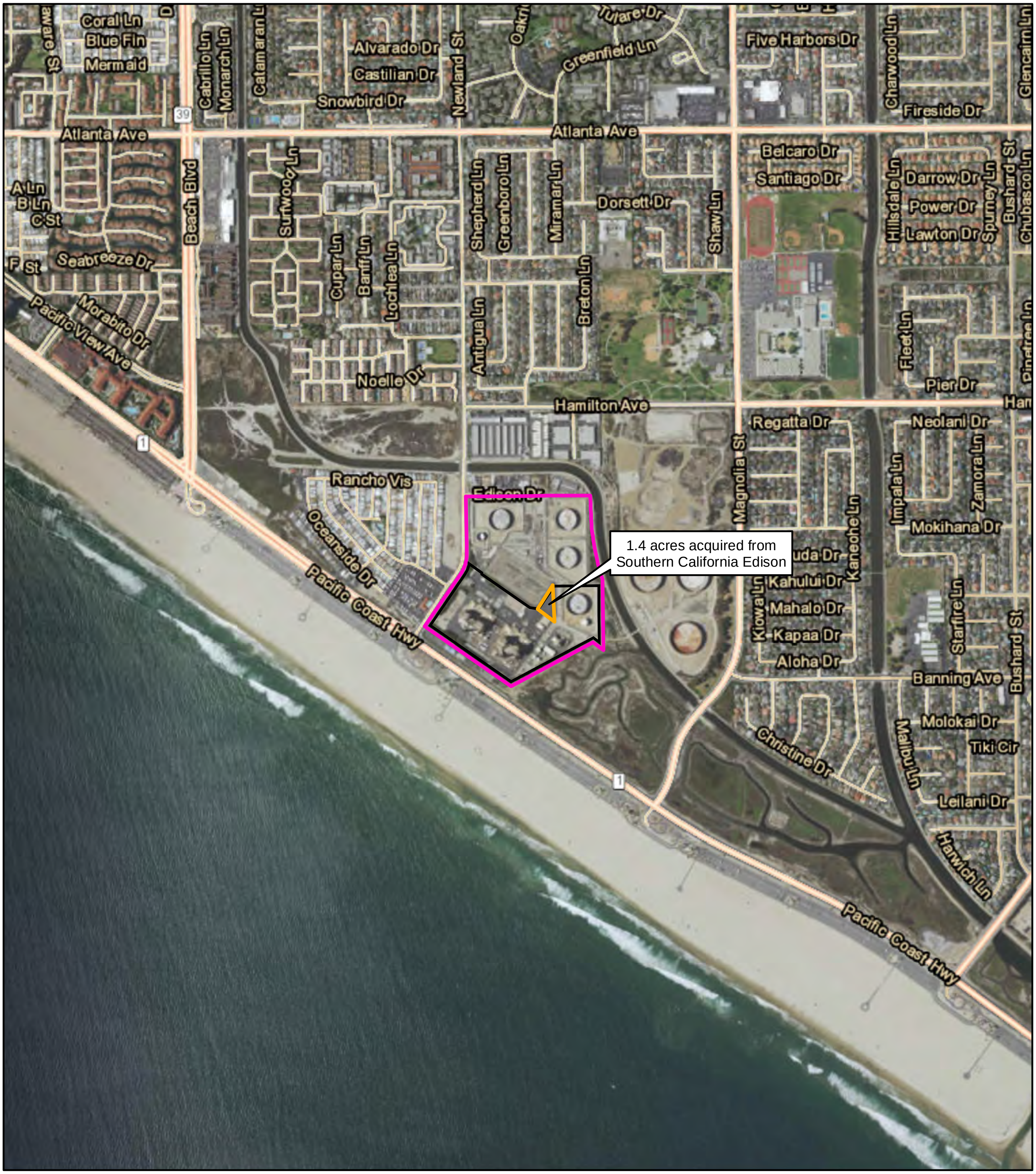
The maximum gross thermal efficiency that can be expected from the configuration specified for HBEP is approximately 56 percent on a LHV basis. This level of efficiency is achieved when the facility is base-loaded. Other types of operations, particularly those at less than full gas turbine output, will result in lower efficiencies. However, the HBEP design achieves a very high level of efficiency across a wide range of generating capacity. The basis of HBEP operations will be system dispatch within California's power generation and transmission system. It is expected that the HBEP will be primarily operated in load-following or cycling service. The number of startup and shutdown cycles is not expected to exceed 500 per year per CTG.

2.6.2 Thermal Efficiency SCGT

The maximum gross thermal efficiency that can be expected from the configuration specified for HBEP is approximately 41 percent on a LHV basis. This level of efficiency is achieved when the facility is base-loaded. Other types of operations, particularly those at less than full gas turbine output, will result in lower efficiencies. However, the HBEP design achieves a very high level of efficiency across a wide range of generating capacity. The basis of HBEP operations will be system dispatch within California's power generation and transmission system. It is expected that the HBEP will be primarily operated in load-following or cycling service. The number of startup and shutdown cycles is not expected to exceed 350 per year per CTG.

2.6.3 Facility Closure

The information analyzed during the Licensed HBEP AFC proceeding for both temporary and permanent facility closure is applicable to the Amended HBEP.



Legend

AES Huntington Beach Generating Station

AES Amended Huntington Beach Energy Project

N

0 0.25

Miles

Figure 2.1-1. HBEP Project Location
AES Amended Huntington Beach Energy Project
Huntington Beach, California

Basemap Source: ESRI

ch2m

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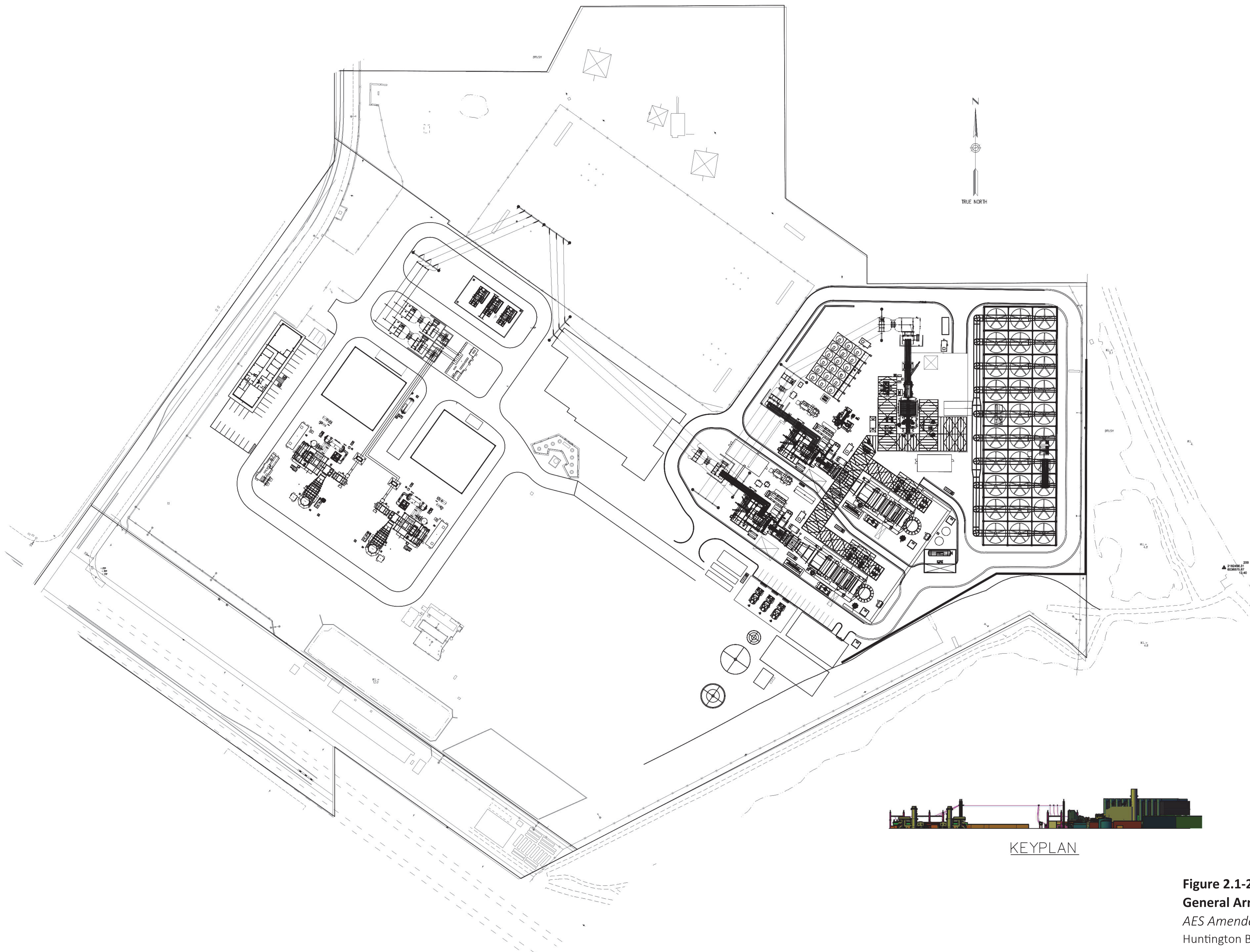
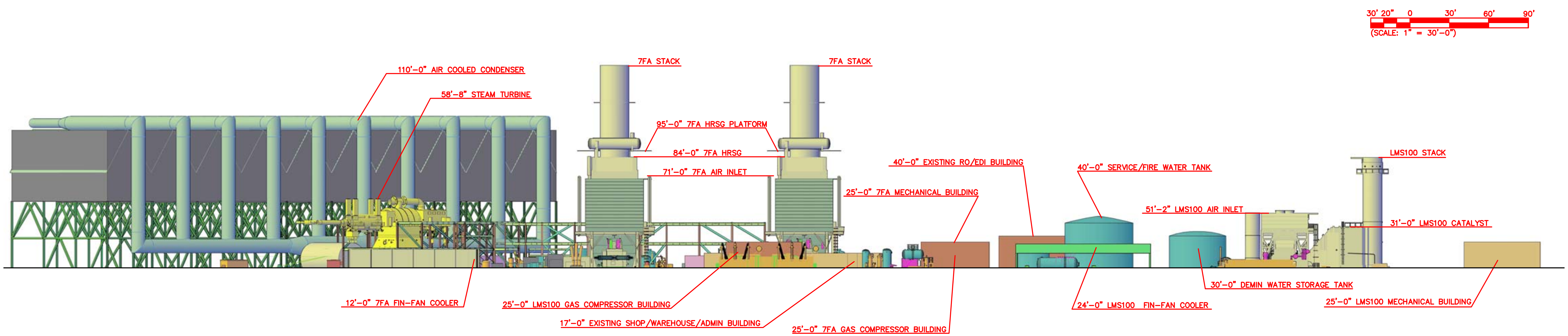
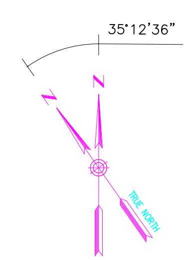


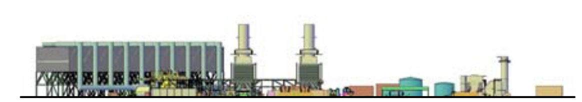
Figure 2.1-2
General Arrangement/Site Plan
AES Amended Huntington Beach Energy Project
Huntington Beach, California

ch2m





TRUE NORTH IS OFFSET FROM PLANT NORTH BY 35°12'36" IN THE COUNTER CLOCKWISE DIRECTION



KEYPLAN

Figure 2.1.-3a
Looking Plant East Elevation
AES Amended Huntington Beach Energy Project
Huntington Beach, California

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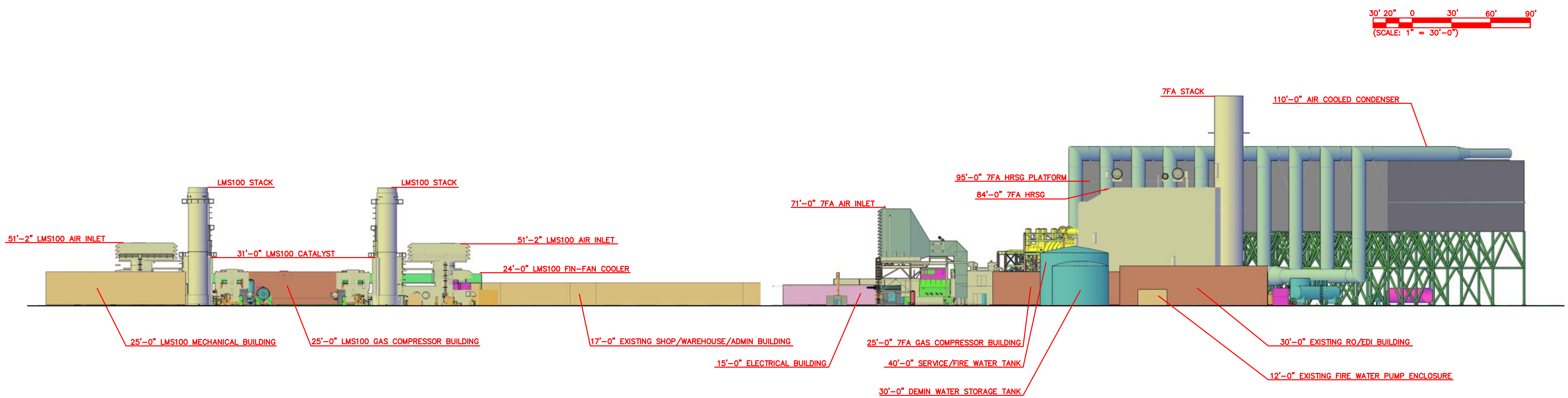
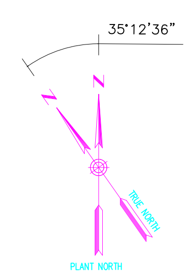




TRUE NORTH IS OFFSET FROM PLANT NORTH BY 35°12'36" IN THE COUNTER CLOCKWISE DIRECTION

KEYPLAN

Figure 2.1-3b
Looking Plant North Elevation
AES Amended Huntington Beach Energy Project
Huntington Beach, California

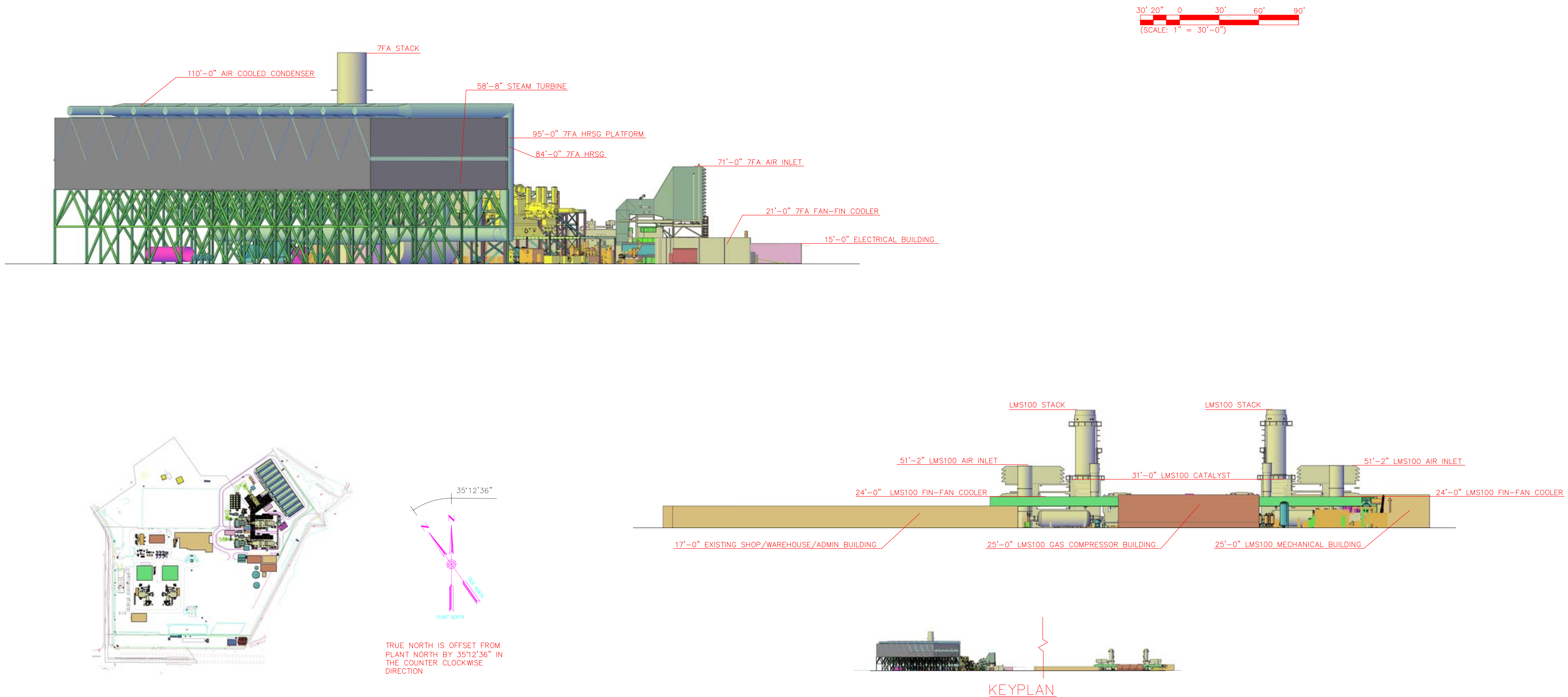
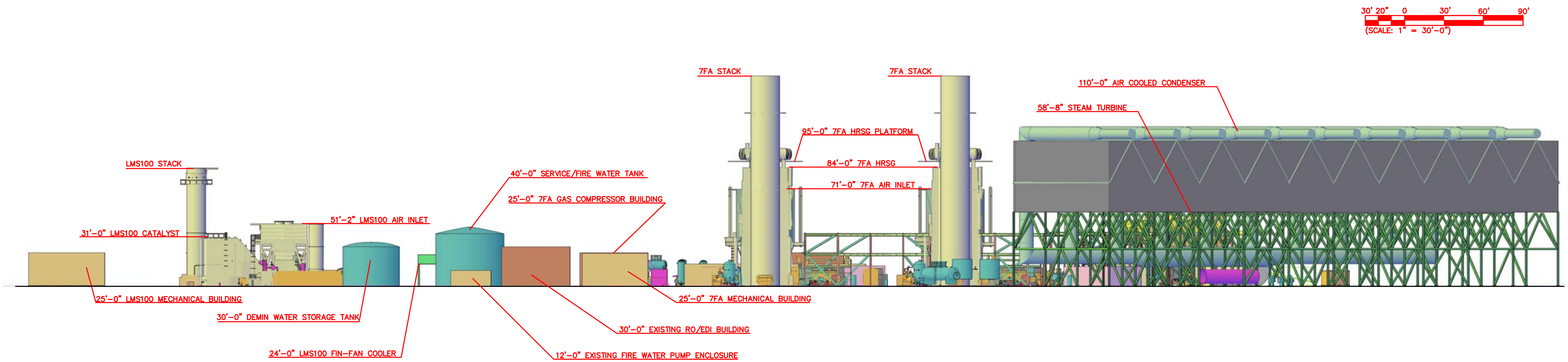
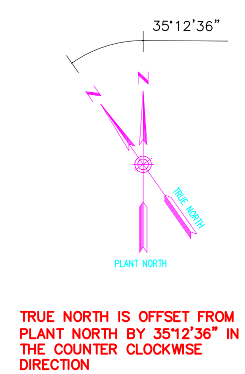


Figure 2.1-3c
Looking Plant South Elevation
AES Amended Huntington Beach Energy Project
Huntington Beach, California





KEYPLAN

Figure 2.1-3d
Looking Plant West Elevation
AES Amended Huntington Beach Energy Project
Huntington Beach, California

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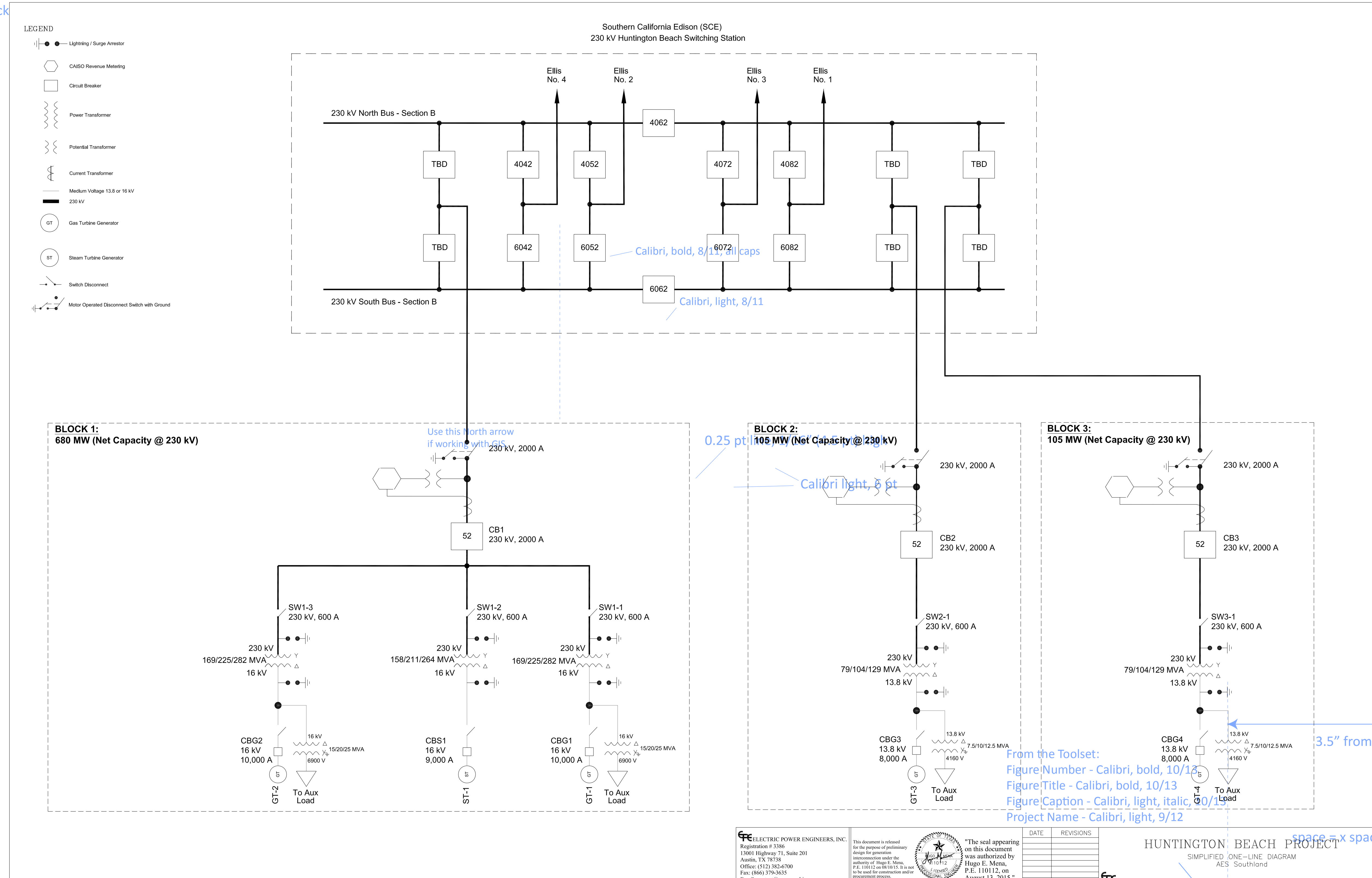

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3.5" from edge of paper

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Figure Title - Calibri, bold, 10/13
Figure Caption - Calibri, light, italic, 10/13
Project Name - Calibri, light, 9/12

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Figure 2.1-4. One-line Diagram
AES Amended Huntington Beach Energy Project
Huntington Beach, California

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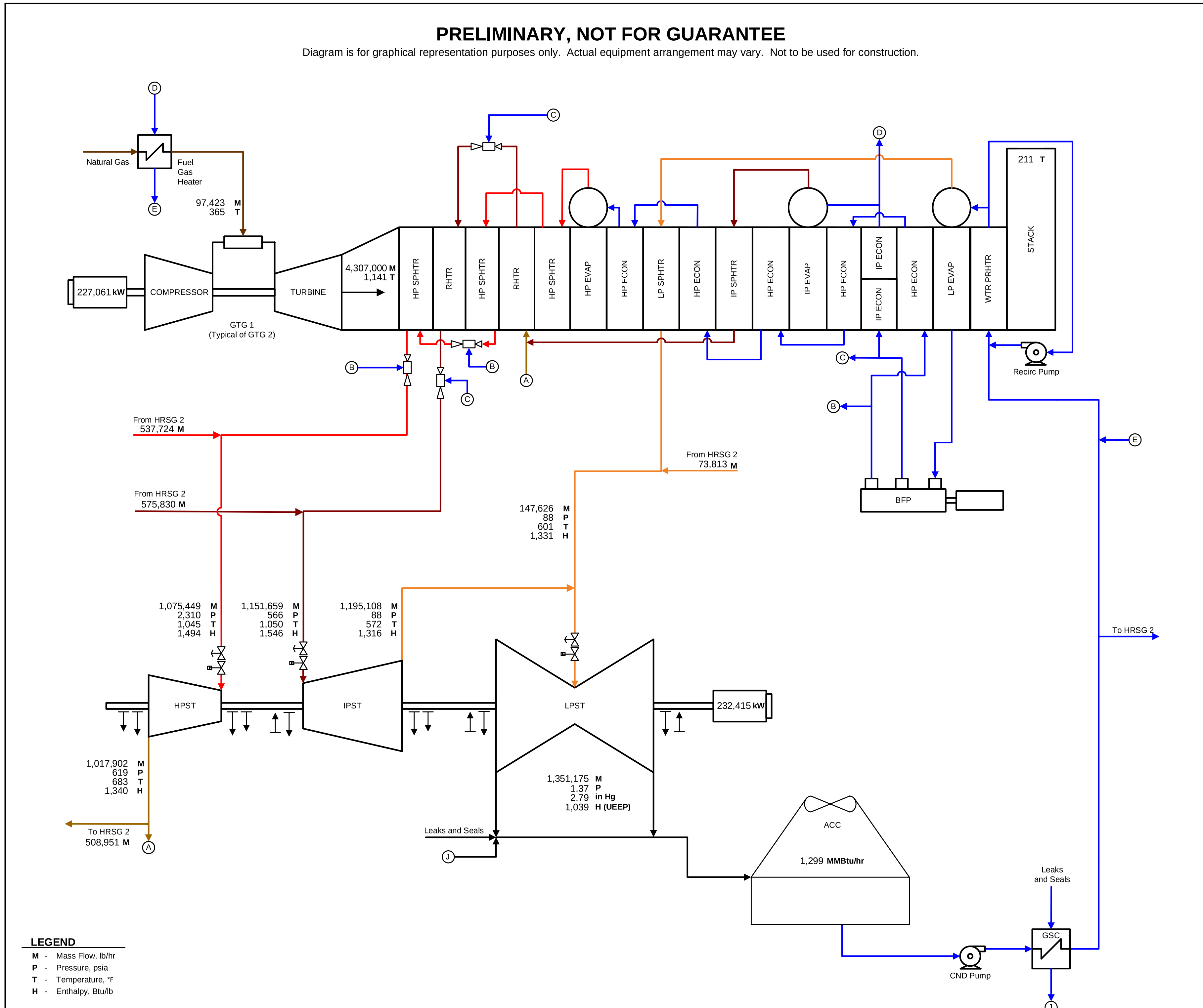


PERFORMANCE SUMMARY

DRY BULB TEMPERATURE, °F	65.8
WET BULB TEMPERATURE, °F	57.0
RELATIVE HUMIDITY, %	58.0%
ELEVATION, FT	14
BAROMETRIC PRESSURE, psia	14.69
GTG1 GROSS OUTPUT, kW	227,061
GTG2 GROSS OUTPUT, kW	227,061
STG GROSS OUTPUT, kW	232,415
GTG1 GROSS LHV HEAT Rate, Btu/kWh	8,894
GTG2 GROSS LHV HEAT Rate, Btu/kWh	8,894
GTG1 LHV HEAT CONSUMPTION, MMBtu/h	2,019
GTG2 LHV HEAT CONSUMPTION, MMBtu/h	2,019
PLANT LHV HEAT CONSUMPTION, MMBtu/h	4,039
AUXILIARY LOAD, kW	18,903
NET PLANT OUTPUT, kW	667,634
NET PLANT LHV HEAT RATE, Btu/kWh	6,050
NET PLANT HHV HEAT RATE, Btu/kWh	6,713
NET LHV CYCLE EFFICIENCY, %	56.4%
NET HHV CYCLE EFFICIENCY, %	50.8%

NOTES:
1. Steam properties are based on IAPWS-IF97 steam tables.
2. Information subject to change based on actual OEM equipment design.
3. Information reflects estimated performance.

REV.	NOTES:	DATE
A	Issued with proposal	3/3/2015
B	AFC Filing Support	7/17/2015

Huntington Beach 2 x 1 Combined Cycle

Date	7/17/2015	Detailed	A.Cerra
Designed	A.Cerra	Checked	J. Schnegelberger

BURNS McDONNELL

HEAT BALANCE DIAGRAM

Project 74473

Drawing HMBD-005 Rev **B**

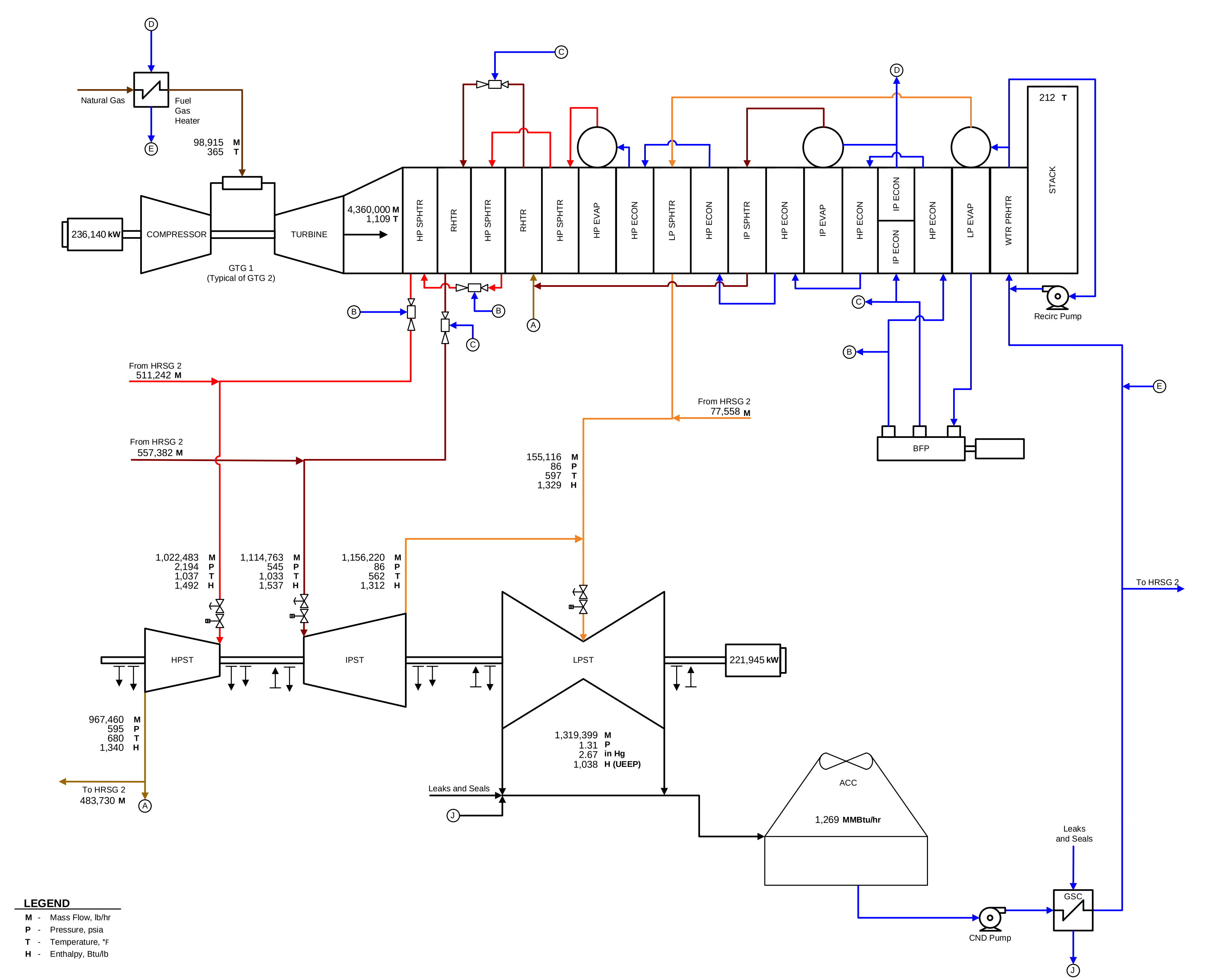
Average Ambient - 2 GTG @ 100% Load, No Evap

Sheet 1 of 1

Figure 2.1-5a
Heat and Mass Balance 1 of 2
AES Amended Huntington Beach Energy Project
Huntington Beach, California

PRELIMINARY, NOT FOR GUARANTEE

Diagram is for graphical representation purposes only. Actual equipment arrangement may vary. Not to be used for construction.



PERFORMANCE SUMMARY

DRY BULB TEMPERATURE, °F	32.0
WET BULB TEMPERATURE, °F	30.9
RELATIVE HUMIDITY, %	87.0%
ELEVATION, FT	14
BAROMETRIC PRESSURE, psia	14.69
GTG1 GROSS OUTPUT, kW	236,140
GTG2 GROSS OUTPUT, kW	236,140
STG GROSS OUTPUT, kW	221,945
GTG1 GROSS LHV HEAT Rate, Btu/kWh	8,683
GTG2 GROSS LHV HEAT Rate, Btu/kWh	8,683
GTG1 LHV HEAT CONSUMPTION, MMBtu/h	2,050
GTG2 LHV HEAT CONSUMPTION, MMBtu/h	2,050
PLANT LHV HEAT CONSUMPTION, MMBtu/h	4,101
AUXILIARY LOAD, kW	19,114
NET PLANT OUTPUT, kW	675,111
NET PLANT LHV HEAT RATE, Btu/kWh	6,074
NET PLANT HHV HEAT RATE, Btu/kWh	6,740
NET LHV CYCLE EFFICIENCY, %	56.2%
NET HHV CYCLE EFFICIENCY, %	50.6%

NOTES:
1. Steam properties are based on IAPWS-IF97 steam tables.
2. Information subject to change based on actual OEM equipment design.
3. Information reflects estimated performance.

REV.	NOTES:	DATE
A	Issued with proposal	3/3/2015
B	AFC Filing Support	7/17/2015

Huntington Beach 2 x 1 Combined Cycle

Date 7/17/2015 | Detailed A.Cerra
Designed A.Cerra | Checked J. Schnegelberger

ARB BURNS McDONNELL

HEAT BALANCE DIAGRAM

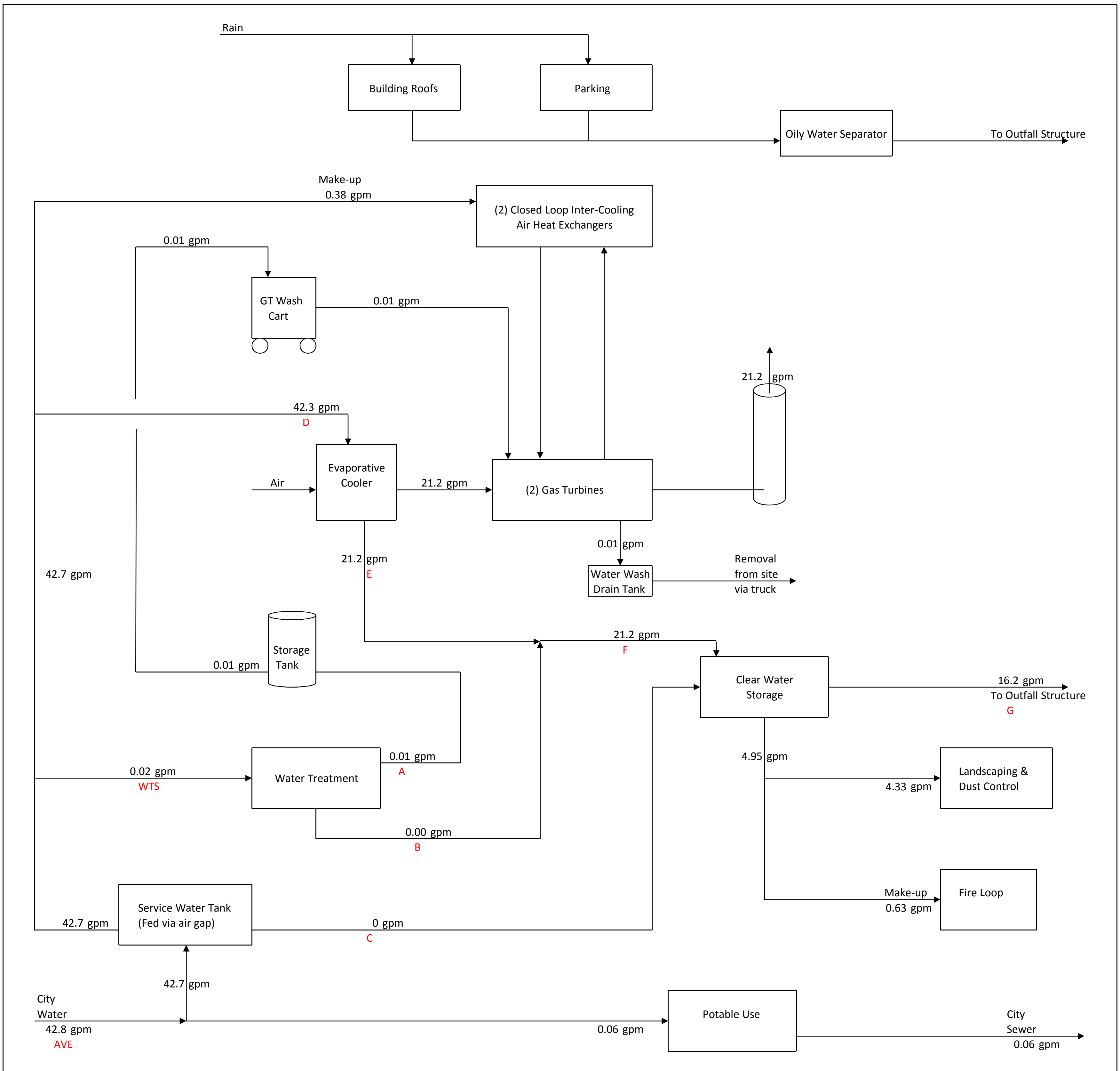
Project 74473
Drawing HMBD-004 Rev **B**

Minimum Ambient - 2 GTG @ 100% Load

Sheet 1 of 1

Figure 2.1-5b
Heat and Mass Balance 2 of 2
AES Amended Huntington Beach Energy Project
Huntington Beach, California

ch2m



Huntington Beach Energy Project

2 LMS 100

85F, 47% RH, Evap On

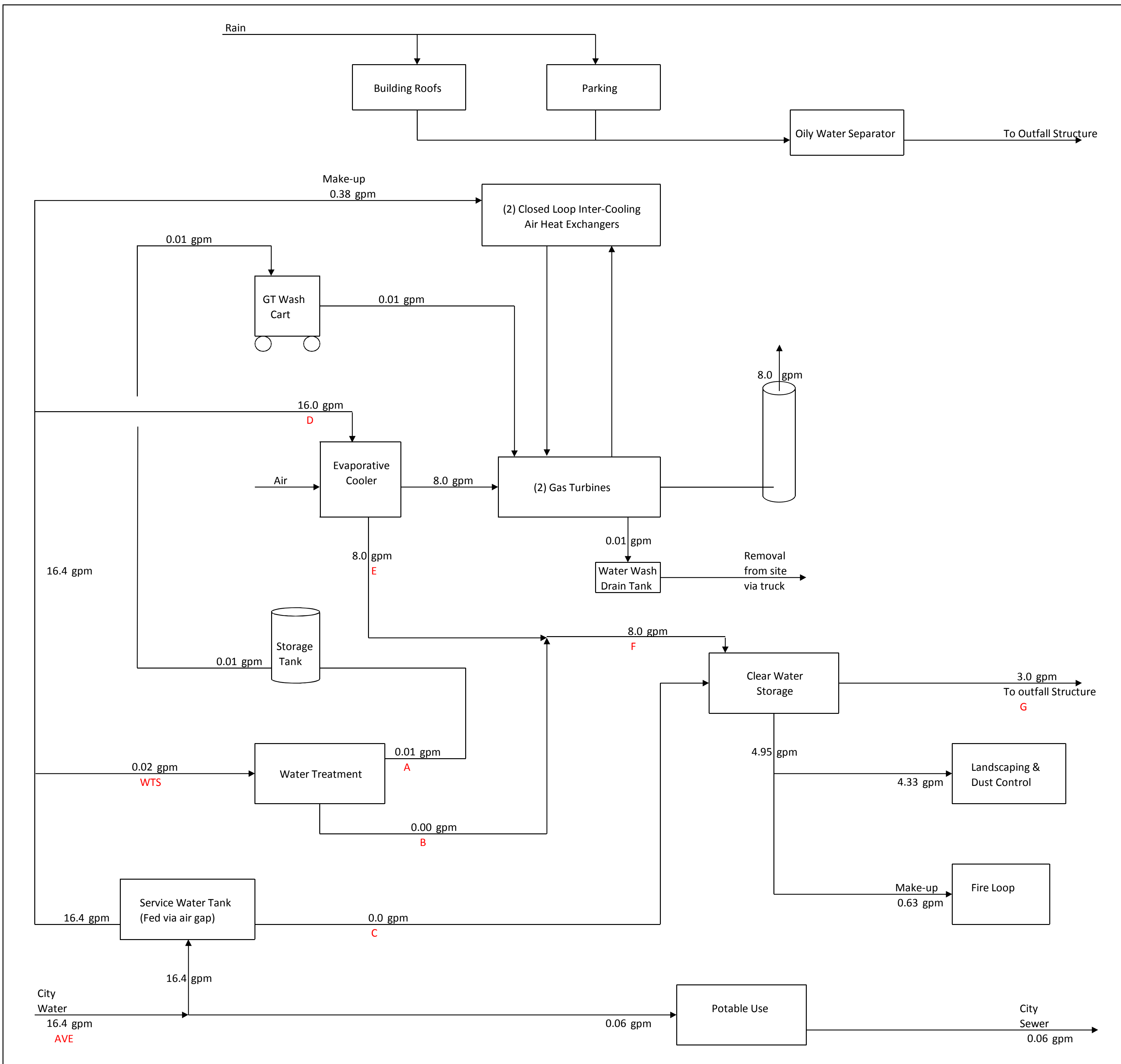
Date:	7/16/2015
Rev.	1
Designed:	JS COONS
Calcs:	
Checked:	
Approved:	H Larios

PEC **Power Engineers Collaborative, LLC.**

Figure 2.1-6a. Water Balance 1 of 2

AES Amended Huntington Beach Energy Project

Huntington Beach, California



Huntington Beach Energy Project

2 LMS 100

Avg. Ambient, 65.8F, 58% RH, Evap On

Date: 7/16/2015
Rev. 1
Designed: JS COONS
Calcs:
Checked:
Approved: H Larios

PEC

Power Engineers Collaborative, LLC.

Figure 2.1-6b. Water Balance 2 of 2

AES Amended Huntington Beach Energy Project

Huntington Beach, California

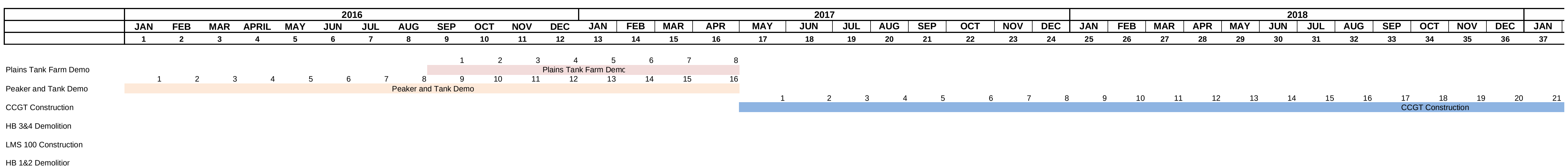


Figure 2.2-1
Huntington Beach Integrated Schedule 1 of 3
AES Amended Huntington Beach Energy Project
Huntington Beach, California

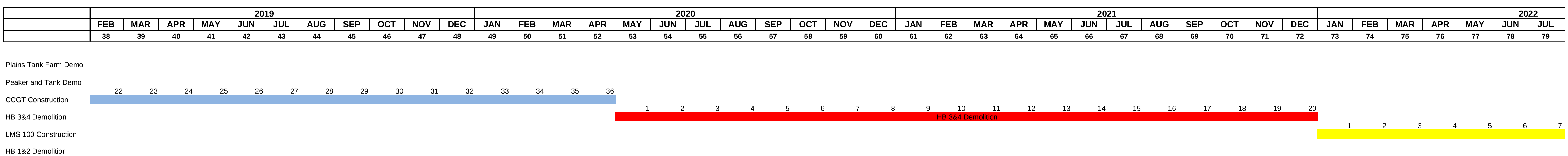


Figure 2.2-1
Huntington Beach Integrated Schedule 2 of 3
AES Amended Huntington Beach Energy Project
Huntington Beach, California

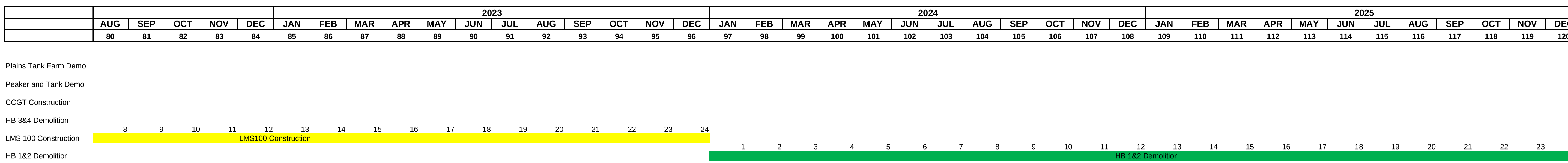


Figure 2.2-1
Huntington Beach Integrated Schedule 3 of 3
AES Amended Huntington Beach Energy Project
Huntington Beach, California

WT0726151024SCO 653771.01.02.04 HBEP_integrated_schedule_3.ai 8/15

Figure 2.3-1. HBEP Construction Parking Areas
AES Amended Huntington Beach Energy Project
Huntington Beach, California

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SECTION 3.0

Transmission System Engineering

Similar to the licensed Huntington Beach Energy Project (Licensed HBEP), the Amended HBEP will interconnect to the existing Southern California region's electrical grid.

There are no changes to the applicable laws, ordinances, regulations and standards (LORS), or Conditions of Certification, for the Licensed HBEP related to the transmission system engineering and operations for the Amended HBEP, nor to the transmission interconnection studies described in Section 3.2.

3.1 Transmission Lines Description, Design, and Operation

Similar to the Licensed HBEP, the Amended HBEP will connect to the regional electrical grid using the existing Southern California Edison (SCE) 230-kilovolt (kV) switchyard located on a parcel owned by SCE within the existing Huntington Beach Generating Station site. As for the Licensed HBEP, no new offsite transmission lines will be needed for the Amended HBEP.

Amended HBEP Blocks 1 and 2 will connect via two new single-circuit, overhead 230-kV interconnections to the existing onsite SCE 230-kV switchyard. Figure 3.1-1, Electrical One-line Diagram, shows the interconnection configuration of Amended HBEP to the SCE electric transmission system. Figure 3.1-2, Typical Support Tower Designs, shows typical support tower designs that could be used for the transmission lines connecting the Amended HBEP to the SCE switchyard. The interconnection lines will be the same as those analyzed in the Commission Decision (CEC, 2014).

3.1.1 230-kV Interconnection Switchyard Characteristics

Each Amended HBEP power block will be connected to separate two-winding, three-phase, generator step-up transformers. Two new single-circuit overhead interconnection lines will be installed on the Amended HBEP site to connect each power block's generator step-up transformers to the existing SCE 230-kV switchyard. The SCE switchyard will contain 230-kV circuit breaker and air break disconnect switches to interconnect Amended HBEP's units to the SCE 230-kV transmission system. The Amended HBEP interconnection at the SCE 230-kV switchyard will utilize 230-kV air or gas-insulated circuit breakers in a ring bus arrangement to obtain a high level of service reliability.

Similar to the Licensed HBEP, station service power for the Amended HBEP will be provided via the onsite SCE 230-kV switchyard. Auxiliary controls and protective relay systems for the SCE 230-kV switchyard will be located in a control building separate from the Amended HBEP.

3.1.2 Power Plant Interconnect Characteristics

As with the Licensed HBEP, each of the two new Amended HBEP power blocks will interconnect to the California Independent System Operator (CAISO) transmission system through a ring bus breaker arrangement presently located in the existing SCE switchyard. The Amended HBEP interconnection will use 230-kV air- or gas-insulated circuit breakers and an individual generator step-up transformer for each of the generating units. The interconnection to the SCE switchyard and equipment will be designed to ensure compliance with applicable National Electrical Code and National Electrical Safety Code rules following the CAISO requirements. The main buses and the bays will also be designed following these requirements. Power for the Amended HBEP will be back-fed through the generator step-up transformer and auxiliary transformer. Auxiliary controls and protective relay systems for the SCE switchyard may be located in the Amended HBEP control building. No existing underground interconnect lines will be affected by the project.

3.2 Transmission Interconnection Studies

The existing transmission interconnection studies supporting the Licensed HBEP are valid for Amended HBEP.

Similar to the Licensed HBEP, the Amended HBEP will largely replace megawatts from the existing Huntington Beach Generating Station at the same electrical node, and will slightly reduce generation to the grid at this connection point. Therefore, as with the Licensed HBEP, the Amended HBEP will result in negligible system impacts and the electrical characteristics are substantially unchanged from the existing Huntington Beach Generation Station in accordance with Section 25.1 of the International Organization for Standardization tariff.

3.3 Transmission Line Safety and Nuisances

The Final Decision for the Licensed HBEP included a complete analysis for HBEP's interconnection to the SCE switchyard. As with the Licensed HBEP, the interconnection lines will be entirely onsite and the transmission line safety and nuisance impacts will be similar to or less than those analyzed in the Commission Decision.

3.4 Consistency with Laws, Ordinances, Regulations, and Standards

The Final Decision found the project to be in compliance with all applicable LORS. The list of applicable LORS that apply to the design, engineering, and construction of transmission lines and substations and the list of national, state, and local jurisdictions with jurisdiction over these LORS in the Licensed HBEP are applicable for the Amended HBEP and are not reproduced in this Petition to Amend. The Amendment will not alter the assumptions or conclusions made in the Final Decision.

3.5 Conditions of Certification

No changes to previously identified transmission system engineering impacts will result from the approval of this Petition. Therefore, no additional transmission system engineering measures beyond those required in the HBEP Final Decision are necessary.

3.6 References

California Energy Commission (CEC). 2014. *Huntington Beach Energy Project Final Decision*. CEC-800-2014-001-CMF. Docket Number 12-AFC-02.

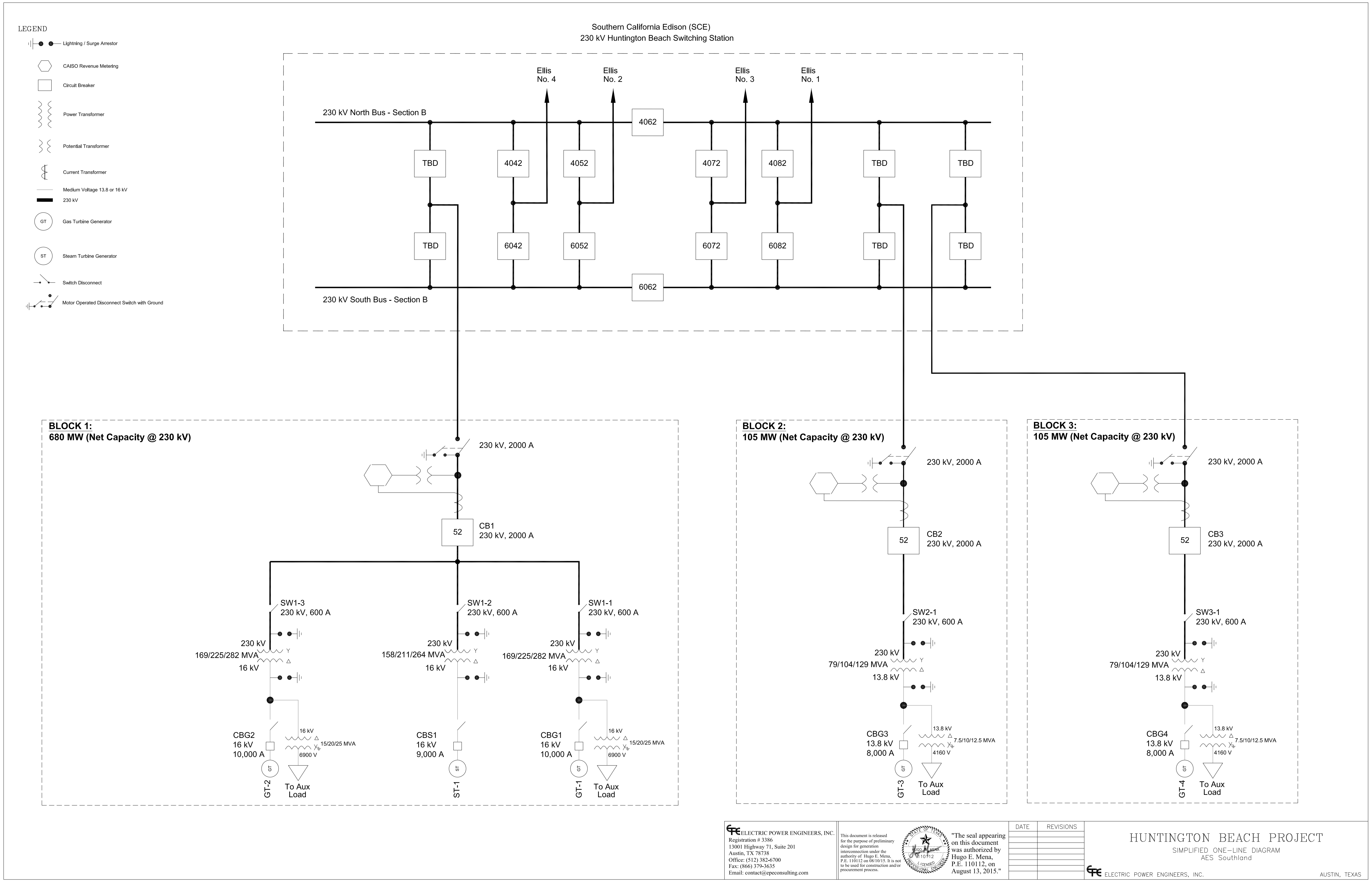


Figure 3.1-1
One-line Diagram
AES Amended Huntington Beach Energy Project
Huntington Beach, California

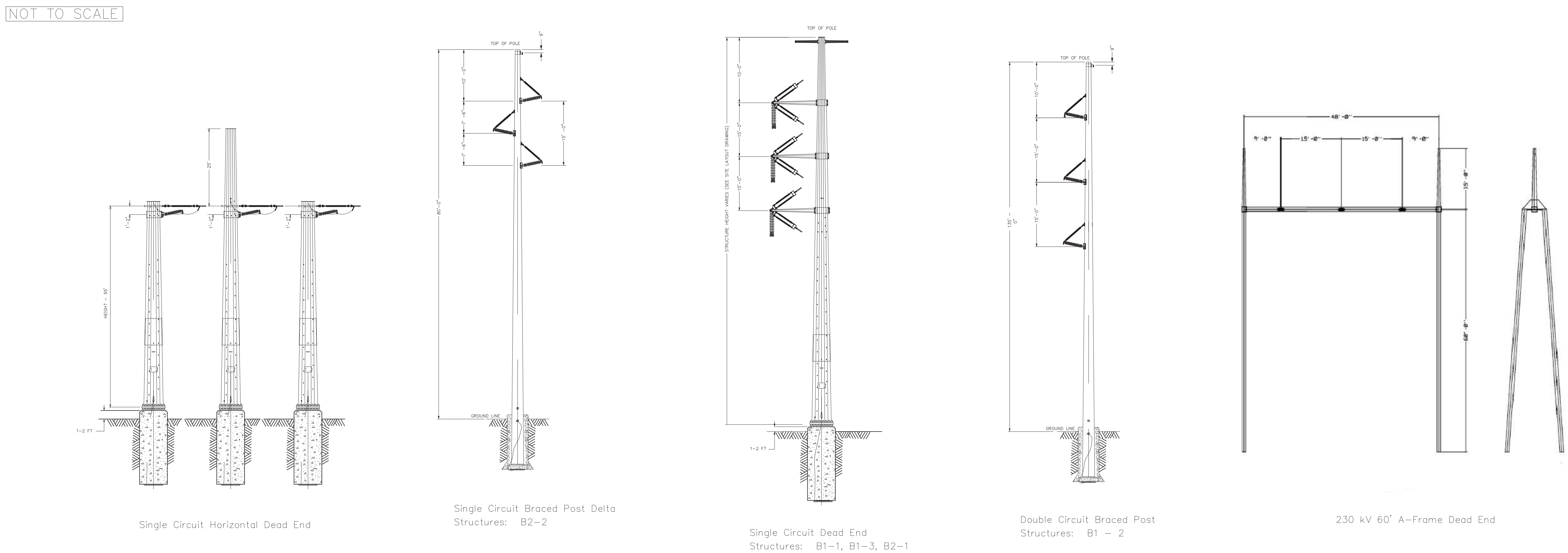


Figure 3.1-2
Typical Transmission Structure Configurations
AES Amended Huntington Beach Energy Project
Huntingon Beach, California

SECTION 4.0

Natural Gas Supply

As with the Licensed HBEP, the Amended HBEP power blocks will only combust natural gas. The natural gas supply for Amended HBEP is similar to the natural gas supply for the Licensed HBEP. See Sections 2.1.1.3 (Pipelines and Transmission Interconnections) and 2.1.6 (Fuel System) in Section 2.0 (Project Description) for a description and discussion of the natural gas supply for the Amended HBEP.

SECTION 5.0

Environmental Information

This section presents the environmental, public health and safety, and local impact assessment disciplines for which the California Energy Commission Energy Facilities Siting Regulations (Title 20, California Code of Regulations, Section 1704, Appendix B) require information in a Petition to Amend. The subsections have a standardized format under the following headings:

- Amendment Overview
- Changes to the Affected Environment
- Environmental Analysis
- Cumulative Effects
- Consistency with Laws, Ordinances, Regulations, and Standards
- Conditions of Certification
- References

The Amendment Overview subsection briefly describes the proposed changes to the Licensed HBEP. Changes to the Affected Environment contains relevant background information about the project's environmental, social, and regulatory settings and any changes to the Licensed HBEP. Environmental Analysis analyzes the potential environmental consequences of the construction and operation of the Amended HBEP. Cumulative Effects discusses potential effects of the Amended HBEP that are not significant adverse impacts, but that could reach significance cumulatively in combination with other projects. Consistency with Laws, Ordinances, Regulations, and Standards discusses and lists the LORS that pertain to the Amended HBEP for a given discipline, if distinct from the Licensed HBEP. Conditions of Certification briefly discusses the COCs approved for the Licensed HBEP and any changes needed for the Amended HBEP. The References subsection lists documents specifically cited in the Amended HBEP discussion.

Select discipline subsections also contain headings for Mitigation Measures, Permits and Permit Schedule, and Agencies and Agency Contacts, if this information has changed from the Application for Certification.

5.1 Air Quality

This section describes and evaluates the air quality effects of the Amended Huntington Beach Energy Project (Amended HBEP) and how the Amended HBEP will comply with the laws, ordinances, regulations, and standards (LORS) and the Conditions of Certification (COCs) in the existing HBEP license applicable to air quality. The South Coast Air Quality Management District (SCAQMD) will issue a revised Determination of Compliance for the Amended HBEP; therefore, Air Quality COCs AQ-1 through AQ-43 will likely be modified to match the specifications and operational characteristics of the generating technology in the Amended HBEP, but the impacts and proposed permit limits will remain the same or functionally similar to the Licensed HBEP. As described in Section 5.1.10, Conditions of Certification, the Project Owner proposes one modification to COC AQ-SC6 to change the level of construction fugitive dust mitigation to correspond with the predicted ambient air quality impacts, which exceed the applicable ambient air quality standard.

The Amended HBEP will not create any new air quality-related impacts that were not previously analyzed during the Licensed HBEP AFC proceedings. The Amended HBEP is consistent with the Licensed HBEP, will meet the approved COCs, and will comply with all applicable LORS.

5.1.1 Amendment Overview

As discussed in detail in Section 2.0 (Project Description) of this Petition to Amend (PTA), while similar in nature to the Licensed HBEP, the Amended HBEP differs from the Licensed HBEP in key ways. The Amended HBEP is a natural-gas-fired, combined-cycle and simple-cycle, air-cooled electrical generating facility located on the site of the existing Huntington Beach Generating Station in Huntington Beach, California. The combined-cycle power block will include GE Frame 7FA.05 combined-cycle gas turbines, unfired HRSGs, a steam turbine generator, an air-cooled condenser, a natural-gas-fired auxiliary boiler, and related ancillary equipment. The simple-cycle power block will include two GE LMS-100 simple-cycle units.

The Amended HBEP will be constructed on 30 acres entirely within the site of the existing Huntington Beach Generating Station. As with the Licensed HBEP, the Amended HBEP will reuse existing onsite potable water, natural gas, stormwater, process wastewater, and sanitary pipelines and electrical transmission facilities. No offsite linear developments were required for the Licensed HBEP and no offsite linear developments are required for the Amended HBEP.

Both power blocks will interconnect to the existing onsite SCE 230-kV switchyard.

As with the Licensed HBEP, construction of the Amended HBEP will require the removal of the existing Huntington Beach Generating Station Unit 5 and Units 3 and 4. Demolition of Unit 5, scheduled to occur in 2016, will provide the space for the construction of HBEP Block 1. Construction of Block 1 is expected to take approximately 36 months (including commissioning), with construction scheduled to occur from the first quarter of 2017 through the second quarter of 2020.

As with the Licensed HBEP, demolition of existing Huntington Beach Generating Station Units 3 and 4 is not part of the Amended HBEP project description, but is required in advance of the construction of the Amended HBEP simple-cycle power block. The demolition of the existing Huntington Beach Generating Station Units 3 and 4 structures is addressed in the cumulative impact assessment.

In addition to the construction of the new generating units, upon the commercial operation of the Amended HBEP simple-cycle power block, existing Huntington Beach Generating Station Units 1 and 2 will be decommissioned and demolished to their turbine deck. See Section 2.0 (Project Description) for a description of the decommissioning and demolition of existing Huntington Beach Generating Station Units 1 and 2.

5.1.2 Changes to the Affected Environment

The affected environment remains the same as the Licensed HBEP. In addition, construction of the Amended HBEP may require the use of an additional 20 acres beyond the 1.9 acres identified in the Final Decision at the former Plains All American Tank Farm site located adjacent to the HBEP site for construction laydown and construction worker parking (see Figure 5.12-4). Thus, the analysis herein includes 22 acres of the former Plains All American Tank Farm site for construction laydown and construction worker parking.

Access to the construction laydown/construction parking area will occur via Pacific Coast Highway to Magnolia Boulevard. Access from the construction laydown area to HBEP for equipment and materials will occur via Magnolia Boulevard to Pacific Coast Highway, right on Pacific Coast Highway to Newland Street, and right on Newland Street to the HBEP entrance. As included in the Licensed HBEP, large components of the Amended HBEP power blocks that arrive at the Port of Long Beach/Port of Los Angeles may be stored in a construction storage area at AES's Alamitos Generating Station until they can be transported and installed at the Amended HBEP site.

Construction workers parking at the former Plains All American Tank Farm will walk to the HBEP site via an existing bridge over the Huntington Beach Channel and walking path. The bridge and walking path will be fenced with temporary construction fencing for safety and to avoid impacts to the adjacent wetlands. Construction equipment will be moved from the Plains site to the Amended HBEP site via Magnolia Avenue, the Pacific Coast Highway, and Newland Street. Limited construction worker parking also is available on the Amended HBEP site.

The geography of the Amended HBEP site, elevations of the surrounding landscape, long-term climatic characteristics, and short-term weather variations all have important effects on the resulting ground-level pollutant concentrations that would result from air emissions related to the Amended HBEP. The effects of the land and atmospheric variables remain the same as those assessed in the original licensing proceeding.

5.1.3 Overview of Air Quality Standards

Table 5.1-1 presents the National Ambient Air Quality Standards (NAAQS) and California Ambient Air Quality Standards (CAAQS).

TABLE 5.1-1
Ambient Air Quality Standards

Pollutant	Averaging Time	California	National
Ozone	1-hour 8 hour	0.09 ppm (180 µg/m³) 0.07 ppm (137 µg/m³)	— 0.075 ppm (147 µg/m³)
Carbon monoxide (CO)	1-hour 8-hour	20 ppm (23 mg/m³) 9.0 ppm (10 mg/m³)	35 ppm (40 mg/m³) 9 ppm (10 mg/m³)
Nitrogen dioxide (NO_2)	1-hour Annual arithmetic mean	0.18 ppm (339 µg/m³) 0.030 ppm (57 µg/m³)	100 ppb (188 µg/m³) [a] 53 ppb (100 µg/m³)
Sulfur dioxide (SO_2) [b]	1-hour 3-hour (secondary standard) 24-hour	0.25 ppm (655 µg/m³) — 0.04 ppm (105 µg/m³)	75 ppb (196 µg/m³) 0.5 ppm (1,300 µg/m³) —
Respirable Particulate Matter (PM_{10})	24-hour Annual arithmetic mean	50 µg/m³ 20 µg/m³	150 µg/m³ —
Fine Particulate Matter ($PM_{2.5}$)	24-hour Annual arithmetic mean	— 12 µg/m³	35 µg/m³ [c] 12.0 µg/m³ [d]
Sulfates	24-hour	25 µg/m³	—
Lead	30-day average Calendar quarter Rolling 3-month average	1.5 µg/m³ — —	— 1.5 µg/m³ 0.15 µg/m³
Hydrogen sulfide (H_2S)	1-hour	0.03 ppm (42 µg/m³)	—
Vinyl chloride	24-hour	0.010 ppm (26 µg/m³)	—

TABLE 5.1-1
Ambient Air Quality Standards

Pollutant	Averaging Time	California	National
Visibility-reducing particles	8-hour (10 a.m. to 6 p.m. PST)	In sufficient amount to produce an extinction coefficient of 0.23 per kilometer because of particles when the relative humidity is less than 70 percent.	—

[a] To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 100 ppb.

[b] On June 2, 2010, EPA established a new 1-hour SO_2 standard, effective August 23, 2010, which is based on the 3-year average of the annual 99th percentile of 1-hour daily maximum concentrations. The EPA also revoked both the 24-hour SO_2 standard of 0.14 ppm and the annual primary SO_2 standard of 0.030 ppm, effective August 23, 2010. The secondary SO_2 standard was not revised at that time; however, the secondary standard is undergoing a separate review by EPA.

[c] The 24-hour standard is attained when 98 percent of the daily concentrations, averaged over 3 years, are equal to or less than the standard.

[d] 3-year average of the weighted annual mean concentrations.

Notes:

EPA = U.S. Environmental Protection Agency
$\mu g/m^3$ = microgram(s) per cubic meter
mg/m^3 = milligram(s) per cubic meter
ppb = parts per billion
ppm = parts per million

Source: California Air Resources Board (ARB), 2013a

5.1.4 Existing Air Quality

The attainment status at the Amended HBEP site for both the NAAQS and CAAQS are listed in Table 5.1-2.

TABLE 5.1-2
State and Federal Air Quality Designations for the Amended Project Area

Pollutant	State Designation	Federal Designation
Ozone	1-Hour: Nonattainment (Moderate) 8-hour: Nonattainment	1-hour: N/A 8-hour: Nonattainment (Extreme)
CO	1-hour: Attainment 8-hour: Attainment	1-hour: Attainment 8-hour: Attainment
NO_2	1-hour: Attainment Annual: Attainment	1-hour: Attainment Annual: Attainment
SO_2	1-hour: Attainment 24-hour: Attainment	1-hour: Attainment 24-hour: N/A
PM_{10}	24-hour: Nonattainment Annual: Nonattainment	24-hour: Attainment[a] Annual: N/A
$PM_{2.5}$	24-hour: N/A Annual: Nonattainment	24-hour: Nonattainment (Moderate) Annual: Nonattainment
Lead	Attainment	Attainment
H_2S and Sulfates	Unclassified and Attainment	N/A and N/A

[a] Effective July 26, 2013, the South Coast Air Basin was reclassified by the U.S. Environmental Protection Agency (EPA) from nonattainment to attainment with an approved maintenance plan for PM_{10} (78 Federal Register 38223; EPA-R09-OAR-2013-0007-0021).

Notes:

N/A = not applicable (i.e., no standard)

Sources: ARB, 2013b; EPA, 2015b

Data from several ambient air monitoring stations were used to characterize air quality for the Amended HBEP site. The Costa Mesa (North Coastal Orange County) monitoring station is the nearest ambient air quality monitoring station to the Amended HBEP site; it is located approximately 3.5 miles to the northeast. However, because the Costa Mesa station measures only ozone, carbon monoxide (CO), nitrogen dioxide (NO_2), and sulfur dioxide (SO_2), data collected at the Mission Viejo (Saddleback Valley) monitoring station were used for respirable particulate matter (PM_{10}) and fine particulate matter ($PM_{2.5}$). The Mission Viejo monitoring station is located approximately 17 miles southeast of the Amended HBEP site.[7]

The ambient air quality data presented in this section are based on data published by the SCAQMD (SCAQMD, 2015a; Historical Data by Year Website), the California Air Resources Board (ARB, 2015; iADAM Website), and the U.S. Environmental Protection Agency (EPA, 2015a; AIRS Website). The SCAQMD data summaries were used as the primary source of data and the ARB and EPA data summaries were used when data were unavailable from the SCAQMD. The maximum ambient background concentrations will be combined with the modeled concentrations and used for comparison to the ambient air quality standards.[8] A summary of the monitored background concentrations for 2011 through 2013 are presented in Table 5.1-3. Complete background concentrations for the year 2014 were not available at the time of publication.

TABLE 5.1-3
Background Air Concentrations (2011–2013) [a]

Pollutant	Averaging Time	Existing Monitored Concentrations, μg/m³ 2011	2012	2013	Maximum, μg/m³	Average, μg/m³
Ozone [b]	1-hour	183	177	187	187	—
	8-hour	151	149	163	163	—
CO [b]	1-hour	3,321	2,405	2,748	3,321	—
	8-hour	2,519	1,947	2,290	2,519	—
NO_2 [b]	1-hour (max)	114	140	142	142	—
	1-hour (98th percentile)	99.3	95.2	100	—	98.2
	Annual [d]	18.8	19.6	21.8	21.8	—
SO_2 [b]	1-hour (max)	20.2	16.2	11.0	20.2	—
	1-hour (99th percentile)	12.6	5.2	8.6	—	8.8
	3-hour [e]	20.2	16.2	11.0	20.2	—
	24-hour	5.2	2.6	2.6	5.2	—
PM_{10} [c]	24-hour	48.0	37.0	51.0	51.0	—
	Annual	19.2	17.3	19.3	19.3	—
$PM_{2.5}$ [c]	24-hour (max)	33.4	27.6	28.0	33.4	—
	24-hour (98th percentile)	28.8	17.6	17.5	—	21.3
	Annual	8.6	7.9	8.1	8.6	—

[a] The SCAQMD, ARB, and EPA ambient air quality data summaries were used as reference.

[b] Data from the Costa Mesa monitoring station.

[c] Data from the Mission Viejo monitoring station.

[d] Annual Arithmetic Mean

[e] Background concentrations for the 3-hour federal secondary standard for SO_2 were not available for the three most recent years. Therefore, the maximum 1-hour background concentration was conservatively used.

Note:

Sources: SCAQMD, 2015a; ARB, 2015; EPA, 2015a

[7] Although the California Energy Commission previously used background concentrations from the Long Beach (South Coastal Los Angeles County 1) monitoring station for pollutants not measured at the Costa Mesa station, the Project Owner believes the Mission Viejo station is a more representative station due to wind flow patterns expected in the vicinity of the Amended HBEP. Additionally, background concentrations reported at the Long Beach station for the year 2013 are incomplete and, therefore, not recommended for use.

[8] Except for 1-hour average NO_2 and SO_2, and 24-hour average PM_{10}, for which the standards are statistically based. See Table 5.1-1.

5.1.5 Environmental Analysis

The following sections describe the emission sources that have been evaluated, the results of the ambient air quality impacts analysis, and an evaluation of the Amended HBEP's compliance with the applicable air quality regulations. These analyses were designed to confirm that the Amended HBEP's design features lead to less-than-significant impacts. A comparison of impacts for the Amended HBEP and the Licensed HBEP are also presented, as appropriate.

5.1.5.1 Criteria Pollutant and Greenhouse Gas Emission Estimates

Criteria pollutant emission rates were calculated for three components of the project: demolition of existing structures and construction of the new electrical generating components, commissioning activities, and operation. Hourly, daily, and annual criteria pollutant emissions were calculated based on each phase of the demolition and construction schedule, 6,612 hours of operation, including 500 startups and shutdowns, per combined-cycle turbine per year, and 1,401 hours of operation, including 350 startups and shutdowns, per simple-cycle turbine per year. Operational emissions from an auxiliary boiler and oil-water separator system were also incorporated, as appropriate. The criteria pollutants evaluated include volatile organic compounds (VOCs), CO, nitrogen oxides (NO_X), SO_2, PM_{10}, and $PM_{2.5}$.

Greenhouse gas (GHG) emissions were also evaluated for demolition and construction activities and facility operation. The GHGs evaluated include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and sulfur hexafluoride (SF_6), as applicable. Carbon dioxide equivalent (CO_2e) emissions were also determined, using the following global warming potentials: 25 for CH_4, 298 for N_2O, and 22,800 for SF_6 (The Climate Registry, 2015).

Demolition and Construction Emissions. Demolition and construction emissions were estimated consistent with the methodology described in Section 3.1, Construction, of the *Dispersion Modeling Protocol for the Amended Huntington Beach Energy Project* (Modeling Protocol; see Appendix 5.1F), with the following clarifications:

- Fugitive dust emissions resulting from the loading and dumping of cut/fill material were included in the analysis, and estimated using methodology consistent with the California Emissions Estimator Model (CalEEMod; Version 2013.2.2).
- Fugitive dust emissions were assumed to be mitigated by watering; the control efficiency for each mitigation measure applied was determined per the SCAQMD's *California Environmental Quality Act (CEQA) Air Quality Handbook* (SCAQMD, 2007).
- Construction equipment was assumed to meet the Tier 4 final engine control standards.
- Maximum daily and annual emissions were estimated based on the number and type of construction equipment, the number of heavy-duty trucks, and the workforce projected for each month of demolition and construction.
- It was conservatively assumed that the demolition and construction activities would occur 10 hours per day, 23 days per month.
- GHG emissions from vehicle exhaust for truck trips and worker commutes were estimated using fuel economy values from the EMFAC2014 Web Tool Database, based on EMFAC2007 vehicle categories.[9]

The maximum daily demolition/construction emissions occur during month 30 for VOC, CO, NO_X, and SO_2, and during month 32 for PM_{10} and $PM_{2.5}$. The maximum annual demolition/construction emissions vary by pollutant, occurring between months 26 and 37 for VOC, CO, SO_2, PM_{10}, and $PM_{2.5}$, and between months

[9] The database is available online at http://www.arb.ca.gov/emfac/2014/.

25 and 36 for NO_X.[10] The maximum daily and annual emissions from the combined onsite and offsite demolition and construction activities are presented in Table 5.1-4. Detailed calculations are provided in Appendix 5.1A.

TABLE 5.1-4
Maximum Daily and Annual Emissions from Demolition and Construction[a]

Demolition and Construction Emissions	VOC	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$
Maximum Daily Emissions (lb/day)	8.80	116	189	0.78	29.1	10.0
Maximum Annual Emissions (tpy)	0.98	14.9	20.1	0.087	3.33	1.13

[a] Maximum daily and annual emissions include contributions from onsite construction equipment, offsite construction equipment, onsite vehicles, and offsite vehicles. The PM_{10} and $PM_{2.5}$ emissions include exhaust and fugitive dust emissions.

Notes:

lb/day = pound(s) per day
tpy = ton(s) per year

The maximum annual GHG emissions from demolition and construction activities are presented in Table 5.1-5. As with the criteria pollutants, the maximum annual GHG emissions occur during construction of the combined-cycle power block. As noted in Section 3.1, Construction, of the Modeling Protocol, no significant emissions of SF_6 are expected during demolition and construction. Detailed calculations are provided in Appendix 5.1A.

TABLE 5.1-5
Maximum Annual Greenhouse Gas Emissions from Demolition and Construction

Demolition and Construction Emissions	CO_2	CH_4	N_2O	CO_2e
Total (MT/yr)	8,289	0.13	0.063	8,311

Note:

MT/year = metric ton(s) per year

Estimated total fuel use during demolition and construction would be 1,458,865 gallons of diesel and 268,265 gallons of gasoline. Demolition and construction equipment fuel consumption rates were obtained from the OFFROAD2011 model. Vehicle fuel economies were estimated using the EMFAC2014 Web Tool Database, based on EMFAC2007 vehicle categories. Detailed calculations are provided in Appendix 5.1A.

Commissioning Emissions. The commissioning emissions were estimated per the methodology described in Section 3.2, Commissioning, of the Modeling Protocol (see Appendix 5.1F). The emission estimates are based on the estimated duration of each commissioning event, emission control efficiencies expected for each event, and turbine operating rates. The commissioning phase for each turbine type is described in more detail below.

Combined-cycle Turbines. The total duration of the combined-cycle power block commissioning period is expected to be up to 1,992 hours (996 hours per turbine). During the commissioning period, each GE 7FA.05 will be operated for up to 216 hours without emission control systems in operation. The maximum hourly and event commissioning emission rates for the GE 7FA.05s are presented in Table 5.1-6. Because commissioning is expected to be completed within 1,992 hours, annual impacts for the combined commissioning and operation of the combined-cycle power block were also evaluated since annual emissions during the commissioning year could be higher than those during a noncommissioning year.

[10] Construction of the combined-cycle power block occurs during months 18 through 52. These activities contribute to the maximum daily and annual demolition/construction emissions.

Therefore, the annual average emission rates associated with commissioning and operation of the GE 7FA.05s are also presented in Table 5.1-6. Detailed calculations are provided in Appendix 5.1B.

TABLE 5.1-6
GE 7FA.05 Turbine Commissioning Emission Rates

Commissioning Emissions	VOC	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$
Short-Term Emission Rates						
Maximum Hourly, lb/hr (per turbine) [a]	270	1,900	190	4.86	9.00	9.00
Total Commissioning Period, tons (per 2x1 block) [b]	14.7	101	30.5	4.84	8.96	8.96
Annual Emission Rates						
Annual Average Hourly, lb/hr (per turbine) [c]	N/A	N/A	16.4	N/A	7.82	7.82
Total Commissioning/Operation Period, tons (per 2x1 block) [d]	N/A	N/A	144	N/A	68.5	68.5

[a] SO_2, PM_{10}, and $PM_{2.5}$ emissions are not emitted in amounts greater than normal operating rates.

[b] Total commissioning period SO_2, PM_{10}, and $PM_{2.5}$ emissions are based on the maximum emission rates at 32°F (see Appendix 5.1B) multiplied by the total number of commissioning hours.

[c] Annual average hourly emissions for evaluating annual impacts are based on the sum of total commissioning emissions and annual operation emissions per turbine, divided by 8,760.

[d] Total commissioning/operation period emissions are based on the total commissioning period emissions presented here and the annual average operation emission rates at 65.8°F and 100 percent load (see Appendix 5.1B).

Note:

N/A = not applicable (i.e., no annual average ambient air quality standard exists for these pollutants; therefore, annual average emissions were not modeled)

Simple-cycle Turbines. The total duration of the simple-cycle power block commissioning period is expected to be up to 560 hours (280 hours per turbine). During the commissioning period, each GE LMS-100PB will be operated for up to 4 hours without emission control systems in operation. The maximum hourly and event commissioning emission rates for the GE LMS-100PBs are presented in Table 5.1-7. Because commissioning is expected to be completed within 560 hours, annual impacts for the combined commissioning and operation of the simple-cycle power block were also evaluated since annual emissions during the commissioning year could be higher than those during a noncommissioning year. Therefore, the annual average emission rates associated with commissioning and subsequent operation of the GE LMS-100PBs are also presented in Table 5.1-7. Detailed calculations are provided in Appendix 5.1B.

TABLE 5.1-7
GE LMS-100PB Turbine Commissioning Emission Rates

Commissioning Emissions	VOC	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$
Short-Term Emission Rates						
Maximum Hourly, lb/hr (per turbine) [a]	5.08	244	40.1	1.64	6.24	6.24
Total Commissioning Period, tons (per 2-turbine block) [b]	0.84	25.4	5.72	0.46	1.75	1.75
Annual Emission Rates						
Annual Average Hourly, lb/hr (per turbine) [c]	N/A	N/A	2.53	N/A	1.20	1.20
Total Commissioning/Operation Period, tons (per 2-turbine block) [d]	N/A	N/A	22.2	N/A	10.5	10.5

[a] SO_2, PM_{10}, and $PM_{2.5}$ emissions are not emitted in amounts greater than normal operating rates.

[b] Total commissioning period SO_2, PM_{10}, and $PM_{2.5}$ emissions are based on the maximum emission rates at 65.8°F (see Appendix 5.1B) multiplied by the total number of commissioning hours.

TABLE 5.1-7
GE LMS-100PB Turbine Commissioning Emission Rates

Commissioning Emissions	VOC	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$

[c] Annual average hourly emissions for evaluating annual impacts are based on the sum of total commissioning emissions and annual operation emissions per turbine, divided by 8,760.

[d] Total commissioning/operation period emissions are based on the total commissioning period emissions presented here and the annual average operation emission rates at 65.8°F and 100 percent load (see Appendix 5.1B).

Note:

N/A = not applicable (i.e., no annual average ambient air quality standard exists for these pollutants; therefore, annual average emissions were not modeled)

Operation Emissions. Operational emissions were estimated for two GE 7FA.05s, two GE LMS-100 PBs, and one auxiliary boiler, as described in the following sections. Unless otherwise noted, operational emissions were estimated per the methodology described in Section 3.3, Operation, of the Modeling Protocol (see Appendix 5.1F).

Combined-cycle Turbines.

Startup and Shutdown Emissions. During the startup and shutdown operating modes, the emission control systems are not fully functional, which may result in higher air emission rates for VOC, CO, and NO_X relative to the steady-state operating mode.[11] Three startup scenarios and one shutdown scenario have been developed for the GE 7FA.05s. The time from fuel initiation until reaching the base load operating rate is expected to take up to 60 minutes for a cold start event and up to 30 minutes for a warm or hot start event. A shutdown event is expected to take up to 30 minutes. The maximum GE 7FA.05 startup and shutdown emission rates are presented in Table 5.1-8, on a pound(s) per event (lb/event) basis. Detailed calculations are provided in Appendix 5.1B.

TABLE 5.1-8
GE 7FA.05 Startup/Shutdown Emission Rates[a]

Startup/Shutdown Type	VOC	CO	NO_X
Cold Start			
Startup (lb/event/turbine)	36.0	325	61.0
Warm Start			
Startup (lb/event/turbine)	25.0	137	17.0
Hot Start			
Startup (lb/event/turbine)	25.0	137	17.0
Shutdown			
Shutdown (lb/event/turbine)	32.0	133	10.0

[a] Maximum emission rates were provided by GE, based on an ambient temperature of 20°F. Startup and shutdown emission rates at other ambient temperatures are provided in Appendix 5.1B.

Steady-State Operating Emissions. The GE 7FA.05 operational emission rates for steady-state operations, shown in Table 5.1-9, have been provided by the manufacturer.

[11] Emission rates of SO_2, PM_{10}, and $PM_{2.5}$ are expected to be equal to or lower than normal operating rates due to reduced loads during startup/shutdown events.

TABLE 5.1-9
Maximum Pollutant Emission Rates for Operation of One GE 7FA.05 [a]

Pollutant	ppmvd @ 15% O_2	Emission Rate (lb/hr)
VOC	2 (1-hour)	1.58
CO	2 (1-hour)	10.0
NO_X	2 (1-hour)	16.5
SO_2 [b]	N/A	4.86
$PM_{10}/PM_{2.5}$ [c]	N/A	9.00
Ammonia	5	15.2

[a] Maximum values are for each turbine at an ambient temperature of 32°F and excludes startups and shutdowns.

[b] Estimated using a maximum fuel sulfur concentration of 0.75 grain of sulfur per 100 dry standard cubic feet (dscf) of natural gas.

[c] 100 percent of particulate emissions assumed to be emitted as PM_{10} and $PM_{2.5}$.

Notes:

N/A = not applicable
ppmvd = part(s) per million by volume, dry

Simple-cycle Turbines.

Startup and Shutdown Emissions. Similar to the GE 7FA.05s, the GE LMS-100PB emission control systems are not fully functional during the startup and shutdown operating modes, which may result in higher air emission rates for VOC, CO, and NO_X relative to the steady-state operating mode.[12] One startup scenario and one shutdown scenario have been developed for the GE LMS-100PBs. The time from fuel initiation until reaching the base load operating rate is expected to take up to 30 minutes for a hot start event. A shutdown event is expected to take up to 13 minutes. The maximum GE LMS-100PB startup and shutdown emission rates are presented in Table 5.1-10, on a lb/event basis. Detailed calculations are provided in Appendix 5.1B.

TABLE 5.1-10
GE LMS-100PB Startup/Shutdown Emission Rates[a]

	VOC	CO	NO_X
Hot Start			
Startup (lb/event/turbine)	2.80	15.4	16.6
Shutdown			
Shutdown (lb/event/turbine)	3.06	28.1	3.12

[a] Maximum emission rates were provided by GE.

Steady-State Operating Emissions. The GE LMS-100PB operational emission rates for steady-state operations, shown in Table 5.1-11, have been provided by the manufacturer.

[12] Emission rates of SO_2, PM_{10}, and $PM_{2.5}$ are expected to be equal to or lower than normal operating rates due to reduced loads during startup/shutdown events.

TABLE 5.1-11
Maximum Pollutant Emission Rates for Operation of One GE LMS-100PB [a]

Pollutant	ppmvd @ 15% O_2	Emission Rate (lb/hr)
VOC	2 (1-hour)	2.31
CO	4 (1-hour)	8.07
NO_X	2.5 (1-hour)	8.29
SO_2 [b]	N/A	1.64
$PM_{10}/PM_{2.5}$ [c]	N/A	6.24
Ammonia	5	6.14

[a] Maximum values are for each turbine at an ambient temperature of 65.8°F and excludes startups and shutdowns.

[b] Estimated using a maximum fuel sulfur concentration of 0.75 grain of sulfur per 100 dscf of natural gas.

[c] 100 percent of particulate emissions assumed to be emitted as PM_{10} and $PM_{2.5}$.

Note:

N/A = not applicable

Auxiliary Boiler.

Startup Emissions. As with the combustion turbines, the auxiliary boiler emission control systems are not fully functional during the startup operating modes, which may result in higher air emission rates for VOC, CO, and NO_X relative to the steady-state operating mode.[13] Three startup scenarios have been developed for the auxiliary boiler. The time from fuel initiation until reaching the base load operating rate is expected to take up to 170 minutes for a cold start event, 85 minutes for a warm start event, and 25 minutes for a hot start event. The maximum auxiliary boiler startup emission rates are presented in Table 5.1-12, on a lb/event basis. Detailed calculations are provided in Appendix 5.1B.

TABLE 5.1-12
Auxiliary Boiler Startup Emission Rates[a]

	VOC	CO	NO_X
Cold Start			
Startup (lb/event)	4.69	4.34	4.22
Warm Start			
Startup (lb/event)	2.34	2.17	2.11
Hot Start			
Startup (lb/event)	0.69	0.64	0.62

[a] Maximum emission rates were provided by CleaverBrooks.

Steady-State Operating Emissions. The auxiliary boiler operational emission rates for steady-state operations, shown in Table 5.1-13, have been estimated based on the maximum heat input rating and the assumption that the boiler will operate at 100 percent load. Detailed calculations are provided in Appendix 5.1B.

[13] Emission rates of SO_2, PM_{10}, and $PM_{2.5}$ are expected to be equal to or lower than normal operating rates due to reduced loads during startup events.

TABLE 5.1-13
Maximum Pollutant Emission Rates for Operation of One Auxiliary Boiler

Pollutant	ppmvd @ 3% O_2	Emission Rate (lb/hr)[a]
VOC	N/A	0.28
CO	50 (1-hour)	2.83
NO_X	5 (1-hour)	0.42
SO_2	N/A	0.048
$PM_{10}/PM_{2.5}$	N/A	0.30
Ammonia	5	0.30

[a]Maximum hourly emission rates assume 100 percent load.

Note:

N/A = not applicable

Facility Emissions. Table 5.1-14 presents the maximum fuel use expected for each of the combustion emission sources included at the Amended HBEP, as well as the facility total. Detailed calculations are provided in Appendix 5.1B.

TABLE 5.1-14
Estimated Facility Fuel Use (MMBtu)

Period	GE 7FA.05 (per unit) [a]	GE LMS100 PB (per unit) [b]	Auxiliary Boiler [c]	Total
Per hour	2,273	885	70.8	6,388
Per day	54,563	21,246	878	152,496
Per year	14,864,741	1,240,114	310,096	32,519,805

[a] The maximum hourly and daily fuel use were based on the maximum heat input at an ambient temperature of 32°F. The annual fuel use was based on an average heat input at 65.8°F, 6,100 hours of steady-state operation per turbine, and 500 startups and shutdowns per turbine.

[b] The maximum hourly and daily fuel use were based on the maximum heat input at an ambient temperature of 65.8°F. The annual fuel use was based on an average heat input at 65.8°F, 1,150 hours of steady-state operation per turbine, and 350 startups and shutdowns per turbine.

[c] Fuel use was based on operation at 100 percent load. Additionally, the annual fuel use assumed 120 startups and 8,760 hours of operation.

Note:

MMBtu = million British thermal unit(s)

Table 5.1-15 presents the Amended HBEP Potential to Emit (PTE) criteria pollutant emissions. Detailed calculations are provided in Appendix 5.1B.

TABLE 5.1-15
Amended HBEP Facility Emissions

	VOC [a]	CO	NO_X	SO_2 [b]	PM_{10}	$PM_{2.5}$
Maximum Hourly Emissions, lb/hr						
Per GE 7FA.05 [c]	36.0	325	61.0	4.86	9.00	9.00
Per GE LMS-100PB [d]	6.52	45.8	22.1	1.64	6.24	6.24
Auxiliary Boiler [e]	0.28	2.83	0.42	0.048	0.30	0.30
Average Daily Facility Emissions, lb/day [f]	433	2,055	1,327	107	760	760

TABLE 5.1-15
Amended HBEP Facility Emissions

	VOC [a]	CO	NO_X	SO_2 [b]	PM_{10}	$PM_{2.5}$
Maximum Monthly Facility Emissions, lb/month [g]	12,983	61,635	39,800	3,214	22,793	22,793
Average Annual Facility Emissions, tpy [h]	42.2	215	131	11.5	68.9	68.9

[a] Average daily, maximum monthly, and average annual facility emissions include VOC emissions from two oil-water separator systems (see Appendix 5.1B, Table 5.1B.16).

[b] Hourly SO_2 emissions are based on a maximum fuel sulfur content of 0.75 grain per 100 dscf of natural gas. Daily, monthly, and annual SO_2 emissions are based on an average fuel sulfur content of 0.25 grain per 100 dscf of natural gas.

[c] Maximum hourly VOC, CO, and NO_X emissions were based on a cold startup. Maximum hourly SO_2, PM_{10}, and $PM_{2.5}$ emissions were based on each turbine operating at full load at 32°F.

[d] Maximum hourly VOC, CO, and NO_X emissions were based on one hot startup, one shutdown, and the balance of the hour at full load at 65.8°F. Maximum hourly SO_2, PM_{10}, and $PM_{2.5}$ emissions were based on each turbine operating at full load at 65.8°F.

[e] Maximum hourly emissions assume operation at 100 percent load. Startup and shutdown emissions are not included.

[f] Average daily emissions represent the maximum monthly total divided by 30 days.

[g] Maximum monthly emissions are based on the following:

- GE 7FA.05s: 2 cold startups, 15 warm startups, 45 hot startups, 62 shutdowns, and 681 hours of steady-state operation at 100 percent load and 65.8°F.
- GE LMS-100PBs: 62 hot startups, 62 shutdowns, and 700 hours of steady-state operation at 100 percent load and 65.8°F.
- Auxiliary Boiler: 10 startups and 31 days of operation at 100 percent load.

[h] Average annual emissions are based on the following:

- GE 7FA.05s: 24 cold startups, 100 warm startups, 376 hot startups, 500 shutdowns, and 6,100 hours of steady-state operation at 100 percent load and 65.8°F.
- GE LMS-100PBs: 350 hot startups, 350 shutdowns, and 1,150 hours of steady-state operation at 100 percent load and 65.8°F.
- Auxiliary Boiler: 120 startups and 365 days of operation at 100 percent load.

Note:

lb/month = pound(s) per month

GHG emissions for normal facility operations are presented in Table 5.1-16 and were calculated based on the maximum fuel use provided in Table 5.1-14 and methodology provided in Section 3.3, Operation, of the Modeling Protocol. Detailed calculations are provided in Appendix 5.1B.

TABLE 5.1-16
Amended HBEP Annual GHG Emissions

	CO_2	CH_4	N_2O	CO_2e [a]
Amended HBEP, MT/yr	1,720,623	38.0	87.4	1,747,624

[a] Value includes SF_6 emissions associated with 10 circuit breakers with an assumed annual leak rate of 0.1 percent (see Appendix 5.1B, Table 5.1B.17).

Tables 5.1-17 and 5.1-18 present the criteria pollutant and GHG emissions, respectively, associated with operational worker commutes and material deliveries. These were estimated per Section 3.3, Operation, of the Modeling Protocol (see Appendix 5.1F), except that vehicle fuel economies were estimated using the EMFAC2014 Web Tool Database, based on EMFAC2007 vehicle categories. Detailed calculations are provided in Appendix 5.1B.

TABLE 5.1-17
Criteria Pollutant Emissions from Worker Commute and Deliveries During Operation

Emission Source	VOC	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$
Worker Commute, lb/yr	11.7	699	58.4	2.44	42.1	17.4
Material Deliveries, lb/yr	0.56	2.38	19.1	0.074	0.56	0.26
Total, lb/yr	**12.2**	**701**	**77.5**	**2.51**	**42.6**	**17.7**

Note:

lb/yr = pound(s) per year

TABLE 5.1-18
GHG Emissions from Worker Commute and Deliveries During Operation

Emission Source	CO_2	CH_4	N_2O	CO_2e
Worker Commute, MT/yr	146	0.0071	0.0015	146
Material Deliveries, MT/yr	3.80	0.000011	0.000010	3.80
Total, MT/yr	**150**	**0.0071**	**0.0015**	**150**

5.1.5.2 Air Quality Impacts Analysis

An air quality impacts analysis was conducted to compare worst-case ground-level impacts resulting from the Amended HBEP with established state and federal ambient air quality standards and applicable SCAQMD significance criteria. The analysis was performed per the methodology in Section 5, Dispersion Modeling Approach, and Section 6, Air Quality Impacts Analysis, of the Modeling Protocol (see Appendix 5.1F), unless otherwise noted below. A comparison to the Licensed HBEP impacts is also provided, where appropriate.

Details of the air quality impacts analysis can be found in Appendix 5.1C, including annual and quarterly wind rose plots for the National Weather Service John Wayne Airport meteorological station, plots of the receptor grids used, layout of the Amended HBEP, and results of all modeled emissions scenarios. The model input and output files are included with this submission on compact disc.

Demolition and Construction Impacts Analysis. Table 5.1-19 presents the maximum daily emissions from the demolition and construction activities compared to the SCAQMD *CEQA Air Quality Handbook* significance thresholds (SCAQMD, 2015b). As indicated, the daily emissions associated with demolition and construction activities are expected to be less than significant, with the exception of NO_X. This conclusion is consistent with that for the Licensed HBEP.

TABLE 5.1-19
Maximum Daily Emissions from Demolition and Construction[a]

Demolition and Construction Emissions	VOC	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$
Maximum Daily Emissions (lb/day)	8.80	116	189	0.78	29.1	10.0
SCAQMD CEQA Significance Threshold (lb/day)	75	550	100	150	150	55
Exceed Threshold? (Yes or No)	No	No	Yes	No	No	No

[a] Maximum daily emissions include contributions from onsite construction equipment, offsite construction equipment, onsite vehicles, and offsite vehicles. The PM_{10} and $PM_{2.5}$ emissions include exhaust and fugitive dust emissions.

As required by the CEC, potential ambient air quality impacts for demolition and construction activities were also estimated, based on the maximum hourly, daily, monthly, and annual rolling 12-month emissions from only onsite activities. Table 5.1-20 presents the results of the modeling analysis. As indicated, the maximum predicted CO, NO_2, SO_2, and $PM_{2.5}$ demolition/construction impacts combined with the background concentrations will be below the ambient air quality standards for each averaging period. For PM_{10}, the annual and 24-hour background concentrations exceed or equal more than 95 percent of the CAAQS without adding the modeled concentrations. As a result, the predicted impacts combined with the background concentrations would be greater than the CAAQS. Based on the modeling analysis, fugitive dust is a significant contributor to the predicted concentration of PM_{10}. With the mitigation measures described in Section 5.1.7.1, Demolition and Construction Mitigation, impacts from demolition/construction will be less than significant. This conclusion is consistent with that of the Licensed HBEP.

TABLE 5.1-20
Maximum Modeled Impacts from Demolition/Construction and the Ambient Air Quality Standards

Pollutant	Averaging Time	Maximum Modeled Concentration, µg/m³	Background Concentration, µg/m³ [a]	Total Predicted Concentration, µg/m³	CAAQS, µg/m³	NAAQS, µg/m³
CO	1-hour	177	3,321	3,498	23,000	40,000
	8-hour	140	2,519	2,659	10,000	10,000
NO_2 [b]	1-hour (max)	27.0	142	169	339	—
	1-hour (98th percentile) [c]	—	—	121	—	188
	Annual	2.05	21.8	23.8	57	100
SO_2	1-hour (max)	0.30	20.2	20.5	655	—
	1-hour (99th percentile) [d]	0.29	8.80	9.09	—	196
	3-hour	0.28	20.2	20.5	—	1,300
	24-hour	0.059	5.20	5.26	105	—
PM_{10}	24-hour	11.1	51.0	62.1	50	150
	Annual	3.01	19.3	22.3	20	—
$PM_{2.5}$	24-hour (98th percentile) [e]	3.42	21.3	24.7	—	35
	Annual	0.85	8.60	9.45	12	12

[a] Background concentrations were the highest concentrations monitored during 2011 through 2013.
[b] The maximum 1-hour and annual NO_2 concentrations include ambient NO_2 ratios of 0.80 (EPA, 2011) and 0.75 (EPA, 2005), respectively.
[c] The total predicted concentration for the federal 1-hour NO_2 standard is the 5-year average, high-8th-high modeled concentration paired with 98th percentile seasonal hour-of-day background concentrations for 2010 through 2012.
[d] The total predicted concentration for the federal 1-hour SO_2 standard is the 5-year average, high-4th-high modeled concentration combined with the 3-year average, 99th percentile background concentration.
[e] The total predicted concentration for the federal 24-hour $PM_{2.5}$ standard is the 5-year average, high-8th-high modeled concentration combined with the 3-year average, 98th percentile background concentration.

With regards to GHG emissions, SCAQMD staff has recommended a GHG significance threshold that would apply to stationary source/industrial projects and would include direct and indirect emissions during construction and operation. Following the Tier 3 screening level approach, construction emissions would be amortized over the life of the project (defined as 30 years) and would be added to the operational emissions for comparison to the significance threshold of 10,000 metric tons (MT) of CO_2e.[14] Because the GHG PTE emissions from the operation of the Amended HBEP are expected to exceed 1,000,000 MT of CO_2e, the Amended HBEP would exceed the 10,000 MT of CO_2e limit. However, the Amended HBEP has been designed to incorporate energy-efficient technologies for reducing GHG PTE emissions from the power generation equipment; additionally, SCAQMD will define the best available control technology (BACT) for reducing GHG emissions as part of the Prevention of Significant Deterioration (PSD) permitting process. Therefore, for purposes of evaluating the potential GHG impacts associated with Amended HBEP demolition and construction activities, the demolition/construction GHG emissions in Table 5.1-5 were compared to the 10,000 MT of CO_2e threshold. Based on this comparison, the annual GHG emissions from demolition and construction activities before amortization would be less than 10,000 MT of CO_2e. As a result, the GHG

[14] Information on thresholds is available online at http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/ghg-significance-thresholds.

emissions from demolition and construction activities are less than significant. This conclusion is consistent with that of the Licensed HBEP.

Commissioning Impacts Analysis.

Combined-cycle Turbines. It was assumed that the maximum impact would occur while the two combined-cycle turbines were undergoing commissioning activities with the highest unabated emissions presented in Table 5.1-6. Note that the analysis excluded a comparison to the federal 1-hour NO_2 and SO_2 standards because the maximum hourly unabated emission rates that result in the highest predicted concentrations would only occur once during the life of the Amended HBEP, that simultaneous commissioning of both turbines while unabated would not occur, and that the one time unabated commissioning would be less than 48 hours per turbine.[15] The 1-hour NO_2 and SO_2 standards are also based on 98th and 99th percentile statistical standards, respectively. Therefore, the simultaneous one-time unabated emissions event for both combined-cycle turbines contributing to an exceedance of the NAAQS could not occur.

Initial modeling of 1-hour NO_2 impacts that assumed commissioning of both combined-cycle turbines concurrently showed an exceedance of the CAAQS. Therefore, refined modeling was conducted assuming each turbine would undergo the worst-case commissioning phase separately. Additionally, the refined modeling was conducted using the plume volume molar ratio method (PVMRM). PVMRM options assumed an initial in-stack NO_2/NO_X ratio of 0.5 and an out-of-stack NO_2/NO_X ratio of 0.9 (EPA, 2011; California Air Pollution Control Officer's Association [CAPCOA], 2011). Corresponding hourly ozone data from the SCAQMD Costa Mesa monitoring station was obtained from the EPA AirData database.

Table 5.1-21 presents the results of the modeling analysis. As indicated, the maximum predicted CO, NO_2, SO_2, annual PM_{10}, and $PM_{2.5}$ commissioning impacts combined with the background concentrations will be below the ambient air quality standards for each averaging period. For PM_{10}, the 24-hour background concentration exceeds the CAAQS without adding the modeled concentration. As a result, the predicted impact combined with the background concentration would be greater than the CAAQS. However, the commissioning activity would be finite, and the Project Owner will limit the hours of operation required to complete commissioning activities. Additionally, as described in Section 5.1.7.3, Operational Mitigation, Amended HBEP emissions will be fully offset consistent with SCAQMD Rule 1303 through the SCAQMD internal offset bank under SCAQMD Rule 1304(a)(2). Therefore, impacts from commissioning will be less than significant. This conclusion is consistent with that of the Licensed HBEP.

TABLE 5.1-21
GE 7FA.05 Commissioning Impacts Analysis – Maximum Modeled Impacts Compared to the Ambient Air Quality Standards

Pollutant	Averaging Time	Maximum Modeled Concentration, µg/m³ [a]	Background Concentration, µg/m³ [b]	Total Predicted Concentration, µg/m³	CAAQS, µg/m³	NAAQS, µg/m³
CO	1-hour	3,377	3,321	6,698	23,000	40,000
	8-hour	1,793	2,519	4,312	10,000	10,000
NO_2	1-hour (max) [c]	179	142	321	339	—
	Annual [d]	0.66	21.8	22.5	57	100
SO_2	1-hour (max)	5.79	20.2	26.0	655	—
	3-hour	4.99	20.2	25.2	—	1,300
	24-hour	1.70	5.20	6.90	105	—
PM_{10}	24-hour	5.69	51.0	56.7	50	150
	Annual	0.59	19.3	19.9	20	—
$PM_{2.5}$	24-hour (98th percentile) [e]	3.31	21.3	24.6	—	35
	Annual	0.59	8.60	9.19	12	12

[15] The highest commissioning emission rates occur during turbine testing at full speed with no load; this commissioning event lasts up to 48 hours.

TABLE 5.1-21
GE 7FA.05 Commissioning Impacts Analysis – Maximum Modeled Impacts Compared to the Ambient Air Quality Standards

Pollutant	Averaging Time	Maximum Modeled Concentration, $\mu g/m^3$ [a]	Background Concentration, $\mu g/m^3$ [b]	Total Predicted Concentration, $\mu g/m^3$	CAAQS, $\mu g/m^3$	NAAQS, $\mu g/m^3$

[a] Maximum modeled 1-hour NO_2 and 1- and 8-hour CO concentrations are for commissioning of a single GE 7FA.05 turbine only. Maximum modeled annual NO_2; 1-, 3-, and 24-hour SO_2; and 24-hour and annual $PM_{10/2.5}$ concentrations include impacts from both GE 7FA.05 turbines and the auxiliary boiler.
[b] Background concentrations were the highest concentrations monitored during 2011 through 2013.
[c] The maximum 1-hour NO_2 concentration is based on American Meteorological Society/EPA Regulatory Model (AERMOD) PVMRM output with an in-stack NO_2 to NO_X ratio of 0.5 and an out-of-stack NO_2 to NO_X ratio of 0.9 (EPA, 2011; CAPCOA, 2011). Hourly paired ozone data is from the SCAQMD Costa Mesa monitoring station.
[d] The maximum annual NO_2 concentration includes an ambient NO_2 ratio of 0.75 (EPA, 2005).
[e] The total predicted concentration for the federal 24-hour $PM_{2.5}$ standard is the 5-year average, high-8th-high modeled concentration combined with the 3-year average, 98th percentile background concentration.

Simple-cycle Turbines. The simple-cycle turbines will be commissioned after the combined-cycle turbines are already in operation. Therefore, it was assumed that the maximum impact would occur while the two simple-cycle turbines were simultaneously undergoing commissioning activities with the highest unabated emissions presented in Table 5.1-7 and the two combined-cycle turbines were simultaneously operating with the steady-state emissions presented in Table 5.1-9. The analysis again excluded a comparison to the federal 1-hour NO_2 and SO_2 standards, as explained above.

Table 5.1-22 presents the results of the modeling analysis. As indicated, the maximum predicted CO, NO_2, SO_2, annual PM_{10}, and $PM_{2.5}$ commissioning impacts combined with the background concentrations will be below the ambient air quality standards for each averaging period. For PM_{10}, the 24-hour background concentration exceeds the CAAQS without adding the modeled concentrations. As a result, the predicted impact combined with the background concentration would be greater than the CAAQS. However, the commissioning activity would be finite, and the Project Owner will limit the hours of operation required to complete commissioning activities. Additionally, as described in Section 5.1.7.3, Operational Mitigation, Amended HBEP emissions will be fully offset consistent with SCAQMD Rule 1303 through the SCAQMD internal offset bank under SCAQMD Rule 1304(a)(2). Therefore, impacts from commissioning will be less than significant.

TABLE 5.1-22
GE LMS-100PB Commissioning Impacts Analysis – Maximum Modeled Impacts Compared to the Ambient Air Quality Standards

Pollutant	Averaging Time	Maximum Modeled Concentration, $\mu g/m^3$	Background Concentration, $\mu g/m^3$ [a]	Total Predicted Concentration, $\mu g/m^3$	CAAQS, $\mu g/m^3$	NAAQS, $\mu g/m^3$
CO	1-hour	527	3,321	3,848	23,000	40,000
	8-hour	125	2,519	2,644	10,000	10,000
NO_2 [b]	1-hour (max)	79.1	142	221	339	—
	Annual	0.49	21.8	22.3	57	100
SO_2	1-hour (max)	5.69	20.2	25.9	655	—
	3-hour	4.94	20.2	25.1	—	1,300
	24-hour	1.66	5.20	6.86	105	—
PM_{10}	24-hour	5.38	51.0	56.4	50	150
	Annual	0.53	19.3	19.8	20	—
$PM_{2.5}$	24-hour (98th percentile) [c]	3.13	21.3	24.4	—	35
	Annual	0.53	8.60	9.13	12	12

TABLE 5.1-22
GE LMS-100PB Commissioning Impacts Analysis – Maximum Modeled Impacts Compared to the Ambient Air Quality Standards

Pollutant	Averaging Time	Maximum Modeled Concentration, μg/m³	Background Concentration, μg/m³ [a]	Total Predicted Concentration, μg/m³	CAAQS, μg/m³	NAAQS, μg/m³

[a] Background concentrations were the highest concentrations monitored during 2011 through 2013.
[b] The maximum 1-hour and annual NO_2 concentrations include ambient NO_2 ratios of 0.80 (EPA, 2011) and 0.75 (EPA, 2005), respectively.
[c] The total predicted concentration for the federal 24-hour $PM_{2.5}$ standard is the 5-year average, high-8th-high modeled concentration combined with the 3-year average, 98th percentile background concentration.

Operation Impacts Analysis. To evaluate the worst-case air quality impacts, each technology was assessed at peak, average, and minimum load at low, average, and high ambient temperatures. Table 5.1-23 presents a comparison of the maximum Amended HBEP operational impacts to the CAAQS and NAAQS. As indicated, the maximum predicted CO, NO_2, SO_2, annual PM_{10}, and $PM_{2.5}$ operational impacts combined with the background concentrations will be below the ambient air quality standards for each averaging period. The 24-hour PM_{10} background concentration exceeds the CAAQS without adding the modeled concentration. As a result, the predicted impact combined with the background concentration will be greater than the CAAQS. However, as described in Section 5.1.7.3, Operational Mitigation, Amended HBEP emissions will be fully offset consistent with SCAQMD Rule 1303 through the SCAQMD internal offset bank under SCAQMD Rule 1304(a)(2). Therefore, impacts from operation will be less than significant. This conclusion is consistent with that of the Licensed HBEP.

TABLE 5.1-23
Amended HBEP Operation Impacts Analysis – Maximum Modeled Impacts Compared to the Ambient Air Quality Standards

Pollutant	Averaging Time	Maximum Modeled Concentration, μg/m³	Background Concentration, μg/m³ [a]	Total Predicted Concentration, μg/m³	CAAQS, μg/m³	NAAQS, μg/m³
CO	1-hour	627	3,321	3,948	23,000	40,000
	8-hour	118	2,519	2,637	10,000	10,000
NO_2 [b]	1-hour (max)	94	142	236	339	—
	1-hour (98th percentile) [c]	—	—	126	—	188
	Annual	0.56	21.8	22.4	57	100
SO_2	1-hour (max)	5.69	20.2	25.9	655	—
	1-hour (99th percentile) [d]	4.80	8.80	13.6	—	196
	3-hour	4.94	20.2	25.1	—	1,300
	24-hour	1.66	5.20	6.86	105	365
PM_{10}	24-hour	5.38	51.0	56.4	50	150
	Annual	0.59	19.3	19.9	20	—
$PM_{2.5}$	24-hour (98th percentile) [e]	3.13	21.3	24.4	—	35
	Annual	0.59	8.60	9.19	12	12

[a] Background concentrations were the highest concentrations monitored during 2011 through 2013.
[b] The maximum 1-hour and annual NO_2 concentrations include ambient NO_2 ratios of 0.80 (EPA, 2011) and 0.75 (EPA, 2005), respectively.
[c] The total predicted concentration for the federal 1-hour NO_2 standard is the 5-year average, high-8th-high modeled concentration paired with 98th percentile seasonal hour-of-day background concentrations for 2010 through 2012.
[d] The total predicted concentration for the federal 1-hour SO_2 standard is the 5-year average, high-4th-high modeled concentration combined with the 3-year average, 99th percentile background concentration.
[e] The total predicted concentration for the federal 24-hour $PM_{2.5}$ standard is the 5-year average, high-8th-high modeled concentration combined with the 3-year average, 98th percentile background concentration.

Rule 2005. The maximum modeled NO_2 concentrations are presented in Table 5.1-24 and are compared to the SCAQMD Rule 2005 significance threshold. Although each combustion emission unit was modeled, the results presented in Table 5.1-24 are only for the emission unit causing the highest modeled concentrations, in this case one combined-cycle turbine. The maximum modeled NO_2 concentrations were also added to representative background concentrations and compared to the state and federal ambient air quality standards for NO_2. Although the NO_2 concentrations per emission unit are greater than the SCAQMD Rule 2005 1-hour threshold, they are less than the ambient air quality standards and will be fully offset through the surrender of NO_X Regional Clean Air Incentives Market (RECLAIM) trading credits (RTCs). Therefore, the predicted NO_2 impacts from operation will be less than significant compared to SCAQMD Rule 2005. This conclusion is consistent with that of the Licensed HBEP.

TABLE 5.1-24
Rule 2005 Air Quality Thresholds and Standards Applicable to the Amended HBEP (per emission unit)

Pollutant/Averaging Time	Maximum Modeled Concentration, μg/m³ [a]	Significant Threshold, μg/m³ [b]	Background Concentration, μg/m³ [c]	Total Predicted Concentration, μg/m³	CAAQS, μg/m³	NAAQS, μg/m³
NO_2 (1-hour)	60.3	20	142	202	339	—
NO_2 (Federal 1-hour)	62.0	N/A	98.2	160	—	188
NO_2 (Annual)	0.27	1.0	21.8	22.1	57	100

[a] The maximum 1-hour and annual NO_2 concentrations include ambient NO_2 ratios of 0.80 (EPA, 2011) and 0.75 (EPA, 2005), respectively.
[b] Allowable change in air quality concentration per emission unit per SCAQMD Rule 2005, Appendix A.
[c] Background concentrations were the highest concentrations monitored during 2011 through 2013.

Rule XVII (PSD). Table 5.1-25 presents a summary of the predicted 1-hour and 8-hour CO, hourly and annual NO_2, and 24-hour and annual PM_{10} impacts from operation of the Amended HBEP, compared to the Class II significance impact levels (SILs), Class II PSD Increment Standards, and the significant monitoring concentration levels. This modeling was performed consistent with that performed for the operation impacts analysis, presented in Table 5.1-23, with the exception of 24-hour PM_{10}. For 24-hour PM_{10}, the scenario contributing the maximum impact had both GE 7FA.05 turbines operating at minimum load for 24 hours per day. Because this is an unlikely scenario, refined modeling was performed assuming each GE 7FA.05 turbine would operate 20 hours per day at minimum load and 4 hours per day at average load.

As shown in Table 5.1-25, the maximum predicted 1-hour CO, 8-hour CO, annual NO_2, 24-hour PM_{10}, and annual PM_{10} impacts from operation of the Amended HBEP are below the Class II SILs, Class II PSD Increment Standards, and significant monitoring concentrations. Therefore, additional analysis of 1-hour CO, 8-hour CO, annual NO_2, 24-hour PM_{10}, and annual PM_{10} impacts is not required. However, the maximum predicted 1-hour NO_2 impacts from operation of the Amended HBEP exceed the Class II SIL, with a radius of impact with predicted concentrations greater than 7.52 μg/m³ of 5.3 kilometers (km). Therefore, the cumulative impacts of the Amended HBEP and competing sources were assessed, per the methodology described in Section 6.3.2, Tier 2 Analysis, of the Modeling Protocol (see Appendix 5.1F), for all receptors where the Amended HBEP impacts alone exceeded the 1-hour NO_2 SIL. The competing sources evaluated were those approved by the SCAQMD on October 8, 2013, as provided in Attachment 2 of the Modeling Protocol, and are consistent with the analysis conducted for the Licensed HBEP.

TABLE 5.1-25

Amended HBEP Predicted Impacts Compared to the PSD Air Quality Impact Standards

Pollutant/Averaging Time	Maximum Modeled Concentration, µg/m³	Significant Impact Level, µg/m³	PSD Class II Increment Standard, µg/m³	Significant Monitoring Concentration, µg/m³
CO (1-hour)	627	2,000	N/A	N/A
CO (8-hour)	118	500	N/A	575
NO_2 (1-hour) [a]	88.9	7.52 [c]	N/A	N/A
NO_2 (Annual) [a]	0.56	1.0	25	14
PM_{10} (24-hour) [b]	4.93	5.0	30	10
PM_{10} (Annual)	0.59	1.0	17	N/A

[a] The maximum 1-hour and annual NO_2 concentrations include ambient NO_2 ratios of 0.80 (EPA, 2011) and 0.75 (EPA, 2005), respectively.

[b] The 24-hour PM_{10} concentration is based on both GE 7FA.05 turbines operating 20 hours per day at minimum load and 4 hours per day at average load.

[c] The SIL for 1-hour NO_2 is based on SCAQMD correspondence.

N/A = not applicable (i.e., no standard)

Table 5.1-26 presents a summary of the predicted cumulative 1-hour NO_2 impacts from operation of the Amended HBEP and competing sources, as well as a comparison to the NAAQS. As shown, the predicted Amended HBEP cumulative impacts, including a representative background NO_2 concentration, are below the NAAQS. Therefore, operation of the Amended HBEP will not cause or contribute to a violation of the NAAQS. This conclusion is consistent with that of the Licensed HBEP.

TABLE 5.1-26

Amended HBEP and Competing Source Predicted 1-hour NO_2 Impacts Compared to the NAAQS

Pollutant	Averaging Time	Total Predicted Concentration, µg/m³[a]	NAAQS, µg/m³
NO_2	1-hour	146	188

[a] The total predicted concentration for the federal 1-hour NO_2 standard is the 5-year average, high-8th-high modeled concentration paired with 98th percentile seasonal hour-of-day background concentrations for 2010 through 2012.

Table 5.1-27 presents a summary of the predicted annual NO_2, 24-hour PM_{10}, and annual PM_{10} impacts and a comparison to the PSD Class I Increment Standards. The predicted impacts from operation of the Amended HBEP are below the SILs. Therefore, the Amended HBEP would have a negligible impact at the more distant Class I areas. This conclusion is consistent with that of the Licensed HBEP.

TABLE 5.1-27

Amended HBEP Predicted Impacts Compared to the Class I SIL and PSD Class I Increment Standards

Pollutant/Averaging Time	Maximum Modeled Concentration at 50 km, µg/m³	Significant Impact Level, µg/m³	PSD Class I Increment Standard, µg/m³
NO_2 (Annual)[a]	0.0062	0.1	2.5
PM_{10} (24-hour)	0.055	0.3	2.0
PM_{10} (Annual)	0.0067	0.2	1.0

[a] The annual NO_2 concentration includes an ambient NO_2 ratio of 0.75 (EPA, 2005).

Class II Visibility. A visibility analysis for Class II areas within 50 km of the Amended HBEP was performed using the VISCREEN plume modeling program per the procedures outlined in the *Workbook for Plume Visual Impact Screening and Analysis* (EPA, 1992), as described in Section 6.1.1, Rule 1303 and Rule 1304, of the Modeling Protocol (see Appendix 5.1F). Please note that Level I and Level II assessments were conducted using criterion for Class I areas, as no criteria exist for Class II areas. Therefore, the visibility assessment was conducted using overly conservative assumptions for Class II areas. However, even using the conservative approach, the modeled results from the visual assessment demonstrate that the Amended HBEP would not adversely affect visibility at nearby Class II areas.

Table 5.1-28 summarizes the VISCREEN Level I modeled results for each Class II area evaluated, with the exception of Huntington Beach State Park, which was evaluated separately and is described in the following subsection. As shown, the maximum modeled values for color difference and contrast are presented for inside the area analyzed, regardless of the VISCREEN modeled lines of sight for the observer.

TABLE 5.1-28
Amended HBEP Level I VISCREEN Results

Class II Area	Minimum Distance (km)	Maximum Distance (km)	Variable	Sky	Terrain	Criteria[a]
Crystal Cove State Park	12.5	18.4	Color Difference	**2.424**	**5.349**	2
			Contrast	0.03	0.029	0.05
Water Canyon National Park	33.6	42.9	Color Difference	1.076	1.637	2
			Contrast	0.013	0.014	0.05
Chino Hills State Park	35.8	41.6	Color Difference	0.882	1.506	2
			Contrast	0.011	0.013	0.05
San Mateo Canyon Wilderness Area	44.3	57.6	Color Difference	0.683	1.099	2
			Contrast	0.008	0.011	0.05

Bold values exceed the Class I significant impact criterion.

[a] Levels of concern for Class I areas were used because no specific requirements or criteria exist for assessing Class II visibility impacts (FLM, 2010).

As shown in Table 5.1-28, the Level I assessment results demonstrate that the Amended HBEP would be below the significance criterion for both color difference and contrast at Water Canyon National Park, Chino Hills State Park, and San Mateo Wilderness Area. The Level I assessment did, however, exceed the criterion for color difference at Crystal Cove State Park and, therefore, required a Level II assessment. The Level II assessment results are summarized in Table 5.1-29.

TABLE 5.1-29
Amended HBEP Level II VISCREEN Results

Class II Area	Minimum Distance (km)	Maximum Distance (km)	Wind Speed (m/s) [a]	Stability [a]	Variable	Sky	Terrain	Criteria [b]
Crystal Cove State Park	12.5	18.4	3	D	Color Difference	0.256	0.635	2
					Contrast	0.003	0.003	0.05

Bold values exceed the Class I significant impact criterion.

[a] The Joint Frequency Distribution table used to calculate the wind speed and stability for the Level II assessment is presented in Appendix 5.1C.

[b] Levels of concern for Class I areas were used because no specific requirements or criteria exist for assessing Class II visibility impacts (FLM, 2010).

Note:

m/s = meter(s) per second

As shown in Table 5.1-29, the Level II assessment results for Crystal Cove State Park are below the conservative Class I area criterion for both color difference and contrast; therefore, the Amended HBEP would not adversely affect visibility at nearby Class II areas. This conclusion is consistent with that of the Licensed HBEP. The VISCREEN input and output files, as well as the meteorological data used in this analysis, have been separately prepared and are included on the attached modeling compact disc.

Huntington Beach State Park. The Huntington Beach State Park (HB State Park) Class II area is a small swath of land which extends along the California Coast for 3.4 km, located directly west of the Amended HBEP. The HB State Park is bordered to the west by the Pacific Ocean and bordered to the east by California State Highway 1. On average, the width of the HB State Park is about 160 meters (m), with a range of widths between 130 m to 230 m. A plume blight analysis using VISCREEN would evaluate the change in background contrast and color affecting an observer looking through the center of a plume. The viewer's background *within* the limited area of interest can be defined as either an object (mountain side or building) or sky. A viewer standing on the border of the HB State Park looking across the beach or up the beach would not have any terrain or building to observe *within* the HB State Park. Therefore, the only feature *within* the HB State Park that would be observable is the sky. Areas outside of the HB State Park have not been identified and, therefore, were not evaluated.

The HB State Park is open between the hours of 6:00 am and 10:00 pm.[16] Therefore, the frequency of atmospheric stability class and winds blowing from the Amended HBEP across the HB State Park were determined for times when the HB State Park would be open. Table 5.1-30 provides a breakdown of the frequency of atmospheric stability class and winds blowing across the HB State Park toward the sectors of 120 degrees to 305 degrees from true north, based on the NWS John Wayne Airport meteorological data used throughout the air quality impacts analysis.

TABLE 5.1-30
Frequency and Stability of Winds Blowing from the Amended HBEP Toward Huntington Beach State Park Between 6 am and 10 pm

Stability	Count [a]	Average Wind Speed (m/s)	Frequency (%) [b]
F	868	1.6	2.0
E	720	2.0	1.6
D	1,081	3.3	2.5
C	554	2.5	1.3
B	316	1.8	0.7
A	14	1.8	0.0

[a] The count of hours is based on the 5-year AERMET meteorological dataset.

[b] The frequency is based on a total of 43,824 hours in the 5-year AERMET meteorological dataset.

Air dispersion modeling categorizes the effects of atmospheric turbulence and wind speed into six different atmospheric stability classes, A through F. Of these, A is the most unstable and F is the most stable. A plume is most likely to remain cohesive in E or F stability conditions and least likely to remain cohesive in A or B stability conditions; however, due to the close proximity of the Amended HBEP to the HB State Park, the A or B stability conditions may not have the distance or time to disperse the plume downwind of the Amended HBEP exhaust stacks. Hours associated with the E and F atmospheric stability classes would, by definition, never occur during daylight hours.[17] Therefore, none of the Table 5.1-30 values associated with E or F stability conditions would have an effect on visibility at the HB State Park as those conditions would not occur during the daytime hour assessment period.

A VISCREEN Class II visibility analysis of the remaining atmospheric stability classes (A through D) and corresponding wind speeds identified in Table 5.1-30 was conducted. The procedures outlined in the *Workbook for Plume Visual Impact Screening and Analysis* (EPA, 1992) were followed to conduct the

16 Please refer to http://www.parks.ca.gov/?page_id=643 for details.

17 D.B. Turner, *Workbook of Atmospheric Dispersion Estimates*, at page 6 (1969).

analysis. Based on the frequency of winds blowing across the HB State Park from the Amended HBEP and the modeled impacts, as presented in Table 5.1-31, an observer looking across the HB State Park would have the sky background Class I thresholds exceeded for either contrast or color difference during hours associated with stability classes A, B, C, and D. On average, this corresponds to 4.5 percent of the time or 395 hours[18] per year when the sky background would be obstructed compared to the extremely conservative Class I area thresholds.

TABLE 5.1-31
Amended HBEP VISCREEN Analysis Results for Huntington Beach State Park

Stability	VISCREEN Results (Contrast/Color Difference)[a]
D	0.098/7.377
C	0.076/5.753
B	0.18/10.052
A	0.138/7.8

[a] Class I criteria of |0.05| for contrast and 2.0 for color difference.

As noted above, this analysis is extremely conservative and only evaluates the Amended HBEP's plume impacts on color difference and contrast in comparison to the more restrictive, and not necessarily appropriate, Class I area thresholds. Additionally, the VISCREEN model only allows for one source or exhaust stack to be evaluated. Therefore, in order to assess all five Amended HBEP exhaust stacks, it was assumed that emissions from all five exhaust stacks are emitted from a single exhaust stack, which overestimates the Amended HBEP's visibility impacts. Additionally, this analysis conservatively used the annual average background visual range at the HB State Park, when visual impacts associated with inland emission sources or regional haze may have a greater negative impact on the background visual range than the Amended HBEP. Specifically, fires on the beach within the specified fire pits may have a greater negative impact on visibility at the HB State Park compared to the Amended HBEP. This analysis also conservatively does not discount present natural weather conditions, such as fog or rain, where the background would be naturally obscured and a plume from the Amended HBEP would not be perceptible.

Therefore, based on the limited and infrequent number of perceptibility impacts compared to the conservative Class I criteria identified using the VISCREEN model, the Amended HBEP would not cause an adverse impairment to perceptibility at the HB State Park. This conclusion is consistent with that of the Licensed HBEP. The VISCREEN input and output files, as well as the meteorological data used in this analysis, have been separately prepared and are included on the attached modeling compact disc.

Fumigation. As described in Section 6.5.4, Fumigation Impact Assessment, of the Modeling Protocol (see Appendix 5.1F), conditions causing fumigation are short-lived. Therefore, fumigation impacts were only compared to the 1-, 3-, 8-, and 24-hour standards that have a "shall not exceed" qualification for pollutants for which Orange County is designated as maintenance or attainment, as described in Section 5.1.3, Existing Air Quality. Table 5.1-32 presents a comparison of the potential Amended HBEP operational fumigation impacts to the state and federal ambient air quality standards. As indicated, the CO, NO_2, SO_2, and PM_{10} concentrations combined with the background concentrations do not exceed the CAAQS or NAAQS, as applicable. Therefore, fumigation impacts of CO, NO_2, SO_2, and PM_{10} would be less than significant. This conclusion is consistent with that of the Licensed HBEP.

[18] Cumulative frequency of stability classes A, B, C, and D multiplied by 8,760 hours per year.

TABLE 5.1-32
Amended HBEP Operation Impacts Analysis – Fumigation Impacts Analysis Results Compared to the Ambient Air Quality Standards

Pollutant	Averaging Time	SCREEN3 Fumigation Result, µg/m³	Background Concentration, µg/m³ [a]	Total Predicted Concentration, µg/m³	CAAQS, µg/m³	NAAQS, µg/m³
NO_2 [b]	1-hour (max)	172	142	314	339	—
SO_2	1-hour (max)	10.5	20.2	30.7	655	—
	3-hour	9.45	20.2	29.7	—	1,300
	24-hour	4.20	5.20	9.40	105	—
CO	1-hour	980	3,321	4,301	23,000	40,000
	8-hour	204	2,519	2,723	10,000	10,000
PM_{10}	24-hour	15.5	51.0	66.5	N/A	150

[a] Background concentrations were the highest concentrations monitored during 2011 through 2013.

[b] The 1-hour NO_2 concentration includes an ambient NO_2 ratio of 0.80 (EPA, 2011).

N/A = not applicable (i.e., area is designated nonattainment such that a comparison to the standard is not required)

Overlap Impacts Analysis. Based on the proposed schedule for demolition and construction, commissioning, and operation, two scenarios were selected for inclusion in the Amended HBEP overlap impacts analysis:

- Combined-cycle power block operation with simultaneous construction of the simple-cycle power block.
- Combined-cycle and simple-cycle power block operation with simultaneous demolition of Huntington Beach Generating Station Units 1 and 2.

Although other potential overlap scenarios were identified, they were either previously evaluated or were not considered to result in the worst possible air quality impacts. Specifically:

- Operation of the combined-cycle power block is expected to overlap with commissioning of the simple-cycle power block. However, those impacts were previously addressed in Section 5.1.5.2.2, Commissioning Impacts Analysis.
- Operation of the combined-cycle power block is also expected to overlap with demolition of Huntington Beach Generating Station Units 3 and 4. However, impacts associated with demolition of Huntington Beach Generating Station Units 3 and 4 are expected to be similar to those associated with demolition of Huntington Beach Generating Station Units 1 and 2. The latter was selected as an overlap scenario because it occurs simultaneously with operation of both power blocks, rather than just one.

Overlap Scenario 1. The first overlap scenario is intended to determine modeled impacts from the simultaneous operation of the combined-cycle power block and construction of the simple-cycle power block. To evaluate the air quality impacts from this scenario, the combined-cycle power block operating scenarios resulting in maximum predicted impacts were modeled with the simple-cycle power block construction emissions in Table 5.1-64 of Appendix 5.1A. The American Meteorological Society/EPA Regulatory Model (AERMOD) modeling setup for this scenario is presented in Figure 5.1C-7 of Appendix 5.1C.

Table 5.1-33 presents a comparison of the maximum modeled concentrations to the CAAQS and NAAQS. As indicated, the maximum predicted CO, NO_2, SO_2, and $PM_{2.5}$ modeled concentrations combined with the background concentrations will be below the ambient air quality standards for each averaging period. For PM_{10}, the annual and 24-hour background concentrations exceed or are more than 95 percent of the CAAQS without adding the modeled concentrations. As a result, the predicted impacts combined with the background concentrations would be greater than the CAAQS. However, as described in Section 5.1.7, Mitigation Measures, Amended HBEP emissions will be fully offset and/or reduced through implementation of fugitive dust control measures. Therefore, operation of the combined-cycle power block and construction of the simple-cycle power block will be less than significant with mitigation.

TABLE 5.1-33
Maximum Modeled Impacts from Combined-cycle Power Block Operation and Simple-cycle Power Block Construction

Pollutant	Averaging Time	Maximum Modeled Concentration, µg/m³	Background Concentration, µg/m³ [a]	Total Predicted Concentration, µg/m³	CAAQS, µg/m³	NAAQS, µg/m³
CO	1-hour	627	3,321	3,948	23,000	40,000
	8-hour	118	2,519	2,637	10,000	10,000
NO_2 [b]	1-hour (max)	93.8	142	236	339	—
	1-hour (98th percentile) [c]	—	—	126	—	188
	Annual	0.62	21.8	22.4	57	100
SO_2	1-hour (max)	5.68	20.2	25.9	655	—
	1-hour (99th percentile) [d]	4.80	8.80	13.6	—	196
	3-hour	4.94	20.2	25.1	—	1,300
	24-hour	1.66	5.20	6.86	105	—
PM_{10}	24-hour	9.33	51.0	60.3	50	150
	Annual	0.88	19.3	20.2	20	—
$PM_{2.5}$	24-hour (98th percentile) [e]	3.24	21.3	24.5	—	35
	Annual	0.59	8.60	9.19	12	12

[a] Background concentrations were the highest concentrations monitored during 2011 through 2013.
[b] The maximum 1-hour and annual NO_2 concentrations include ambient NO_2 ratios of 0.80 (EPA, 2011) and 0.75 (EPA, 2005), respectively.
[c] The total predicted concentration for the federal 1-hour NO_2 standard is the 5-year average, high-8th-high modeled concentration paired with 98th percentile seasonal hour-of-day background concentrations for 2010 through 2012.
[d] The total predicted concentration for the federal 1-hour SO_2 standard is the 5-year average, high-4th-high modeled concentration combined with the 3-year average, 99th percentile background concentration.
[e] The total predicted concentration for the federal 24-hour $PM_{2.5}$ standard is the 5-year average, high-8th-high modeled concentration combined with the 3-year average, 98th percentile background concentration.

Overlap Scenario 2. The second overlap scenario is intended to determine modeled impacts from the simultaneous operation of the combined-cycle and simple-cycle power blocks and demolition of existing Huntington Beach Generating Station Units 1 and 2. To evaluate the air quality impacts from this scenario, the combined-cycle and simple-cycle power block operating scenarios resulting in maximum predicted impacts were modeled with the Huntington Beach Generating Station Units 1 and 2 demolition emissions obtained from Table 5.1-64 of Appendix 5.1A. The AERMOD modeling setup for this scenario is presented in Figure 5.1C-8.

Table 5.1-34 presents a comparison of the maximum modeled concentrations to the CAAQS and NAAQS. As indicated, the maximum predicted CO, NO_2, SO_2, and $PM_{2.5}$ modeled concentrations combined with the background concentrations will be below the ambient air quality standards for each averaging period. For PM_{10}, the annual and 24-hour background concentrations exceed or equal more than 95 percent of the CAAQS without adding the modeled concentrations. As a result, the predicted impacts combined with the background concentrations would be greater than the CAAQS. However, as described in Section 5.1.7, Mitigation Measures, Amended HBEP emissions will be fully offset and/or reduced through implementation of fugitive dust control measures. Therefore, operation of the combined-cycle and simple-cycle power blocks and demolition of Huntington Beach Generating Station Units 1 and 2 will be less than significant with mitigation.

TABLE 5.1-34
Maximum Modeled Impacts from Amended HBEP Operation and Demolition of Units 1 and 2

Pollutant	Averaging Time	Maximum Modeled Concentration, µg/m³	Background Concentration, µg/m³ [a]	Total Predicted Concentration, µg/m³	CAAQS, µg/m³	NAAQS, µg/m³
CO	1-hour	630	3,321	3,951	23,000	40,000
	8-hour	121	2,519	2,640	10,000	10,000
NO_2 [b]	1-hour (max)	94.3	142	236	339	—
	1-hour (98th percentile) [c]	—	—	126	—	188
	Annual	0.70	21.8	22.5	57	100
SO_2	1-hour (max)	5.70	20.2	25.9	655	—
	1-hour (99th percentile) [d]	4.81	8.80	13.6	—	196
	3-hour	4.95	20.2	25.2	—	1,300
	24-hour	1.66	5.20	6.86	105	—
PM_{10}	24-hour	5.81	51.0	56.8	50	150
	Annual	1.00	19.3	20.3	20	—
$PM_{2.5}$	24-hour (98th percentile) [e]	3.18	21.3	24.5	—	35
	Annual	0.61	8.60	9.21	12	12

[a] Background concentrations were the highest concentrations monitored during 2011 through 2013.
[b] The maximum 1-hour and annual NO_2 concentrations include ambient NO_2 ratios of 0.80 (EPA, 2011) and 0.75 (EPA, 2005), respectively.
[c] The total predicted concentration for the federal 1-hour NO_2 standard is the 5-year average, high-8th-high modeled concentration paired with 98th percentile seasonal hour-of-day background concentrations for 2010 through 2012.
[d] The total predicted concentration for the federal 1-hour SO_2 standard is the 5-year average, high-4th-high modeled concentration combined with the 3-year average, 99th percentile background concentration.
[e] The total predicted concentration for the federal 24-hour $PM_{2.5}$ standard is the 5-year average, high-8th-high modeled concentration combined with the 3-year average, 98th percentile background concentration.

5.1.6 Cumulative Effects

On June 16, 2015, the Project Owner requested a list of projects that are within a 6-mile radius of the Amended HBEP and are either currently in the permitting process undergoing CEQA review, or recently received a Permit to Construct (PTC) from the SCAQMD. Once the source list is received, the sources will be provided to the CEC for review and comment on the appropriateness of excluding specific sources (sources with negligible emissions, administrative permit amendments with no increase in air emissions, and VOC sources) and a cumulative air quality impact analysis will be prepared using the methodology presented in Section 8, Cumulative Impacts Analysis, of the Modeling Protocol (see Appendix 5.1F) within 60 days of receipt of the necessary data from SCAQMD.

5.1.7 Mitigation Measures

5.1.7.1 Demolition and Construction Mitigation

SCAQMD Rule 403 requires the implementation of best mitigation practices to control fugitive dust.[19] Demolition and construction impacts will be further reduced with the implementation of a Construction Particulate Matter Mitigation Plan. This plan will focus on reducing demolition/construction air quality impacts and will include the following construction mitigation measures:

- Watering unpaved roads and disturbed areas
- Limiting onsite vehicle speeds to 10 miles per hour (mph) and posting the speed limit
- Frequent watering during periods of high winds when excavation/grading is occurring
- Sweeping onsite paved roads and entrance roads on an as-needed basis

[19] Best Available Control Measures means fugitive dust control actions that are set forth in Table 1 of Rule 403.

- Replacing ground cover in disturbed areas as soon as practical
- Covering truck loads when hauling material that could be entrained during transit
- Applying dust suppressants or covers to soil stockpiles and disturbed areas when inactive for more than 2 weeks
- Using ultra-low sulfur diesel fuel (15 parts per million [ppm] sulfur) in all diesel-fueled equipment
- Use of Tier 4 construction equipment where feasible
- Maintaining all diesel-fueled equipment per manufacturer's recommendations to reduce tailpipe emissions
- Limiting diesel heavy equipment idling to less than 5 minutes, to the extent practical
- Using electric motors for construction equipment to the extent feasible

Despite implementation of the above measures, predicted PM_{10} impacts during the entire demolition and construction period could potentially cause an exceedances of a health-based ambient air quality standard. Therefore, the Project Owner will also implement a program to reduce local PM_{10} during construction. COC AQ-SC6 requires this plan to be developed and implemented and includes sweeping roadways in the vicinity of the Amended HBEP as one possible mitigation measure. Using this mitigation measure, the number of miles of sweeping required to reduce the Amended HBEP's construction/demolition PM_{10} impacts to less-than-significant levels was calculated based on the emissions reduction needed, the control efficiency achieved by sweeping frequency, fugitive dust emission factors for paved roads (see Appendix 5.1A), and an assumed annual average daily vehicle volume. For purposes of this analysis, the annual average daily vehicle volume was taken from the *Draft Existing Circulation Conditions Technical Report Traffic Study* (Stantec, 2014).

The PM_{10} emissions reduction needed was based on the estimated maximum annual emission rate resulting in an annual modeled impact that, when combined with a background concentration of 19.3 $\mu g/m^3$, would be less than the ambient air quality standard. Based on the modeling results presented in Table 5.1-20, this would require a reduction of approximately 77 percent in fugitive dust emissions during the worst-case year of construction.

Based on results presented in Table 5.1-35, the Project Owner proposes to generate actual emissions reductions using the methodology contained in the Licensed HBEP COC AQ-SC6. In order to demonstrate potential reductions, an assessment of street sweeping was performed, which determined that sweeping 0.81 mile of local roadways once per month for the duration of the construction period could achieve the necessary PM_{10} emissions reductions to assure the modeled annual PM_{10} impacts, combined with background concentrations, are below the applicable ambient air quality standards, thereby reducing construction-related fugitive dust impacts to less than significant. The detailed street sweeper emissions calculations are presented in Appendix 5.1C and include an estimate of the number of miles of sweeping required for the annual construction emissions associated with each of the overlap scenarios.

TABLE 5.1-35
Estimate of Street Sweeping Miles

Pollutant	Emissions Reduction Needed (tons/year)	Street Sweeping Once per Month	
		Control Efficiency[a]	**Miles to Sweep**
PM_{10}	0.33	9%	0.81

[a] Control efficiency was taken from Table XI-C of the SCAQMD's *CEQA Air Quality Handbook* for street sweeping local, arterial, and collector streets (SCAQMD, 2007).

5.1.7.2 Commissioning Mitigation

Because commissioning of the combined-cycle power block and simple-cycle power block would not occur within the same year, it is assumed that the maximum predicted impacts for simultaneous commissioning of the simple-cycle power block combined with operation of the combined-cycle power block (see Table 5.1-22) would be greater than the maximum predicted impacts from commissioning of the combined-cycle power block alone (see Table 5.1-21). As shown in Tables 5.1-22, the maximum predicted commissioning impacts will not cause new exceedances of any state or federal ambient air quality standard. Therefore, mitigation specific to the commissioning periods is not required.

5.1.7.3 Operational Mitigation

The Amended HBEP includes a combination of BACT and emission reduction credits to mitigate air quality impacts, as described below. Additionally, all of the Amended HBEP's combustion units (GE 7FA.05s, GE LMS-100PBs, and auxiliary boiler) will meet the CEC's recommended ammonia slip limit of 5 parts per million by volume, dry (ppmvd) at 15 percent oxygen.

Emission Controls. The Amended HBEP proposes the use of dry, low NO_X combustors with selective catalytic reduction to control NO_X emissions to 2.0 ppmvd (1-hour average). The BACT for CO emissions is best combustion design and the installation of an oxidation catalyst system to reduce CO to 2.0 ppmvd (1-hour). The BACT for VOC emissions is best combustion design and the installation of an oxidation catalyst system to control VOC emissions to 2.0 ppmvd (1-hour). Best combustion practice, use of pipeline-quality natural gas, and use of inlet air filtration limit PM_{10}/$PM_{2.5}$ emissions to 9.0 pound(s) per hour (lb/hr). Operating exclusively on low-sulfur pipeline-quality natural gas with a fuel sulfur content of no more than 0.75 grain per 100 standard cubic feet limits SO_2 emissions. The top-down BACT assessment for criteria pollutants is included in Appendix 5.1D.

Appendix 5.1D also includes a top-down GHG BACT analysis. Based on this analysis, the Amended HBEP proposes "Thermal Efficiency" as BACT. The GHG BACT calculation for the Amended HBEP was determined in pound(s) of CO_2e per megawatt-hour (lb CO_2e/MWh) of energy output (on a gross basis) and includes the inherent degradation in turbine performance over the lifetime of the Amended HBEP. The Amended HBEP has concluded that the BACT for GHG emissions is an emission rate of 709 lb CO_2/MWh of net energy output (including startups and shutdowns) for the combined-cycle power block, 1,075 lb CO_2/MWh of net energy output (including startups and shutdowns) for the simple-cycle units, and a facility-wide annual CO_2e emission limit of 1,747,624 metric tons per year (MT/yr).[20] Degradation over time and turndowns, startup, and shutdown are incorporated into these limits.

Emission Offsets. Per the CEC's Final Decision, SCAQMD Rule 1303(b)(2) requires that all increases in emissions be offset unless exempt from offset requirements pursuant to SCAQMD Rule 1304, as described below.

SCAQMD Rule 1304(a)(2), Electric Utility Steam Boiler Replacement, states that if electric utility boilers are replaced by advanced gas turbines, including combined-cycle and simple-cycle configurations[21], the project would be exempt from emission offset requirements unless there is a Basin-wide electricity generation capacity increase on a per-utility basis. If there is an increase in Basin-wide capacity, only the increased capacity must be offset via traditional offset rules and regulations. SCAQMD Rule 1135 defines advanced combustion sources as those which emit NO_X at no greater than 0.10 pound(s) per net megawatt-hour (lb/net MWh) on a daily average basis, excluding commissioning, startup, and shutdown periods, if the source is located within the South Coast Air Basin. The GE 7FA.05s are combined-cycle gas turbines and

[20] CO_2e emission limit includes approximately 13 MT/yr from operation of two generator circuit breakers, five 230-kV transmission breakers, and three 18-kV transmission breakers (see Appendix 5.1B for calculation details).

[21] The source is replacement of electric utility steam boiler(s) with combined-cycle gas turbine(s); intercooled, chemically recuperated gas turbines; other advanced gas turbine(s); solar, geothermal, or wind energy; or other equipment, to the extent that such equipment will allow compliance with Rule 1135 or Regulation XX rules.

comply with this rule. Similarly, the GE LMS-100PBs are simple-cycle gas turbines and comply with this rule. The auxiliary boiler, however, is not eligible for exemption, as described in more detail below.

In order to qualify for the exemption, the Project Owner proposes to shut down 2 boilers in conjunction with the construction of the Amended HBEP. The 2 boilers include boiler 1 (215 MW) at the Huntington Beach Generating Station and boiler 7 (480 MW) at AES' Redondo Beach Generating Station. The total capacity of the boilers being shutdown is 695 MWs. Therefore, the net MWs would decrease and the new power generating system would qualify for the Rule 1304(a)(2) exemption. Thus, the Amended HBEP does not have to provide emission reduction credits for VOC and PM_{10} emissions from the new gas turbines. Instead, the VOC and PM_{10} emissions from the new gas turbines would be fully offset from SCAQMD's internal bank.

SCAQMD Rule 1304.1, Electrical Generating Fee for Use of Offset Exemption, requires electrical generating facilities which use the specific offset exemption described in Rule 1304(a)(2), Electric Utility Steam Boiler Replacement, to pay fees for up to the full amount of offsets provided by the SCAQMD in accordance with Rule 1304. The Amended HBEP would be required to demonstrate compliance with the specific requirements of this rule prior to issuance of the PTC. However, the timing and location(s) of the air quality projects funded through SCAQMD Rule 1304.1 fees cannot be determined at this time and would be considered mitigation above and beyond that required to demonstrate compliance with state and federal air quality and environmental quality rules and the California Health and Safety Code.

As noted above, the auxiliary boiler is not eligible for offsets exemption under SCAQMD Rule 1304(a)(2). Therefore, the Project Owner will provide sufficient VOC and PM_{10} emission reduction credits to offset the auxiliary boiler's emissions at a 1.2-to-1 ratio, consistent with SCAQMD Rule 1303(b)(2). The average daily emissions, calculated as the monthly emissions divided by 30, are presented in Appendix 5.1B, Table 5.1B.11.

Under SCAQMD Rule 2005, the Amended HBEP would be subject to the RECLAIM program for NO_X emissions. The facility would be required to demonstrate that it holds sufficient RTCs to offset the annual NO_X emission increase for the first compliance period using a 1-to-1 offset ratio. Additionally, since the NO_X PTE after the commissioning year is greater than the existing Huntington Beach Generating Station's initial allocation, the Amended HBEP would be required to hold NO_X RTCs for each subsequent year. The Amended HBEP would also be subject to the sulfur oxides (SO_X) RECLAIM program. Therefore, SO_X RTCs would be required to be held to cover the first year of operation. Additionally, because the existing Huntington Beach Generating Station opted into SO_X RECLAIM after 1994, there is no initial allocation. For this reason, SO_X RTCs would be required to be held for each compliance year after the first year of operation.

SCAQMD Rule 1325 requires a major $PM_{2.5}$ facility to offset $PM_{2.5}$ emissions at a 1.1-to-1 offset ratio. A major polluting facility is defined in the rule as a facility which has actual emissions or a PTE greater than 100 tons per year. The Amended HBEP is not a major $PM_{2.5}$ facility because the total $PM_{2.5}$ PTE of the facility would be 68.6 tons per year, which is less than the 100 tons per year threshold. Therefore, no $PM_{2.5}$ offsets are required for the Amended HBEP.

Because the facility area is designated as attainment for CO, the SCAQMD New Source Review regulations do not require emission reduction credits for this pollutant.

The CEC found that NO_X and SO_X RTCs are an appropriate method to mitigate NO_X and SO_X emissions due to the extensive monitoring and reporting requirements for the RECLAIM program. Accordingly, SCAQMD would provide emission offsets for the Amended HBEP from its internal bank that would meet or exceed a 1-to-1 offset ratio for all ozone and particulate matter precursors.

5.1.8 Consistency with Laws, Ordinances, Regulations, and Standards

The Final Decision found the project to be in compliance with all applicable LORS. No applicable air quality LORS have been modified since the licensing of HBEP. The Amendment will not alter the assumptions or conclusions made in the Final Decision. The Amended HBEP is consistent with all applicable air quality-related LORS.

5.1.9 Permits and Permit Schedule

A PTC application has been submitted to the SCAQMD as part of the CEC PTA process. The PTC included permitting forms for the Title IV and Title V permitting programs (see Appendix 5.1E). The SCAQMD is responsible for issuing the required construction permits related to air quality. Consistent with the CEC siting regulations, SCAQMD must issue a preliminary determination of compliance within 180 days after issuing the application completeness determination letter. If all requirements of the SCAQMD rules are met, SCAQMD will issue a determination of compliance to the CEC within 240 days after the acceptance of the application as complete. Upon approval of the Amended HBEP by the CEC, a determination of compliance serves as the SCAQMD PTC. A permit to operate will be issued by SCAQMD after construction and prior to commencement of operation. A separate PTC, Title IV, and Title V are issued by the SCAQMD at the time of final Commission Decision.

5.1.10 Conditions of Certification

As noted above, the SCAQMD will issue a revised Determination of Compliance for the Amended HBEP, which will likely result in modifications to some or all of COCs AQ-1 through AQ-43. Therefore, the Project Owner is not proposing changes to these COCs. However, based on the proposed construction and demolition mitigation presented above, a proposed modification of COC AQ-SC6 is presented below to align the COC's mitigation requirements with the Amended HBEP's predicted construction and demolition impacts.

AQ-SC6 Construction Particulate Matter Mitigation Plan

The project owner shall prepare and implement a Construction Particulate Matter Mitigation Plan (CPMMP) that details the steps to be taken and the reporting requirements necessary to provide the equivalent of at least ~~8.26~~**2.52** lbs/day PM10 **(or 54.57 lbs/month)** ~~and 0.79 lbs/day PM2.5~~ of emissions reductions during the construction phase of the project. Construction emission reduction measures can include: localized street sweepers or programs; local ban of leaf blowing or blowers; sodding of local parks or playfields; fireplace or woodstove replacements; offsets or emission reduction credits; or other measures that can provide local emission reductions coincident with construction emissions.

VERIFICATION: At least 90 days prior to the start of any ground disturbance, the project owner shall submit the CPMMP to the CPM for review and approval. The CPM will notify the project owner of any necessary modifications to the plan within 30 days from the date of receipt. The CPMMP must be approved by the CPM before the start of ground disturbance. During construction the project owner shall provide the records of the CPMMP in the Monthly Compliance Report.

5.1.11 References

In addition to the references listed below, the references cited or consulted in the AFC and included in the Final Decision are applicable to the Amended HBEP.

California Air Pollution Control Officer's Association (CAPCOA). 2011. *Modeling Compliance of the 1-Hour NO_2 NAAQS*. October 27.

California Air Resources Board (ARB). 2013a. *Ambient Air Quality Standards*. June 4.

California Air Resources Board (ARB). 2013b. *State Area Designations*. June.

California Air Resources Board (ARB). 2015. *iADAM: Air Quality Data Statistics*. Website Accessed March 2015.

California Energy Commission (CEC). 2014. *Huntington Beach Energy Project Final Decision*. CEC-800-2014-001-CMF. Docket Number 12-AFC-02.

Federal Land Managers (FLM). 2010. *Federal Land Managers' Air Quality Related Values Workgroup (FLAG) Phase I Report – Revised (2010)*. October.

South Coast Air Quality Management District (SCAQMD). 2007. *CEQA Air Quality Handbook, Table XI-A Mitigation Measure Examples: Fugitive Dust from Construction & Demolition*. April.

South Coast Air Quality Management District (SCAQMD). 2015a. *Historical Data by Year*. Website Accessed March 2015.

South Coast Air Quality Management District (SCAQMD). 2015b. *SCAQMD Air Quality Significance Thresholds*. March.

Stantec. 2014. *Draft Existing Circulation Conditions Technical Report Traffic Study*. December 19.

The Climate Registry. 2015. *General Reporting Protocol*. April.

U.S. Environmental Protection Agency (EPA). 1992. *Workbook for Plume Visual Impact Screening and Analysis* (EPA-454/R-92-023). October.

U.S. Environmental Protection Agency (EPA). 2005. *Guideline on Air Quality Models*. 40 Code of Federal Regulations 51, Appendix W. November.

U.S. Environmental Protection Agency (EPA). 2011. *Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-Hour NO_2 National Ambient Air Quality Standard*. EPA Office of Air Quality Planning and Standards. March 1.

U.S. Environmental Protection Agency (EPA). 2015a. *AirData: Monitor Values Report*. Website Accessed March 2015.

U.S. Environmental Protection Agency (EPA). 2015b. *The Green Book Nonattainment Areas for Criteria Pollutants*. Website Accessed August 2015.

5.2 Biological Resources

This section describes the biological resources at and near the Amended HBEP site, and the potential effects the project may have on these resources. The Amended HBEP will not create any new biological resources-related impacts that were not previously analyzed during the Licensed HBEP AFC proceedings. The Amended HBEP is consistent with the Licensed HBEP, will comply with the approved COCs in the Final Decision, and will comply with all applicable LORS.

5.2.1 Amendment Overview

As discussed in detail in Section 2.0 (Project Description) of this PTA, while similar in nature to the Licensed HBEP, the Amended HBEP differs from the Licensed HBEP in key ways. The Amended HBEP is a natural-gas-fired, combined-cycle and simple-cycle, air-cooled electrical generating facility located on the site of the existing Huntington Beach Generating Station in Huntington Beach, California. The combined-cycle power block will include GE Frame 7FA.05 combined-cycle gas turbines, a steam turbine generator, an air-cooled condenser, a natural-gas-fired auxiliary boiler, and related ancillary equipment. The simple-cycle power block will include two GE LMS-100 simple-cycle units.

The Amended HBEP will be constructed on 30 acres entirely within the site of the existing Huntington Beach Generating Station. As with the Licensed HBEP, the Amended HBEP will reuse existing onsite potable water, natural gas, stormwater, process wastewater, and sanitary pipelines and electrical transmission facilities. No offsite linear developments were required for the Licensed HBEP and no offsite linear developments are required for the Amended HBEP.

Both power blocks will interconnect to the existing onsite SCE 230-kV switchyard.

As with the Licensed HBEP, construction of the Amended HBEP will require the removal of the existing Huntington Beach Generating Station Unit 5 and Units 3 and 4. Demolition of Unit 5, scheduled to occur in 2016, will provide the space for the construction of HBEP Block 1. Construction of Block 1 is expected to take approximately 36 months (including commissioning), with construction scheduled to occur from the first quarter of 2017 through the second quarter of 2020.

As with the Licensed HBEP, demolition of existing Huntington Beach Generating Station Units 3 and 4 is not part of the Amended HBEP project description, but is required in advance of the construction of the Amended HBEP simple-cycle power block.

In addition to the construction of the new generating units, upon the commercial operation of Amended HBEP simple-cycle power block, existing Huntington Beach Generating Station Units 1 and 2 will be decommissioned and demolished to their turbine deck. See Section 2.0 (Project Description) for a description of the decommissioning and demolition of existing Huntington Beach Generating Station Units 1 and 2.

5.2.2 Changes to the Affected Environment

The affected environment remains the same as the Licensed HBEP. A 1.4-acre triangle-shaped paved parking lot between the SCE substation and the boundary of the Licensed HBEP has been acquired by the Project Owner and is included in the analysis of the Amended HBEP. In addition, construction of the Amended HBEP may require the use of an additional 20 acres beyond the 1.9 acres identified in the Final Decision at the former Plains All American Tank Farm site located adjacent to the HBEP site for construction laydown and construction worker parking (see Figure 5.12-4). Thus, the analysis herein includes 22 acres of the former Plains All American Tank Farm site for construction laydown and construction worker parking.

Access to the construction laydown/construction parking area will occur via Pacific Coast Highway to Magnolia Boulevard. Access from the construction laydown area to HBEP for equipment and materials will occur via Magnolia Boulevard to Pacific Coast Highway, right on Pacific Coast Highway to Newland Street, and right on Newland Street to the HBEP entrance. As included in the Licensed HBEP, large components of the Amended HBEP power blocks that arrive at the Port of Long Beach/Port of Los Angeles may be stored in a construction storage area at AES's Alamitos Generating Station until they can be transported and installed at the Amended HBEP site.

Construction workers parking at the former Plains All American Tank Farm will walk to the HBEP site via an existing bridge over the Huntington Beach Channel and walking path. The bridge and walking path will be fenced with temporary construction fencing for safety and to avoid impacts to the adjacent wetlands. Construction equipment will be moved from the Plains site to the Amended HBEP site via Magnolia Avenue, the Pacific Coast Highway, and Newland Street. Limited construction worker parking also is available on the Amended HBEP site.

A site visit of the Plains All American Tank Farm was conducted on July 10, 2015, and the associated survey report and site photographs are provided in Appendix 5.2A. The Plains All American Tank Farm is located east of the HBEP site. The majority of the internal Plains All American Tank Farm is devoid of vegetation. Vegetation is located on the northern, eastern, and southern fence line and consists primarily of landscape vegetation and non-native plant species. Several mature trees, such as eucalyptus (*Eucalyptus* ssp.) and pine (*Pinus* ssp.), surround the external fence line. The majority of the onsite perimeter vegetation will be left in place, excluding the onsite vegetation that will need to be removed for the new entrance at the intersection of Magnolia and Banning. The entire parcel adjacent to Magnolia is Plains All American Tank Farm property and does not include any public property. Wildlife species observed during the site visit included American crow (*Corvus brachyrhynchos*), Anna's hummingbird (*Calypte anna*), barn swallow (*Hirundo rustica*), black phoebe (*Sayornis nigricans*), bushtit (*Psaltriparus minimus*), California ground squirrel (*Otospermophilus beecheyi*), Cassin's kingbird (*Tyrannus vociferans*), common side-blotched lizard (*Uta stansburiana*), house finch (*Haemorhous mexicanus*), house sparrow (*Passer domesticus*), lesser goldfinch (*Spinus psaltria*), turkey vulture (*Cathartes aura*), and western gull (*Larus occidentalis*).

The additional survey did not identify any biological resources within the Plains All American Tank Farm. A paved parking lot, adjacent to the SCE substation, has been acquired by the Project Owner; however, this small triangle-shaped parcel is completely devoid of vegetation. These modifications will not result in any new or potential impacts to biological resources beyond those previously identified and addressed in the Final Decision. As stated above, the Amended HBEP is consistent with the Licensed HBEP, will meet the approved COCs in the Final Decision, and will comply with all applicable LORS.

5.2.2.1 Significant Regional Wetlands and Other Protected Areas

Several important ecological reserves, wetland preservation sites, and designated open spaces occur in the regional vicinity. These protected areas represent some of the best remaining habitat in the region and provide important habitat for migratory birds along the pacific flyway as well as habitat for several special-status plants and animals. Figures 5.2-1a and 5.2-1b show the locations of these protected areas in relation to the Amended HBEP and the offsite construction storage area. Figures 5.2-2a and 5.2-2b include data from the United States Fish and Wildlife Service's (USFWS) National Wetland Inventory (NWI) (USFWS, 2015c). There were some changes in the mapped NWI for the HBEP site, which include the following: the four fuel oil tank containment basins have been mapped as a palustrine system that has an unconsolidated bottom that is semi-permanently flooded and has been excavated (PUBFx); a portion of the southern-most containment basin is also mapped as a palustrine system that has an unconsolidated shore that is semi-permanently flooded and has been excavated (PUSCx); the Upper Magnolia Marsh is designated as a palustrine system with an unconsolidated shore, emergent hydrophytic vegetation that is temporarily flooded and contains a manmade barrier or dam (PUS/EMAh); and a portion of the Huntington flood control channel is mapped as ma riverine system with tidal influence, an unconsolidated bottom, and has been excavated (R1UBVx) (USFWS, 2015c). Although the fuel oil tank containment basins have been mapped in the NWI, these manmade features are not actual wetlands. A wetland delineation was completed for the HBEP. No changes were identified within the site boundary for the construction storage area at AES's Alamitos Generating Station (Figure 5.2-2b). No additional significant regional wetlands and protected areas have been identified within 10 miles of the Amended HBEP. No additional impacts to significant regional wetlands and protected areas are anticipated from the Amended HBEP.

5.2.2.2 Significant Natural Communities and Critical Habitat

Sensitive habitats within 10 miles of the Amended HBEP site encompass significant natural communities identified by the California Department of Fish and Wildlife (CDFW) California Natural Diversity Database (CNDDB), including southern coastal salt marsh, southern foredunes, southern cottonwood willow riparian forest, and southern coast live oak riparian forest (CDFW, 2015a). For the construction storage area, sensitive habitats within 10 miles include southern coastal marsh, southern dune scrub and southern foredunes (CDFW, 2015a). Critical habitat for the coastal California gnatcatcher and the San Diego fairy shrimp is also present in the regional vicinity of the Amended HBEP site (USFWS, 2015a). The only designated critical habitat within 10 miles of the construction storage area is for western snowy plover (USFWS, 2015a). Sensitive habitat types and critical habitat areas within 10 miles of the project site and the offsite laydown area are shown in (Figures 5.2-3a and 5.2-3b). No additional impacts to significant natural communities and critical habitat are anticipated from the Amended HBEP.

5.2.2.3 Regional Sensitive or Special-status Species

Special-status species are defined as species listed as threatened or endangered that have special requirements under the federal Endangered Species Act (USFWS, 1970) and the California Endangered Species Act (Fish and Game Code, Sections 2050 et seq), California Native Plant Society (CNPS) List 1-4 species, CDFW Species of Special Concern, CDFW Fully Protected Species, other CDFW Special Animals, and bird species protected under the Migratory Bird Treaty Act and Fish and Game Code 3503 and 3503.5. The known locations of special-status species identified in the CNDDB records within a 10-mile range of the Amended HBEP site are shown in Figure 5.2-4a and within 10 miles of the offsite laydown area are displayed in Figure 5.2-4b. In addition, special-status species that occur within one mile of the Amended HBEP site and offsite laydown area are provided in Figures 5.2-4c and 5.2-4d.

Plants were considered to be sensitive or special-status if one or more of the following criteria were met:

- Federally or state-listed, proposed, or candidate for listing, as rare, threatened or endangered (USFWS, 2015b; CDFW, 2015b)
- State Special Plant as defined by the CNDDB (CDFW, 2015b)
- Designated by the CNPS in its Inventory of Rare and Endangered Plants of California (CNPS, 2015)

Animals were considered to be sensitive or special-status if one or more of the following criteria were met:

- Federally- or state-listed, proposed, or candidate for listing as threatened or endangered (USFWS, 2015b; CDFW, 2015c)
- California State Species of Concern as defined by the CNDDB (CDFW, 2015a)
- California State Fully Protected Species (CDFW, 2015d)
- State Special Animal as defined by the CNDDB (CDFW, 2015d)

Four special-status plant species that were not previously included in the Licensed HBEP were identified during an updated CNDDB search; no additional special-status wildlife species were identified. The species, status designations, potential for occurrence, and habitat requirements are provided in Table 5.2-1. No additional impacts to special-status plant and wildlife species are anticipated from the Amended HBEP.

TABLE 5.2-1
Special-Status Plant Species within 10 Miles of the Amended HBEP

Species	Status (Federal/ State/CNPS)	Habitat Requirements	Occurrence Potential
Brand's star phacelia *Phacelia stellaris*	**--/---/1B.1**	Occurs in coastal scrub and coastal dune habitats. An historical record (1932) for this species was documented in Bryant Ranch in the vicinity of Long Beach.	**Possibly Extirpated to Not Expected.** Suitable habitat is not present within the project site.
Decumbent goldenbush *Isocoma menziesii* var. *decumbens*	**--/---/1B.2**	Occurs in sandy soils within coastal scrub and chaparral habitats. An historical record (1945) for this species was documented in the vicinity of Corona Del Mar.	**Not Expected.** Suitable habitat is not present within the project site.
Robinson's pepper-grass *Lepidium virginicum* var. *robinsonii*	**---/---/4.3**	Occurs in dry soils within coastal scrub and chaparral habitats. This species was documented in 2003 within the University of California, Irvine (UCI) Open Space Preserve.	**Not Expected.** Suitable habitat is not present within the project site.
San Diego button-celery *Eryngium aristulatum* var. *parishii*	**FE/SE/1B.1**	Occurs in vernal pools, coastal scrub, valley, and foothill grassland habitats. This species was documented in 2011 within Fairview Park, Costa Mesa.	**Not Expected.** Suitable habitat is not present within the project site.

Source: California Department of Fish and Wildlife (CDFW). 2015a. California Diversity Database (CNDDB), search within 10 miles of the Amended HBEP. August.

Status Designations

Federal:

(FE) Federally Endangered, (FT) Federally Threatened, (FPE) Federally Proposed Endangered, (FPT) Federally Proposed Threatened, (FSC) Species of Concern, (FC) Candidate

State:

(SE) State Endangered, (ST) State Threatened, (SR) State Rare, (CSC) Species of Special Concern, (CFP) Fully Protected Species

California Native Plant Society (CNPS):

(1A) Presumed extinct in California; (1B) Rare, threatened, or endangered in California and elsewhere; (2) Rare, threatened, or endangered in California, but more common elsewhere; (3) More information is needed; (4) Limited distribution; (.1) Seriously endangered in California; (.2) Fairly endangered in California; (.3) Not very endangered in California.

5.2.2.4 Land Cover Types and Vegetation Communities

Land cover types and vegetation communities identified within a 1-mile radius of the Amended HBEP site and offsite laydown area are shown in Figure series 5.2-5a (1 through 7) and 5.2-5b (1 through 6). Urban development collectively represents the largest land use in the survey area. Other land cover and natural vegetation communities identified include industrial, landfill, parks and open space, and coastal salt marsh wetland preserves. The Pacific Ocean is approximately 1,000 feet to the southwest of the HBEP site and 1.5 miles southwest of the offsite laydown area.

5.2.3 Environmental Analysis

Potential direct and indirect impacts to biological resources were evaluated to determine the permanent and temporary effects of Amended HBEP construction and operation. Results from the field surveys, habitat evaluations, literature review, and aerial imagery conclude the potential presence of sensitive biological resources in the immediate vicinity of the Amended HBEP area and offsite laydown area. However, there is no suitable habitat for special-status species within the project area or offsite laydown area since both sites occur in pre-existing and currently operating industrial facilities.

No natural vegetation or habitat is present on the Amended HBEP site or any of the onsite or offsite construction laydown and parking areas. There are no project features that would support special-status plants and the project site does not provide suitable habitat for any special-status wildlife species. Potential minor and less-than-significant impacts are expected due to temporary noise disturbance during demolition and construction activities associated with Amended HBEP.

5.2.3.1 Potential Impacts of Construction and Demolition

Construction- and demolition-related activities for the Amended HBEP will not result in any new impacts to biological resources beyond those previously identified and addressed in the Final Decision. The Amended HBEP is consistent with the Licensed HBEP, will meet the approved COCs in the Final Decision, and will comply with all applicable LORS.

5.2.3.2 Potential Impact of Operation

Operation of the Amended HBEP will not result in any new impacts to biological resources beyond those previously identified and addressed in the Final Decision. The Amended HBEP is predominantly located on the same portion of the larger Huntington Beach Generating Station as the Licensed HBEP, will generate less electricity and air emissions, and will be located more than 100 feet from the adjacent Environmental Sensitive Habitat Area. The Amended HBEP is consistent with the Licensed HBEP, will meet the approved COCs in the Final Decision, and will comply with all applicable LORS.

5.2.4 Cumulative Effects

Extensive urban development has occurred throughout the region and the majority of natural habitats have been developed. The Amended HBEP will not contribute to any additional habitat loss because construction, operation, and demolition will occur within the pre-existing Huntington Beach Generating Station site. In addition, the Amended HBEP will have a positive effect on the environment because the new facility will eliminate the use of ocean water and will produce less emissions and noise than the existing Huntington Beach Generating Station.

The demolition of Huntington Beach Generating Station Units 3 and 4 are licensed by the CEC (00-AFC-13C) and demolition impacts will be mitigated to less than significant levels through the implementation of the Conditions of Certification under that proceeding. Furthermore, Units 3 and 4 demolition impacts are temporary and finite. The Amended HBEP construction-related impacts are expected to include increased noise and light levels, but are also anticipated to be temporary. Once the Amended HBEP is fully-operational, emissions are expected to decrease; therefore, creating a positive impact with project implementation. Unit 3 and 4 demolition combined with HBEP construction and operation is not expected to cause significant, unmitigated impacts to biological resources. As stated previously, there would be no loss of natural habitat and no direct impacts to wetlands or waters of the United States/waters of the State. Any potential impacts to special-status species will be reduced to less than significant less by implementing appropriate mitigation measures, such as shielding lighting during demolition and construction-related activities. Therefore, the Amended HBEP is not expected to result in any adverse cumulative impacts to biological resources.

5.2.5 Consistency with Laws, Ordinances, Regulations, and Standards

The Final Decision found the project to be in compliance with all applicable LORS. No applicable biological resources LORS have been modified since the licensing of HBEP. The Amendment will not alter the assumptions or conclusions made in the Final Decision. The Amended HBEP is consistent with all applicable biological resources-related LORS.

5.2.6 Conditions of Certification

No changes to previously identified biological resources impacts will result from the approval of this Petition. Therefore, no additional biological resources Conditions of Certification beyond those identified in the HBEP Final Decision are necessary.

5.2.7 References

In addition to the references listed below, the references cited or consulted in the AFC and included in the Final Decision are applicable to the Amended HBEP.

California Department of Fish and Wildlife (CDFW). 2015a. California Diversity Database (CNDDB). Search within 10 miles of the Amended HBEP. August.

California Department of Fish and Wildlife (CDFW). 2015b. Natural Diversity Database. *Special Vascular Plants, Bryophytes, and Lichens List*. Quarterly publication. 125 pp. July.

California Department of Fish and Wildlife (CDFW). 2015c. State and federally listed endangered and threatened animals of California. July.

California Department of Fish and Wildlife (CDFW). 2015d. Natural Diversity Database. *Special Animals List*. Periodic publication. 51pp. July.

California Energy Commission (CEC). 2014. *Huntington Beach Energy Project Final Decision*. CEC-800-2014-001-CMF. Docket Number 12-AFC-02.

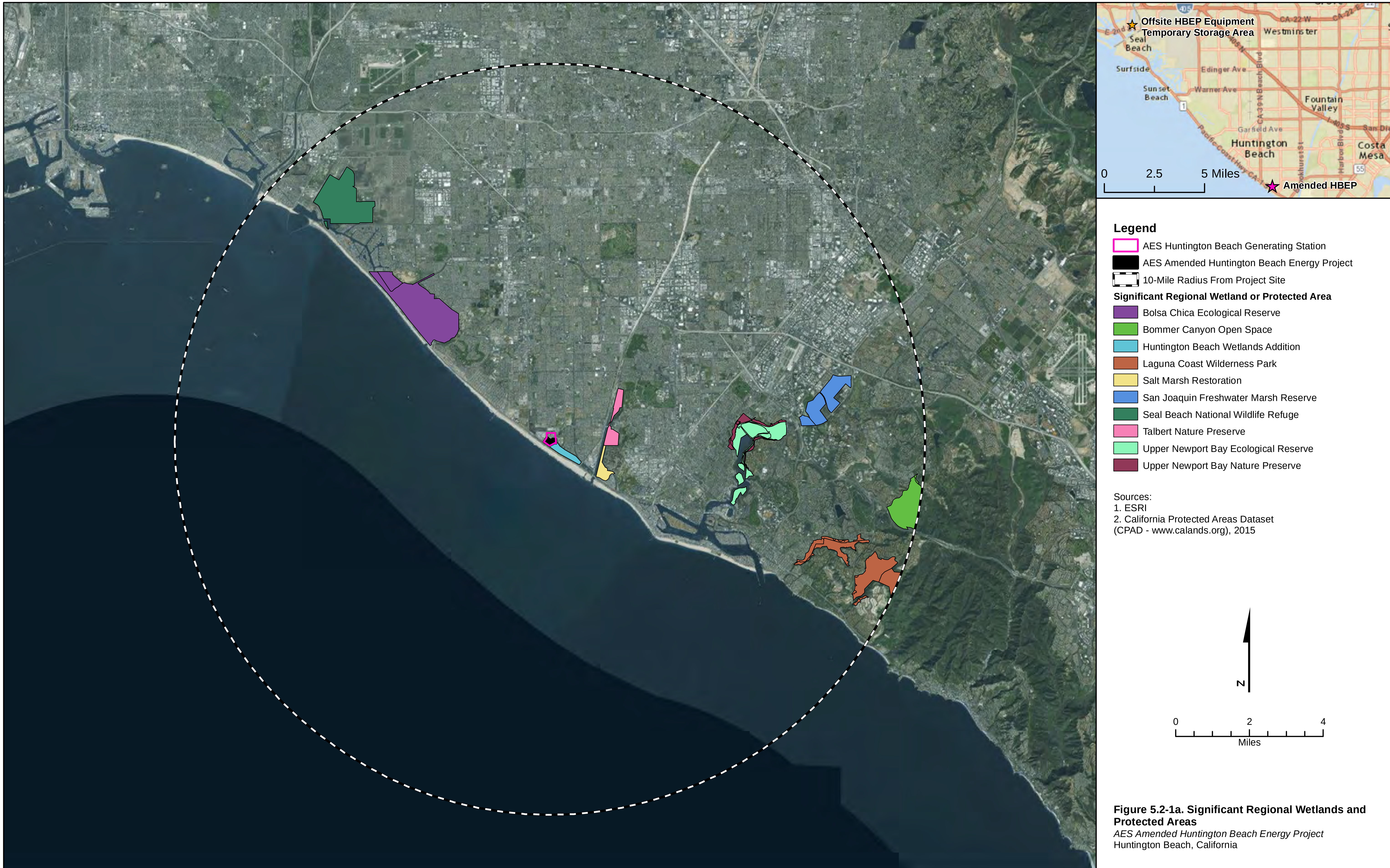
California Native Plant Society (CNPS). 2015. Inventory of rare, threatened, and endangered plants of California. Available online at: http://www.rareplants.cnps.org/.

U.S. Fish and Wildlife Service (USFWS). 1970. Federal Register, Department of the Interior, Fish and Wildlife Service. *United States List of Endangered Fish and Wildlife*. 50 Code of Federal Regulations Part 17. 35 FR 16047-16048. October 13.

U.S. Fish and Wildlife Service (USFWS). 2015a. Critical Habitat Portal. http://ecos.fws.gov/crithab/.

U.S. Fish and Wildlife Service (USFWS). 2015b. Endangered Species Program, United States species. http://www.fws.gov/endangered/species/us-species.html.

U.S. Fish and Wildlife Service (USFWS). 2015c. National Wetland Inventory. http://www.fws.gov/wetlands/.



Sources:
1. ESRI
2. California Protected Areas Dataset (CPAD - www.calands.org), 2015

Figure 5.2-1a. Significant Regional Wetlands and Protected Areas
AES Amended Huntington Beach Energy Project
Huntington Beach, California

ch2m.

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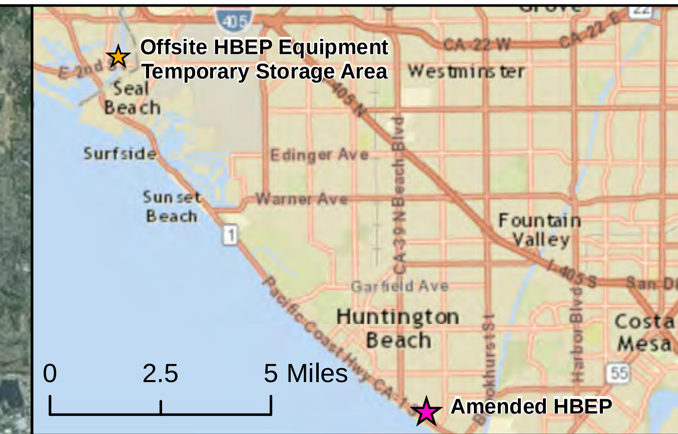

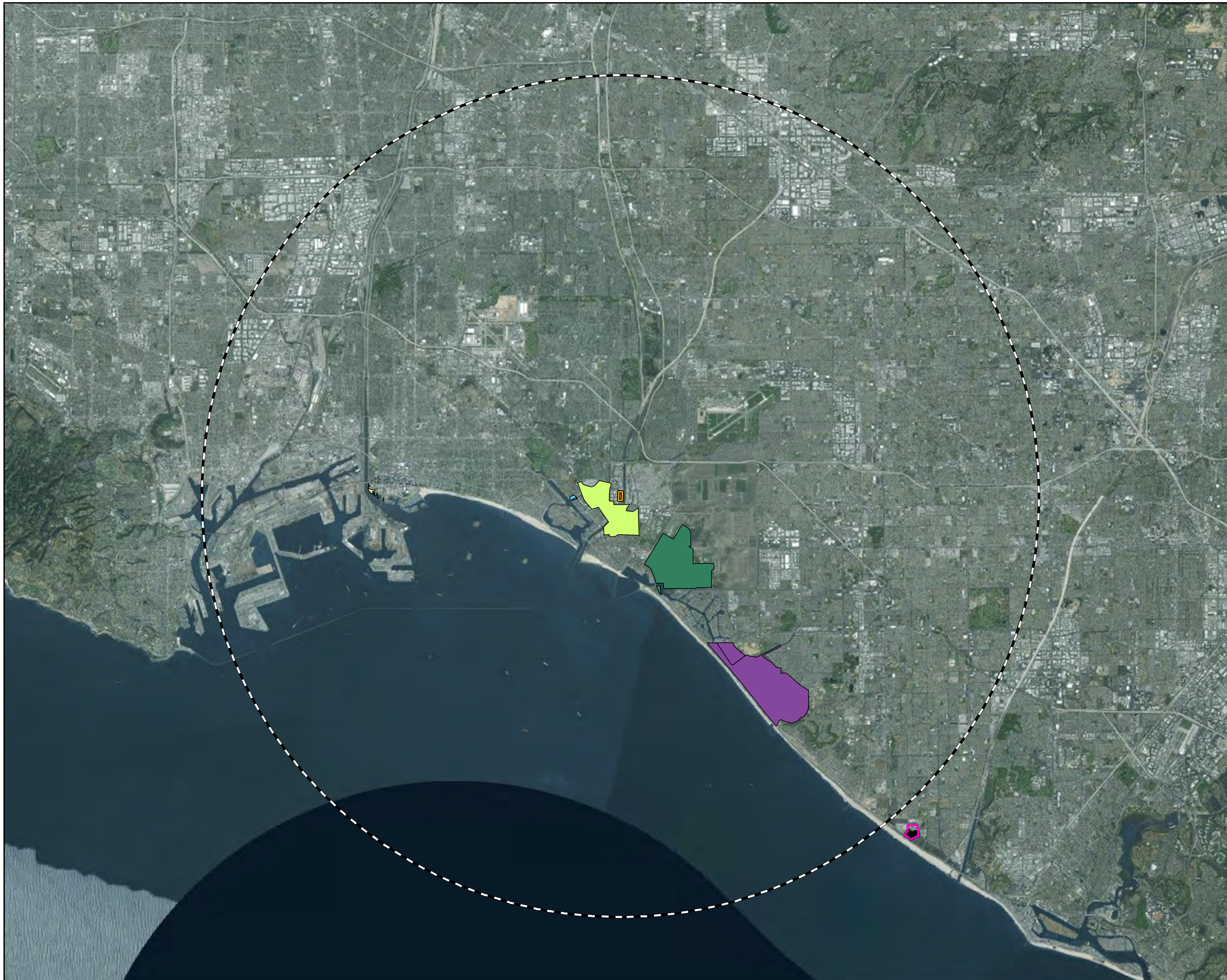

Legend

- Offsite HBEP Equipment Temporary Storage Area
- AES Huntington Beach Generating Station
- AES Amended Huntington Beach Energy Project
- 10-Mile Radius From Offsite Temporary Storage Area

Significant Regional Wetland or Protected Area

- Bolsa Chica Ecological Reserve
- Golden Shore Marine Biological Reserve Park
- Jack Dunster Marine Biological Reserve
- Seal Beach National Wildlife Refuge
- Los Cerritos Wetlands Area

Sources:
1. ESRI
2. California Protected Areas Dataset (CPAD - www.calands.org), 2015
3. Los Cerritos Wetlands Authority (2015)

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Miles

Figure 5.2-1b. Significant Regional Wetlands and Protected Areas
AES Amended Huntington Beach Energy Project
Huntington Beach, California

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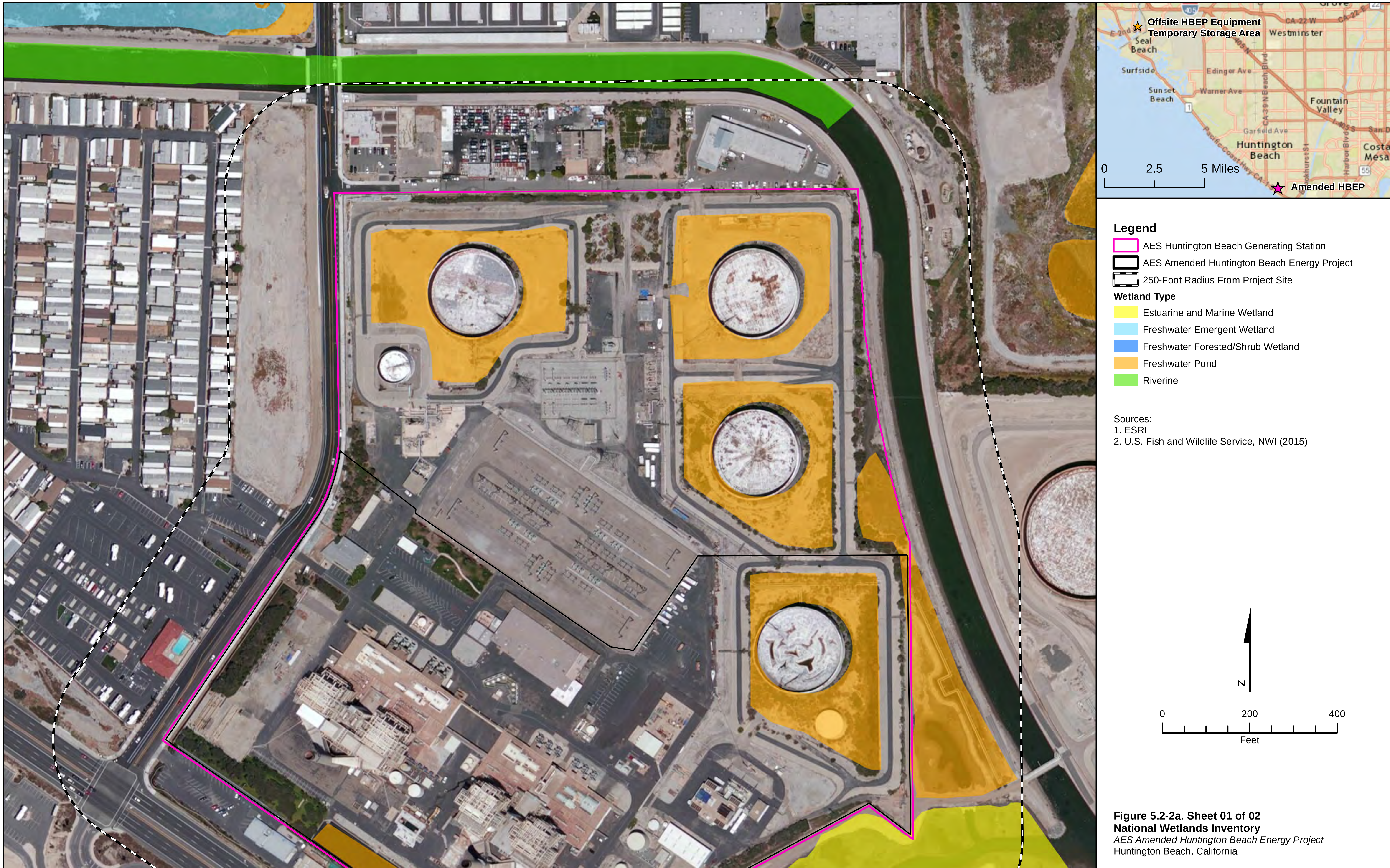

Sources:
1. ESRI
2. U.S. Fish and Wildlife Service, NWI (2015)

Figure 5.2-2a. Sheet 01 of 02
National Wetlands Inventory
AES Amended Huntington Beach Energy Project
Huntington Beach, California

ch2m

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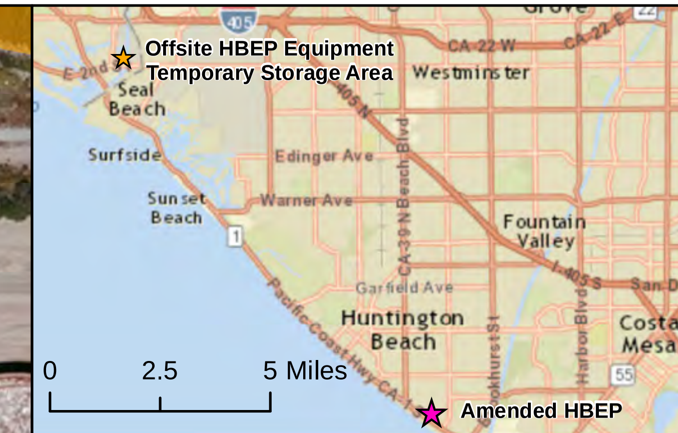

Sources:
1. ESRI
2. U.S. Fish and Wildlife Service, NWI (2015)

Figure 5.2-2a. Sheet 02 of 02
National Wetlands Inventory
AES Amended Huntington Beach Energy Project
Huntington Beach, California

ch2m.

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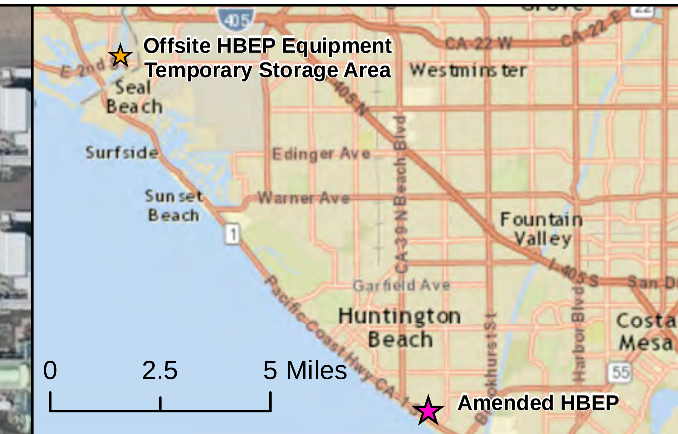

Legend

Offsite HBEP Equipment Temporary Storage Area

250-Foot Radius From Offsite Temporary Storage Area

Estuarine and Marine Wetland

Freshwater Emergent Wetland

Freshwater Forested/Shrub Wetland

Freshwater Pond

Riverine

Sources:
1. ESRI
2. U.S. Fish and Wildlife Service, NWI (2015)

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Feet

Figure 5.2-2b. Sheet 01 of 02
National Wetlands Inventory
AES Amended Huntington Beach Energy Project
Huntington Beach, California

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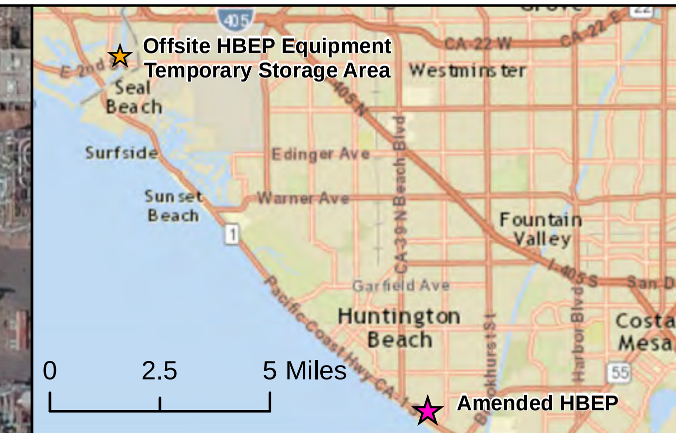

Legend

- Offsite HBEP Equipment Temporary Storage Area
- 250-Foot Radius From Offsite Temporary Storage Area
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Riverine

Sources:
1. ESRI
2. U.S. Fish and Wildlife Service, NWI (2015)

N

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Feet

Figure 5.2-2b. Sheet 02 of 02
National Wetlands Inventory
AES Amended Huntington Beach Energy Project
Huntington Beach, California

ch2m:

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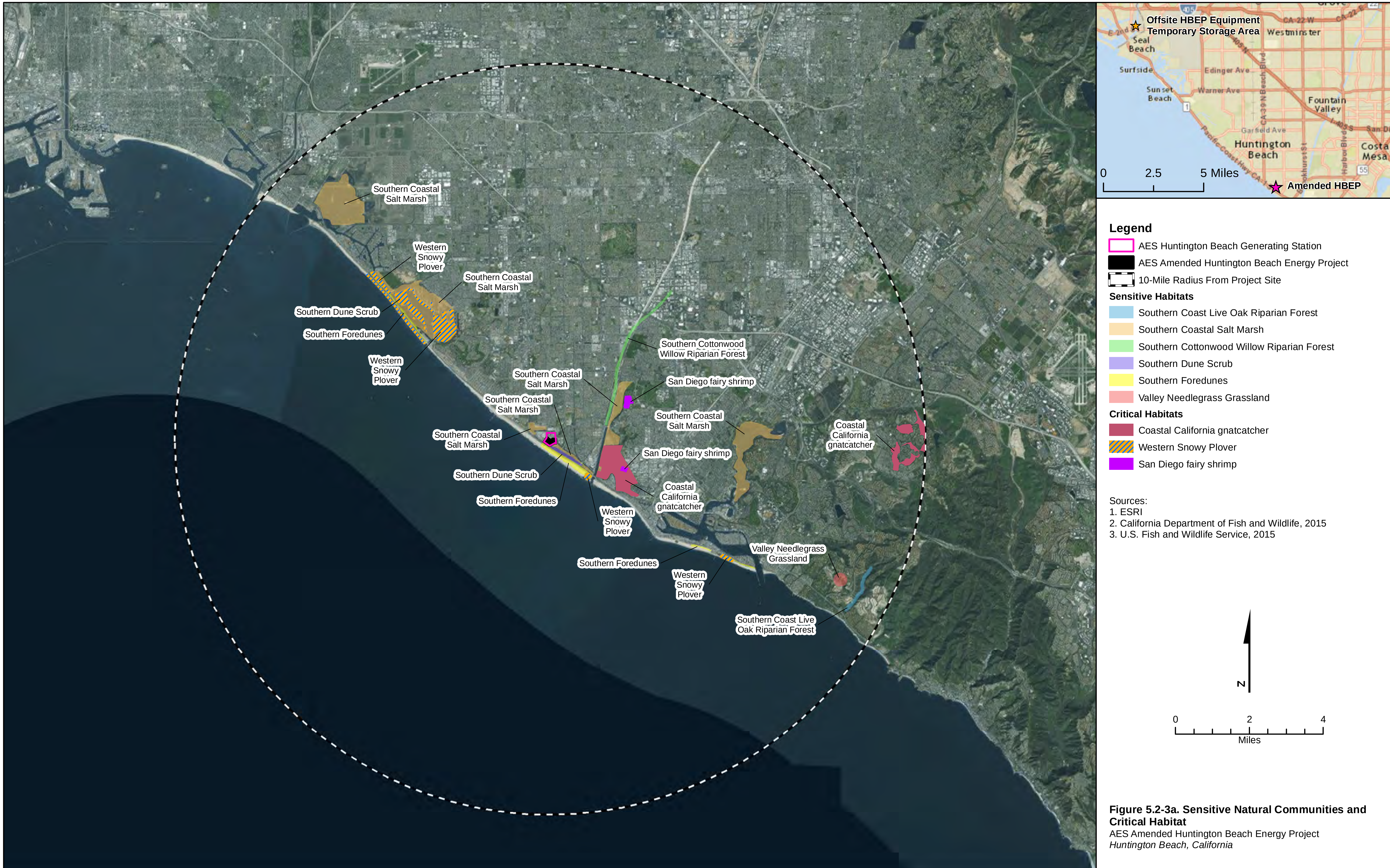

Legend

- AES Huntington Beach Generating Station
- AES Amended Huntington Beach Energy Project
- 10-Mile Radius From Project Site

Sensitive Habitats

- Southern Coast Live Oak Riparian Forest
- Southern Coastal Salt Marsh
- Southern Cottonwood Willow Riparian Forest
- Southern Dune Scrub
- Southern Foredunes
- Valley Needlegrass Grassland

Critical Habitats

- Coastal California gnatcatcher
- Western Snowy Plover
- San Diego fairy shrimp

Sources:
1. ESRI
2. California Department of Fish and Wildlife, 2015
3. U.S. Fish and Wildlife Service, 2015

N

0 2 4
Miles

Figure 5.2-3a. Sensitive Natural Communities and Critical Habitat
AES Amended Huntington Beach Energy Project
Huntington Beach, California

ch2m

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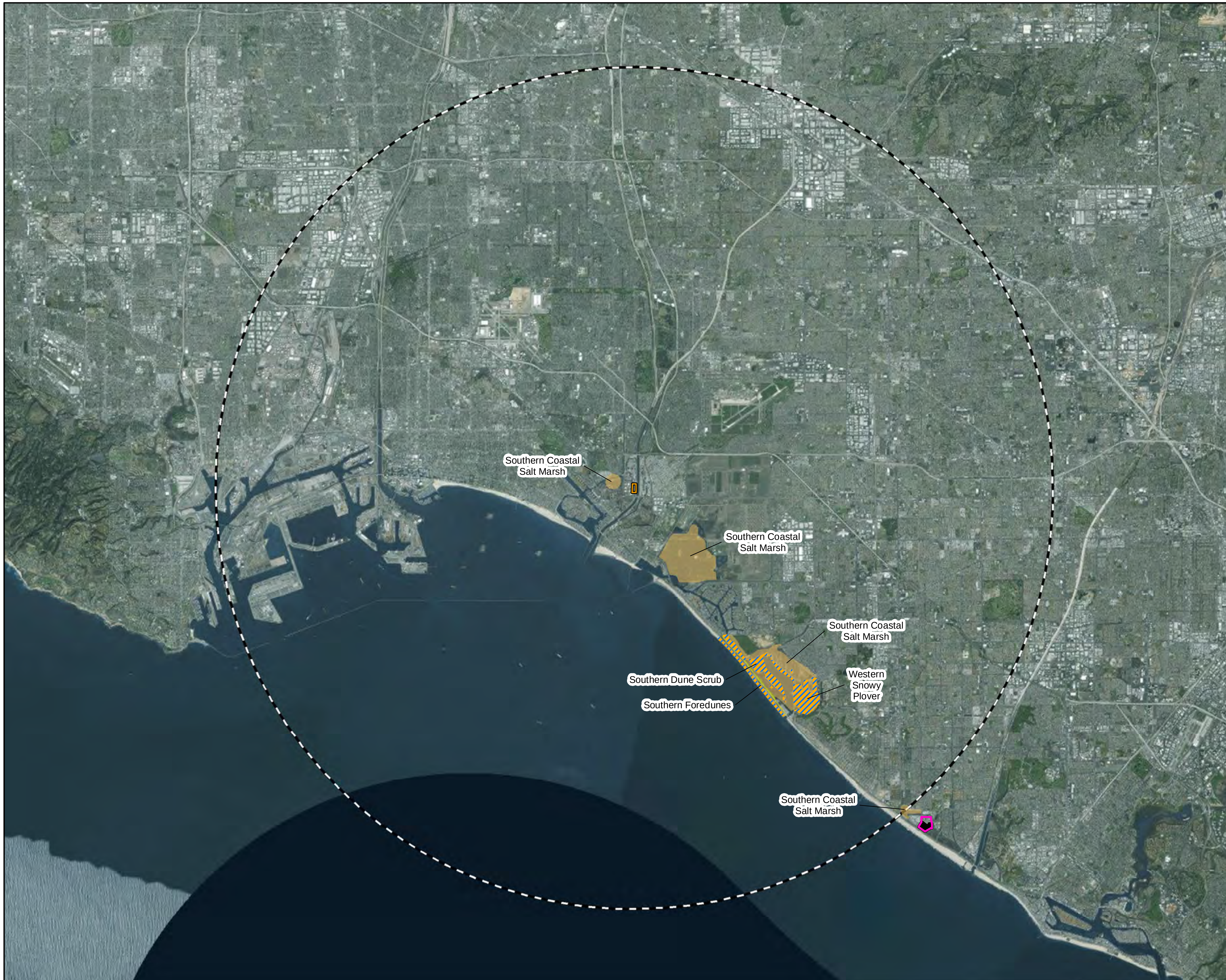

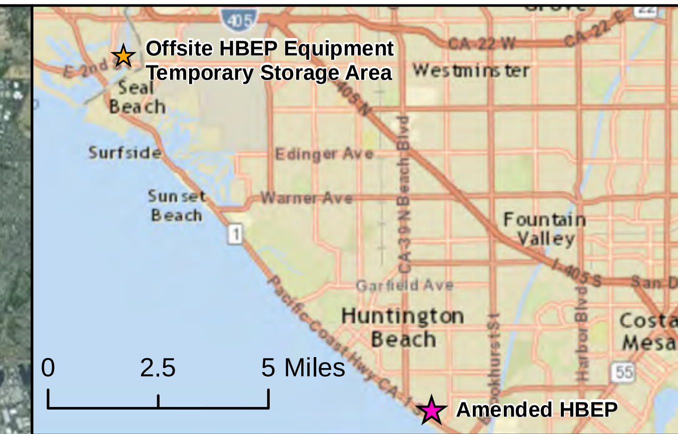

Legend

- Offsite HBEP Equipment Temporary Storage Area
- AES Huntington Beach Generating Station
- AES Amended Huntington Beach Energy Project
- 10-Mile Radius From Offsite Temporary Storage Area
- Western Snowy Plover Critical Habitat

Sensitive Habitats

- Southern Coastal Salt Marsh
- Southern Dune Scrub
- Southern Foredunes

Sources:
1. ESRI
2. California Department of Fish and Wildlife, 2015
3. U.S. Fish and Wildlife Service, 2015

N

0 2 4
Miles

Figure 5.2-3b. Sensitive Natural Communities and Critical Habitat
AES Amended Huntington Beach Energy Project
Huntington Beach, California

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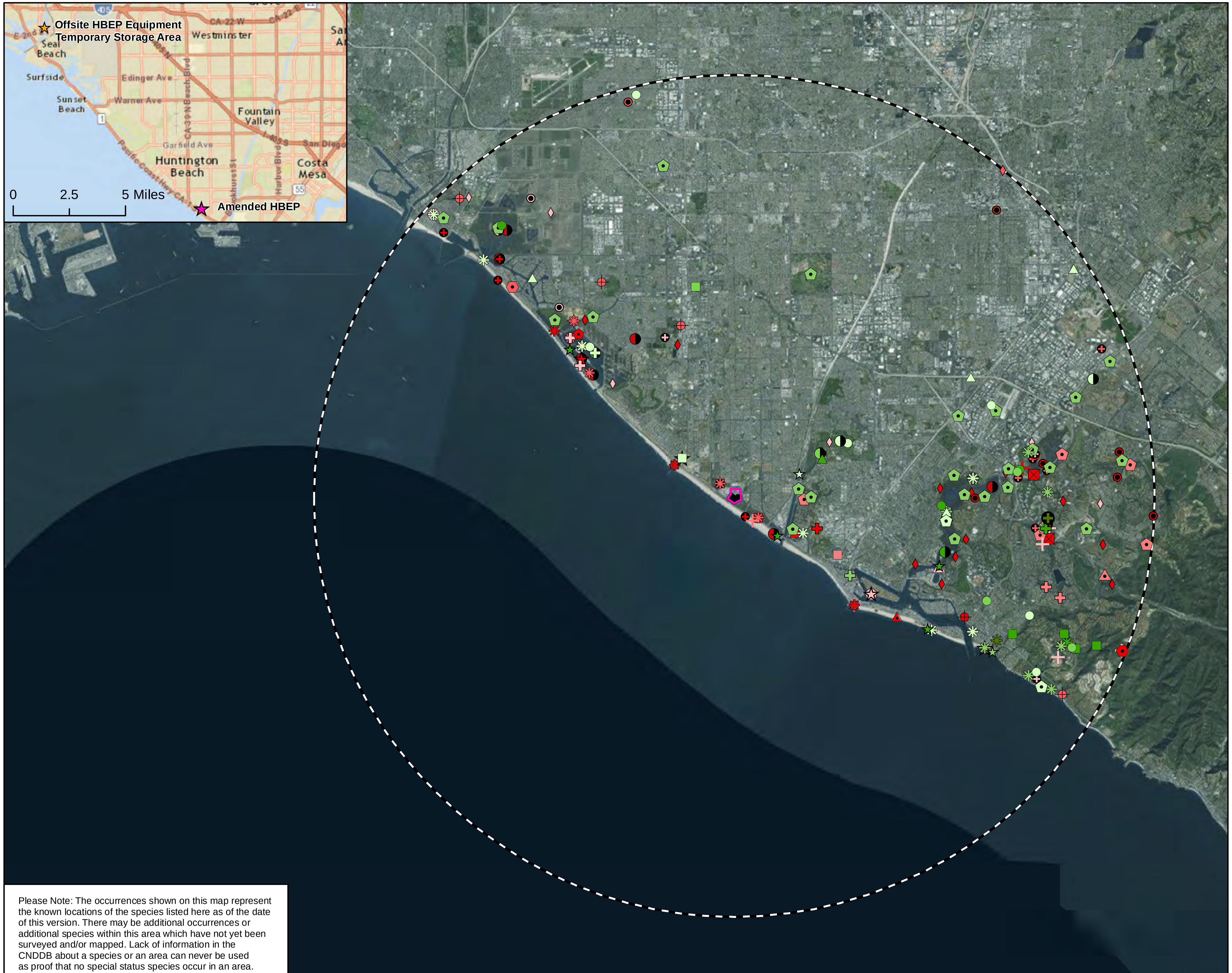

Legend

- AES Huntington Beach Generating Station
- AES Amended Huntington Beach Energy Project
- 10-Mile Radius From Project Site

CNDDB Occurrences

Animals
- American badger
- Belding's savannah sparrow
- California black rail
- California horned lark
- California least tern
- Dorothy's El Segundo Dune weevil
- Pacific pocket mouse
- San Diego fairy shrimp
- bank swallow
- big free-tailed bat
- black skimmer
- burrowing owl
- coast horned lizard
- coastal California gnatcatcher
- coastal cactus wren
- globose dune beetle
- grasshopper sparrow
- hoary bat
- least Bell's vireo
- light-footed clapper rail
- California brackishwater snail
- monarch butterfly
- orangethroat whiptail
- osprey
- red-diamond rattlesnake
- sandy beach tiger beetle
- senile tiger beetle
- south coast marsh vole
- southern California rufous-crowned sparrow
- southern California saltmarsh shrew
- wandering (=saltmarsh) skipper
- western beach tiger beetle
- western mastiff bat
- western pond turtle
- western snowy plover
- western tidal-flat tiger beetle
- western yellow bat
- western yellow-billed cuckoo
- white-tailed kite
- yellow-breasted chat

Plants
- Coulter's goldfields
- Coulter's saltbush
- Davidson's saltscale
- Gambel's water cress
- Los Angeles sunflower
- Nuttall's scrub oak
- Robinson's pepper-grass
- San Bernardino aster
- San Diego button-celery
- Ventura Marsh milk-vetch
- aphanisma
- chaparral ragwort
- chaparral sand-verbena
- cliff spurge
- coast woolly-heads
- decumbent goldenbush
- estuary seablite
- many-stemmed dudleya
- mesa horkelia
- mud nama
- prostrate vernal pool navarretia
- salt marsh bird's-beak
- south coast saltscale
- southern tarplant

Sources:
1. ESRI
2. California Department of Fish and Wildlife, 2015

N

0 2 4
Miles

Please Note: The occurrences shown on this map represent the known locations of the species listed here as of the date of this version. There may be additional occurrences or additional species within this area which have not yet been surveyed and/or mapped. Lack of information in the CNDDB about a species or an area can never be used as proof that no special status species occur in an area.

Figure 5.2-4a. Special-Status Species
AES Amended Huntington Beach Energy Project
Huntington Beach, California

ch2m.

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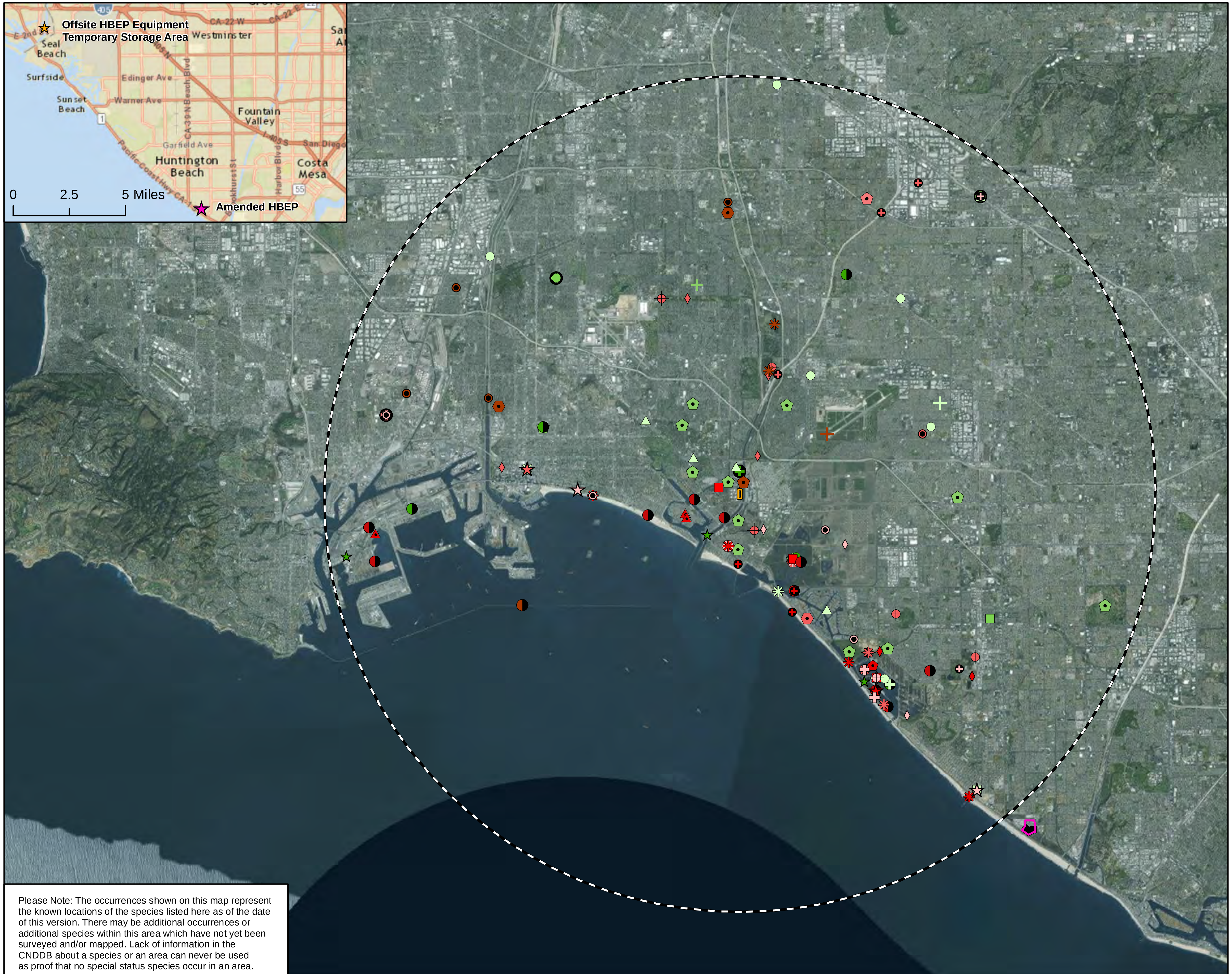

Legend

- Offsite HBEP Equipment Temporary Storage Area
- AES Huntington Beach Generating Station
- AES Amended Huntington Beach Energy Project
- 10-Mile Radius From Offsite Temporary Storage Area

CNDDB Occurrences

Animals

- Belding's savannah sparrow
- California brown pelican
- California least tern
- Dorothy's El Segundo Dune weevil
- Pacific pocket mouse
- bank swallow
- big free-tailed bat
- black skimmer
- burrowing owl
- coast horned lizard
- coastal California gnatcatcher
- ferruginous hawk
- green turtle
- least Bell's vireo
- light-footed clapper rail
- California brackishwater snail
- monarch butterfly
- sandy beach tiger beetle
- senile tiger beetle
- silver-haired bat
- south coast marsh vole
- southern California saltmarsh shrew
- tricolored blackbird
- wandering (=saltmarsh) skipper
- western beach tiger beetle
- western mastiff bat
- western pond turtle
- western snowy plover
- western tidal-flat tiger beetle
- western yellow bat
- western yellow-billed cuckoo

Plants

- Brand's star phacelia
- California Orcutt grass
- Coulter's goldfields
- Coulter's saltbush
- Davidson's saltscale
- Gambel's water cress
- Los Angeles sunflower
- Lyon's pentachaeta
- Parish's brittlescale
- Salt Spring checkerbloom
- San Bernardino aster
- Ventura Marsh milk-vetch
- coast woolly-heads
- estuary seablite
- mud nama
- prostrate vernal pool navarretia
- salt marsh bird's-beak
- southern tarplant

Sources:
1. ESRI
2. California Department of Fish and Wildlife, 2015

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Miles

Figure 5.2-4b. Special-Status Species
AES Amended Huntington Beach Energy Project
Huntington Beach, California

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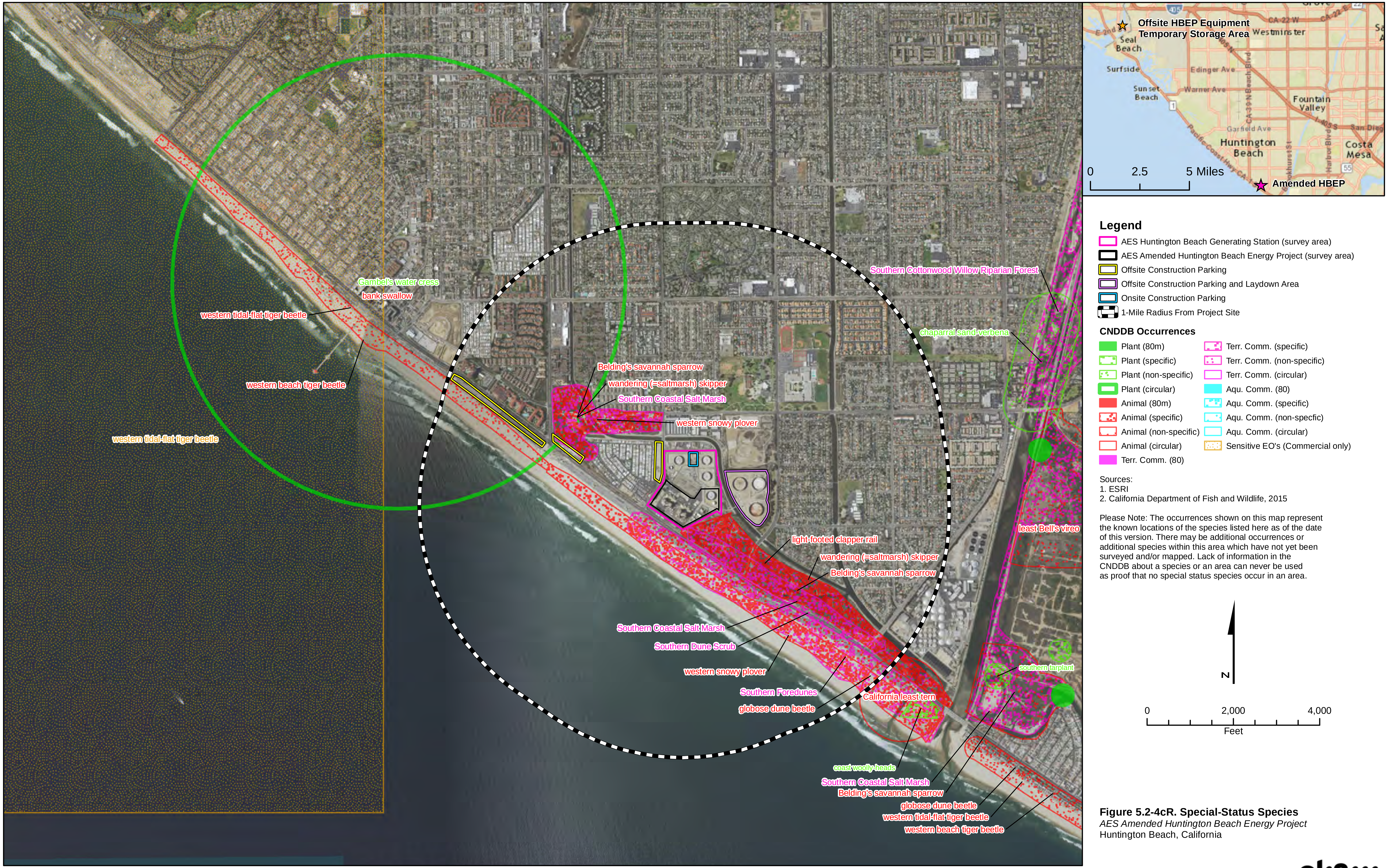

Legend

- AES Huntington Beach Generating Station (survey area)
- AES Amended Huntington Beach Energy Project (survey area)
- Offsite Construction Parking
- Offsite Construction Parking and Laydown Area
- Onsite Construction Parking
- 1-Mile Radius From Project Site

CNDDB Occurrences

- Plant (80m)
- Plant (specific)
- Plant (non-specific)
- Plant (circular)
- Animal (80m)
- Animal (specific)
- Animal (non-specific)
- Animal (circular)
- Terr. Comm. (80)
- Terr. Comm. (specific)
- Terr. Comm. (non-specific)
- Terr. Comm. (circular)
- Aqu. Comm. (80)
- Aqu. Comm. (specific)
- Aqu. Comm. (non-specific)
- Aqu. Comm. (circular)
- Sensitive EO's (Commercial only)

Sources:
1. ESRI
2. California Department of Fish and Wildlife, 2015

Please Note: The occurrences shown on this map represent the known locations of the species listed here as of the date of this version. There may be additional occurrences or additional species within this area which have not yet been surveyed and/or mapped. Lack of information in the CNDDB about a species or an area can never be used as proof that no special status species occur in an area.

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Figure 5.2-4cR. Special-Status Species
AES Amended Huntington Beach Energy Project
Huntington Beach, California

ch2m.

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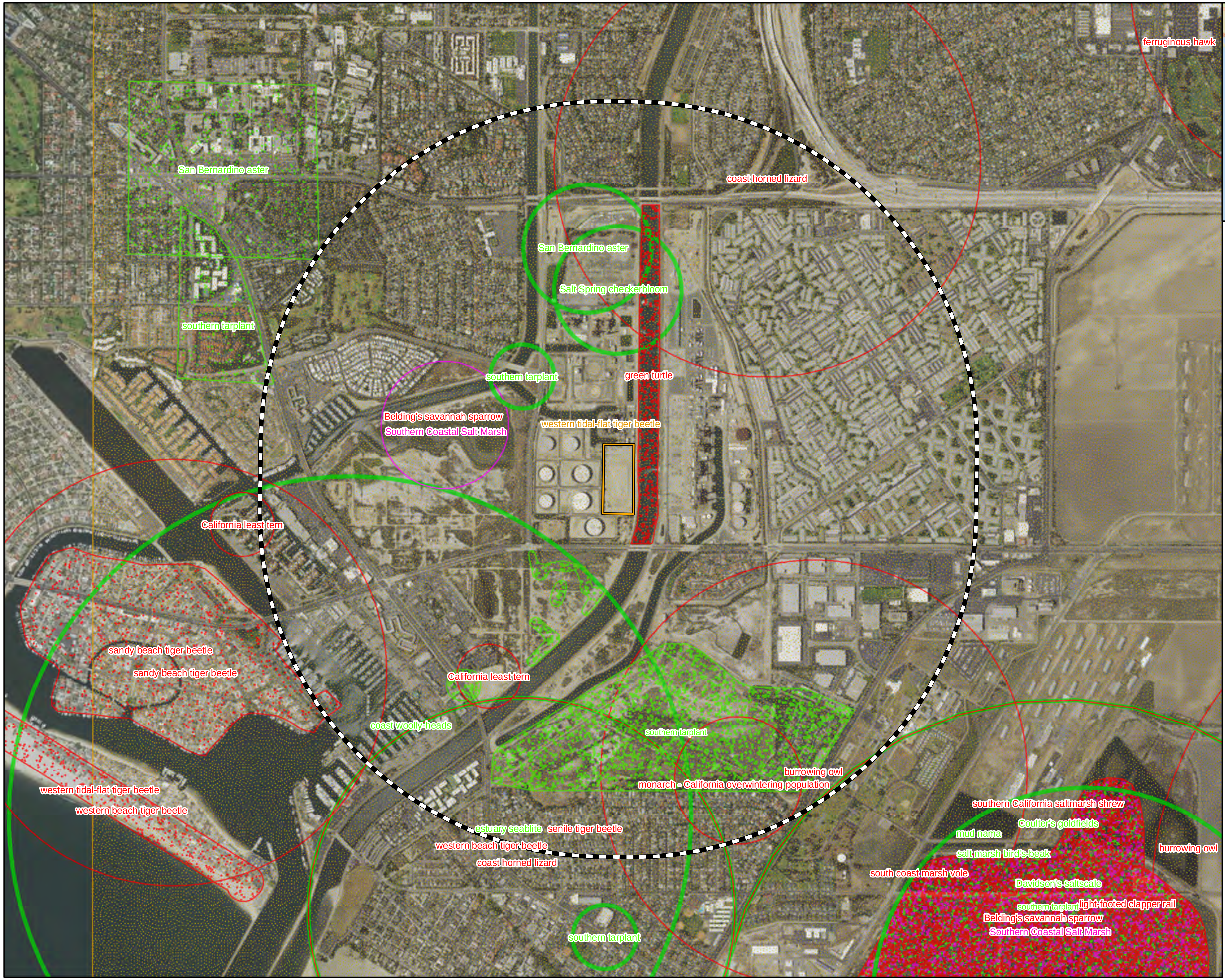

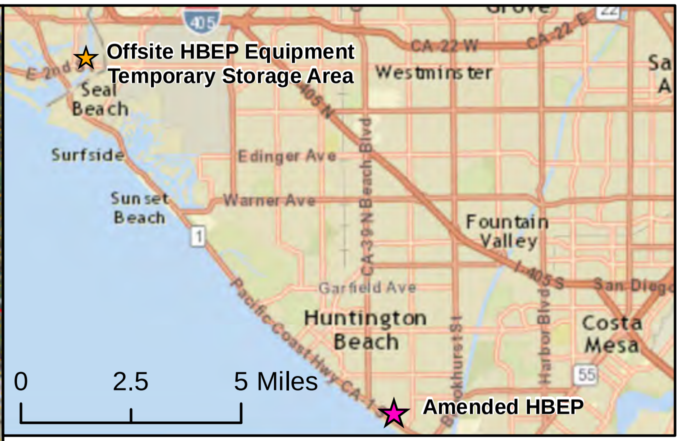

Legend

- Offsite HBEP Equipment Temporary Storage Area
- 1-Mile Radius From Offsite Temporary Storage Area

CNDDB Occurrences

- Plant (80m)
- Plant (specific)
- Plant (non-specific)
- Plant (circular)
- Animal (80m)
- Animal (specific)
- Animal (non-specific)
- Animal (circular)
- Terr. Comm. (80)
- Terr. Comm. (specific)
- Terr. Comm. (non-specific)
- Terr. Comm. (circular)
- Aqu. Comm. (80)
- Aqu. Comm. (specific)
- Aqu. Comm. (non-specfic)
- Aqu. Comm. (circular)
- Sensitive EO's (Commercial only)

Sources:
1. ESRI
2. California Department of Fish and Wildlife, 2015

Please Note: The occurrences shown on this map represent the known locations of the species listed here as of the date of this version. There may be additional occurrences or additional species within this area which have not yet been surveyed and/or mapped. Lack of information in the CNDDB about a species or an area can never be used as proof that no special status species occur in an area.

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Figure 5.2-4dR. Special-Status Species
AES Amended Huntington Beach Energy Project
Huntington Beach, California

ch2m.

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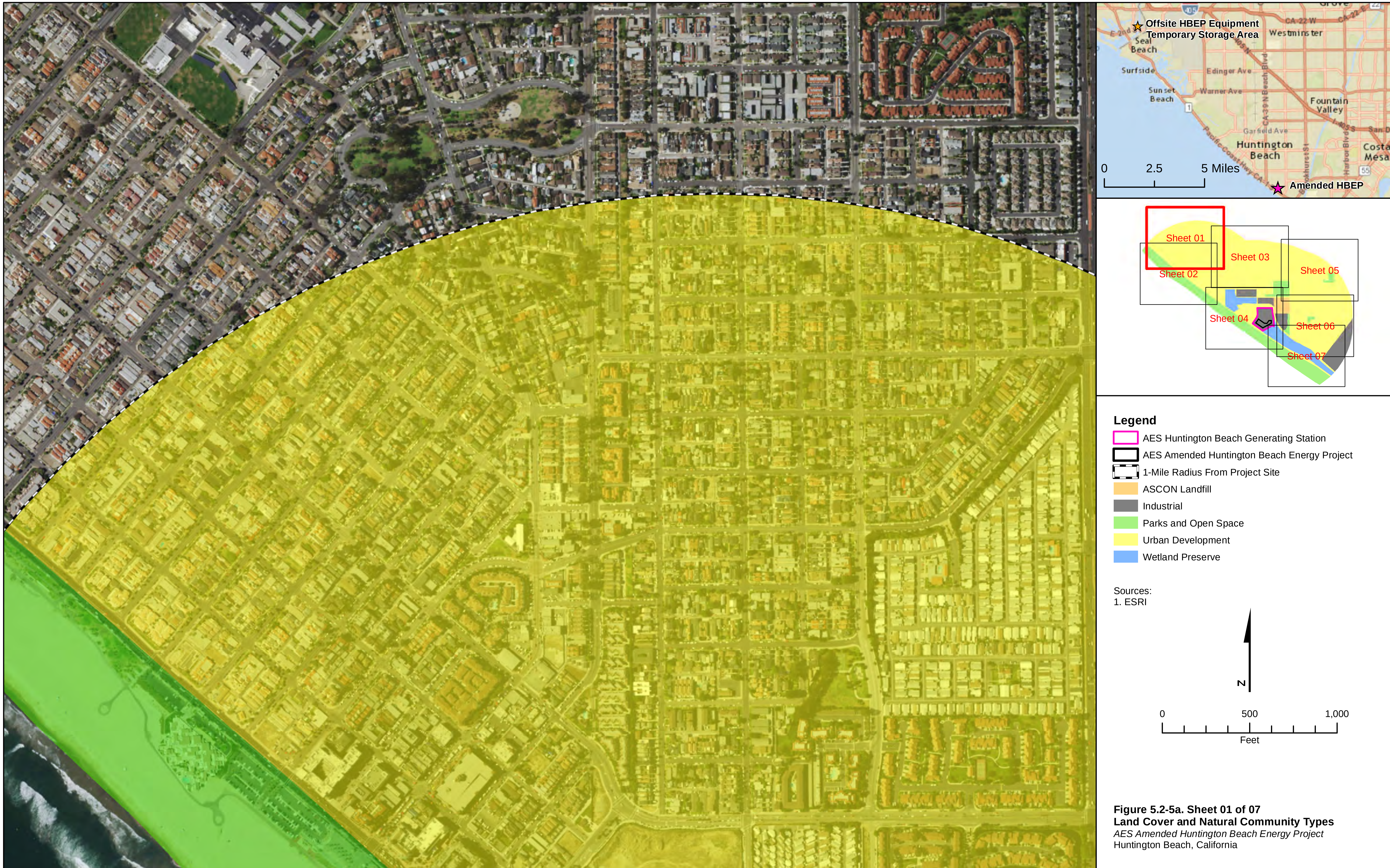

Legend

- AES Huntington Beach Generating Station
- AES Amended Huntington Beach Energy Project
- 1-Mile Radius From Project Site
- ASCON Landfill
- Industrial
- Parks and Open Space
- Urban Development
- Wetland Preserve

Sources:
1. ESRI

N

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Feet

Figure 5.2-5a. Sheet 01 of 07
Land Cover and Natural Community Types
AES Amended Huntington Beach Energy Project
Huntington Beach, California

ch2m.

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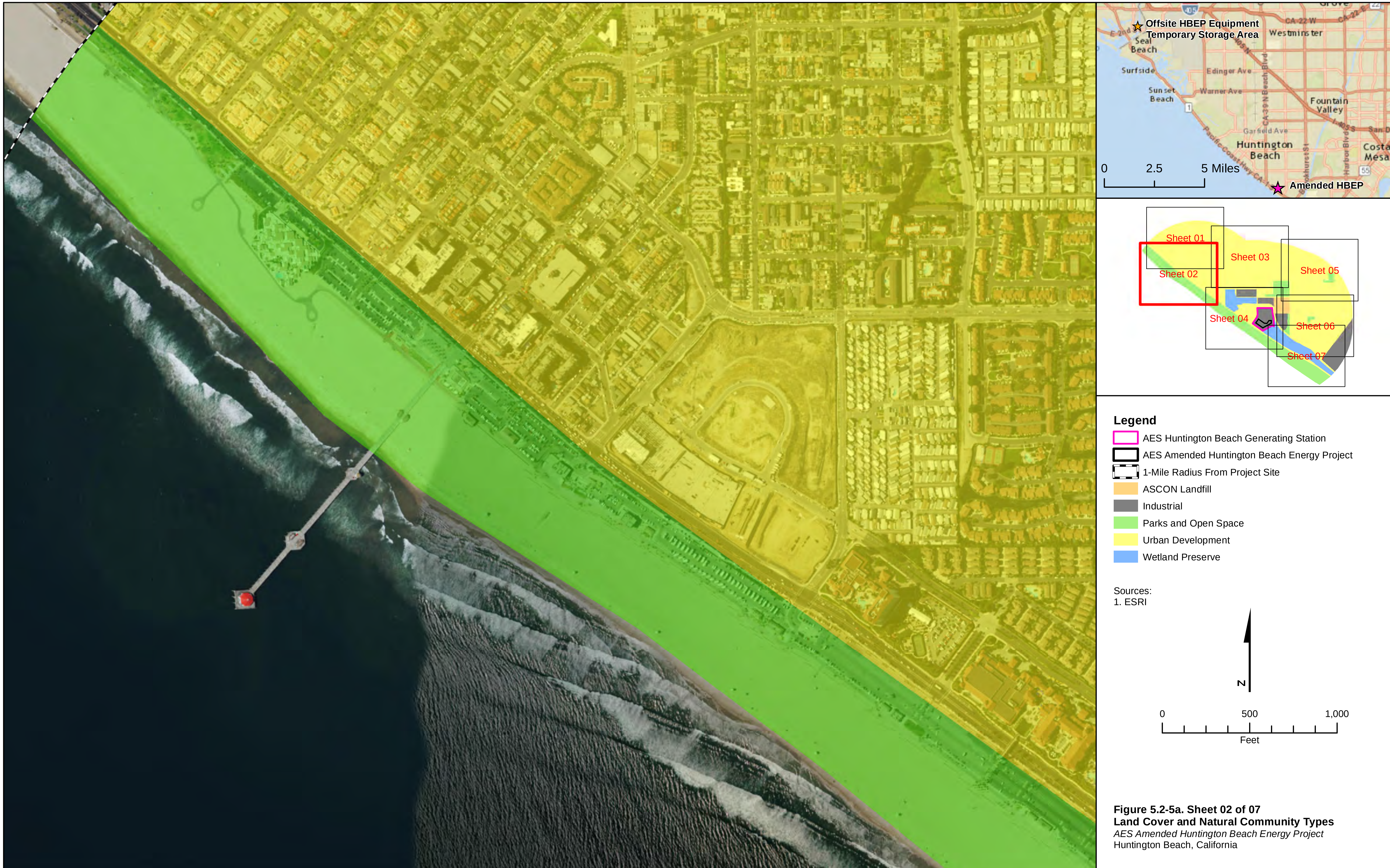

Figure 5.2-5a. Sheet 02 of 07
Land Cover and Natural Community Types
AES Amended Huntington Beach Energy Project
Huntington Beach, California

ch2m.

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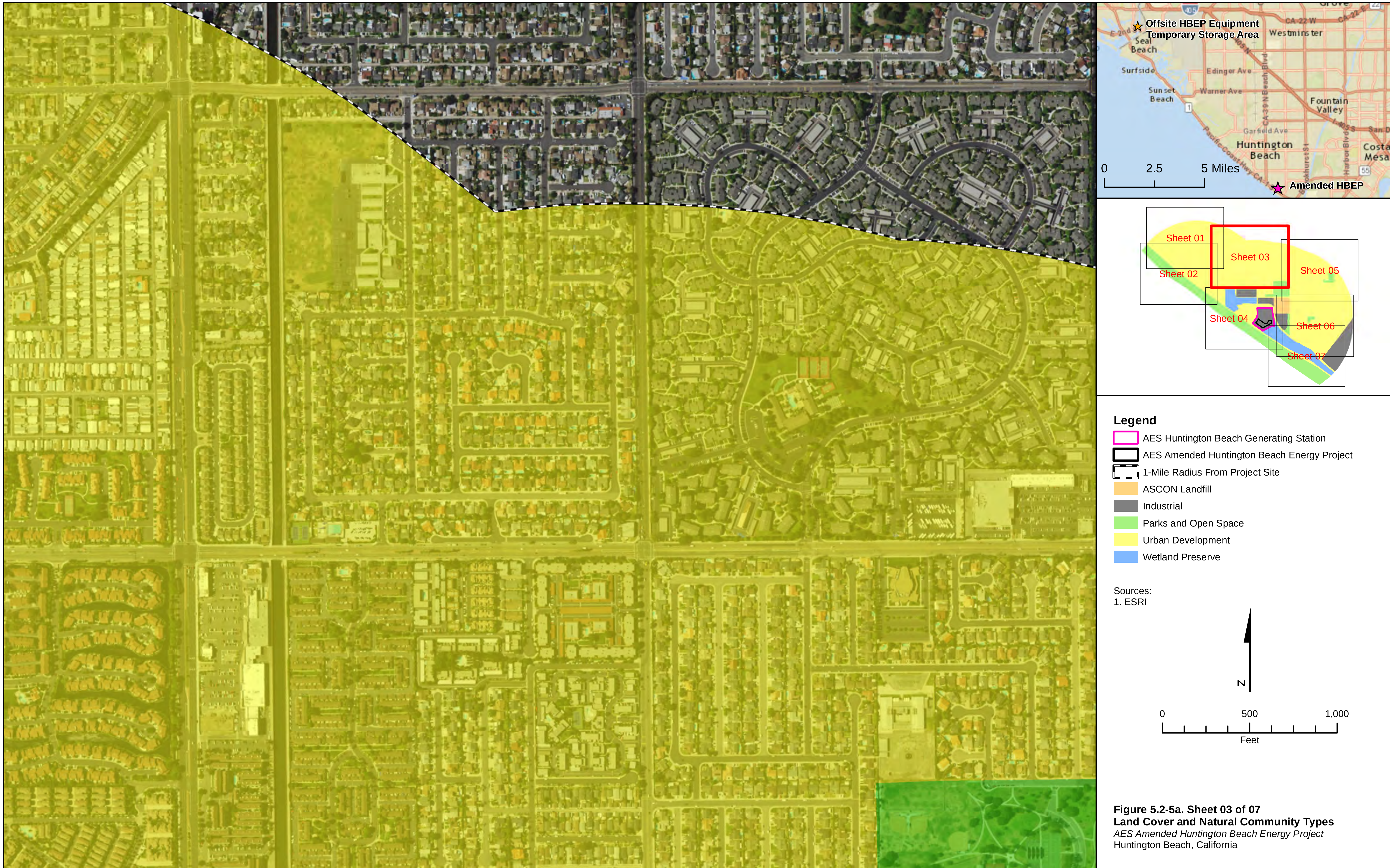

Figure 5.2-5a. Sheet 03 of 07
Land Cover and Natural Community Types
AES Amended Huntington Beach Energy Project
Huntington Beach, California

ch2m.

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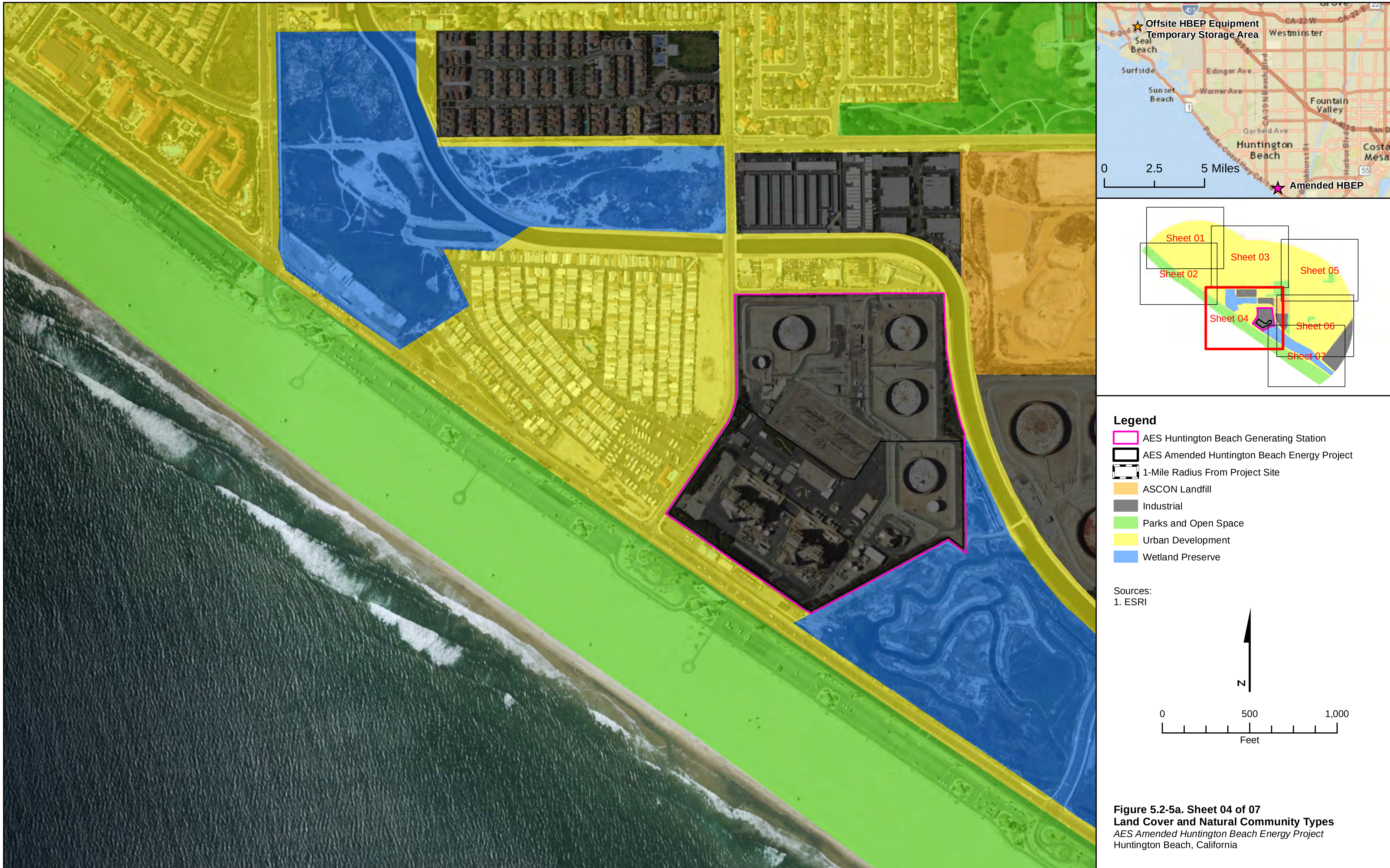

Sources:
1. ESRI

Figure 5.2-5a. Sheet 04 of 07
Land Cover and Natural Community Types
AES Amended Huntington Beach Energy Project
Huntington Beach, California

ch2m.

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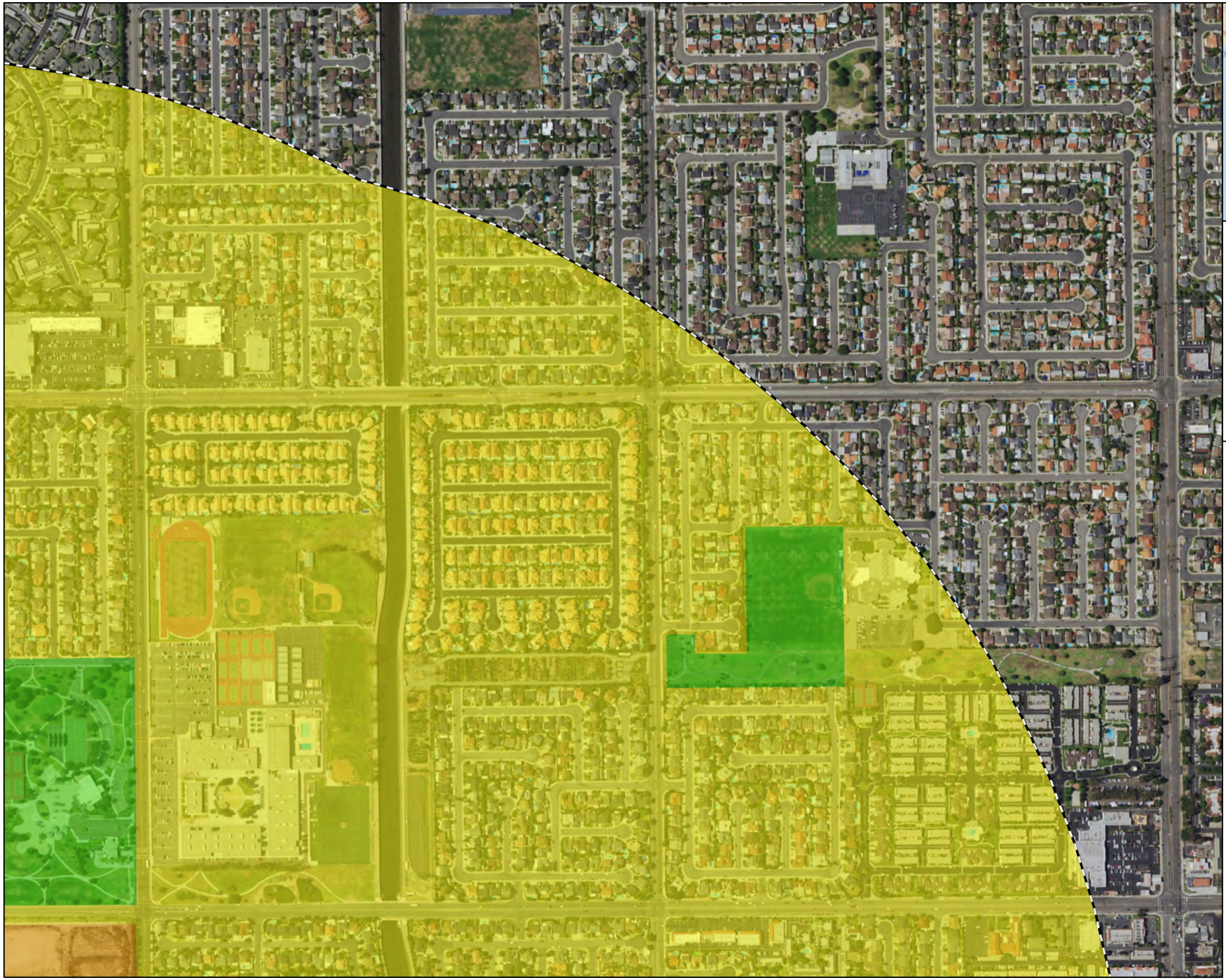

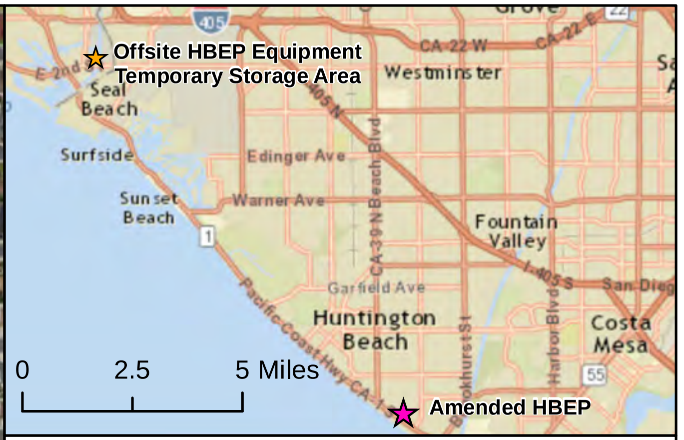

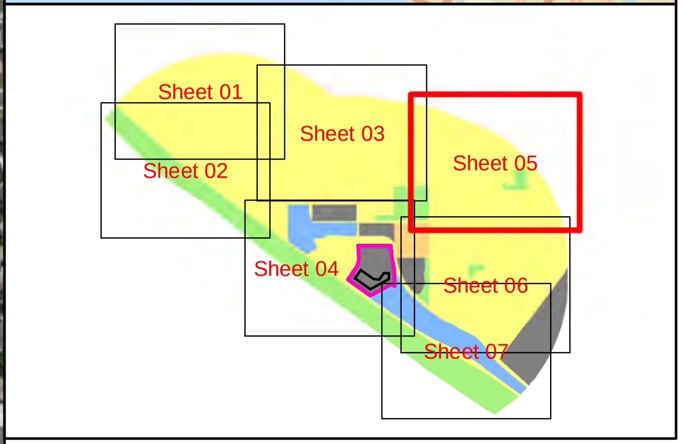

Legend

- AES Huntington Beach Generating Station
- AES Amended Huntington Beach Energy Project
- 1-Mile Radius From Project Site
- ASCON Landfill
- Industrial
- Parks and Open Space
- Urban Development
- Wetland Preserve

Sources:
1. ESRI

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Feet

Figure 5.2-5a. Sheet 05 of 07
Land Cover and Natural Community Types
AES Amended Huntington Beach Energy Project
Huntington Beach, California

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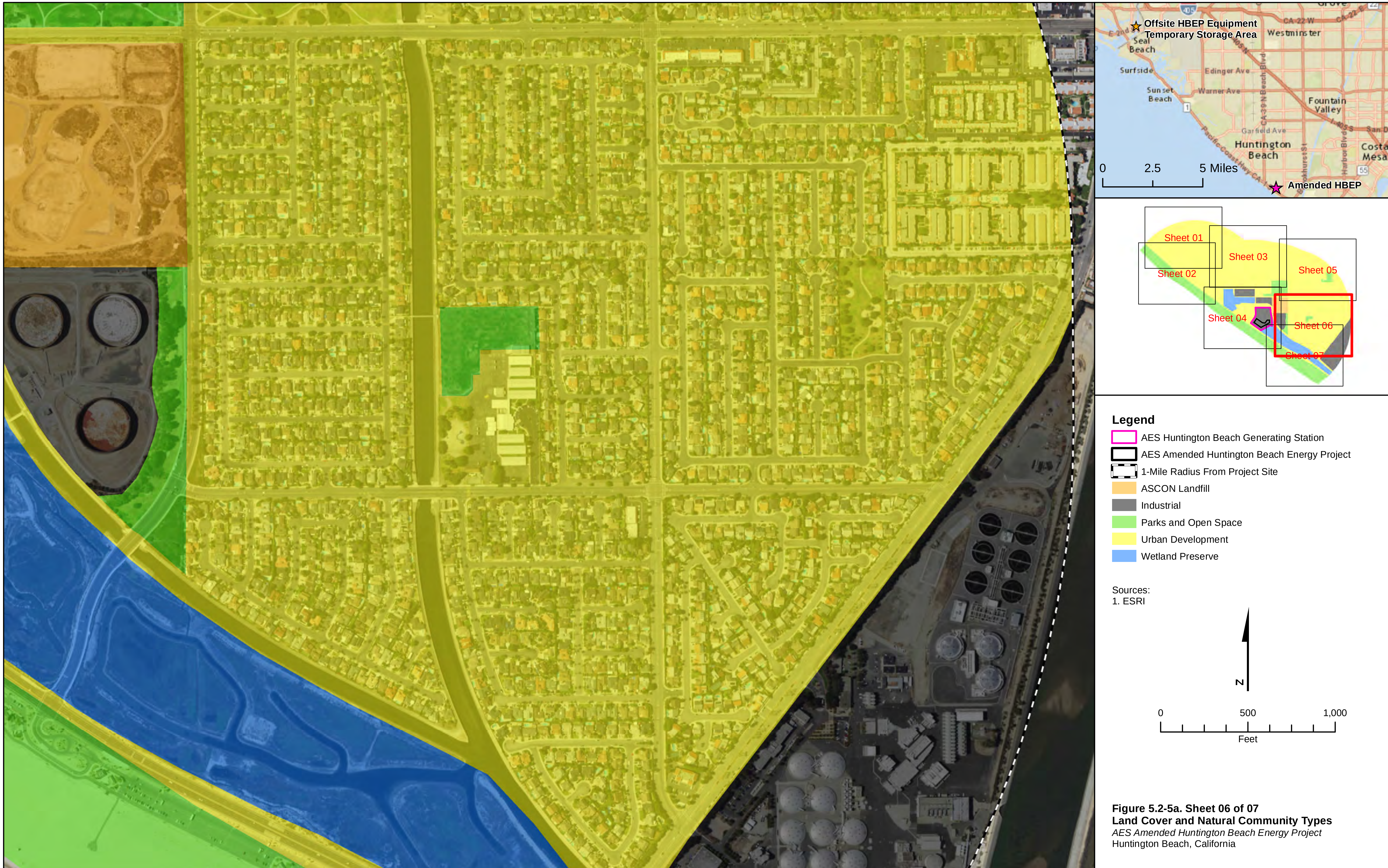

Legend

- AES Huntington Beach Generating Station
- AES Amended Huntington Beach Energy Project
- 1-Mile Radius From Project Site
- ASCON Landfill
- Industrial
- Parks and Open Space
- Urban Development
- Wetland Preserve

Sources:
1. ESRI

N

0 500 1,000
Feet

Figure 5.2-5a. Sheet 06 of 07
Land Cover and Natural Community Types
AES Amended Huntington Beach Energy Project
Huntington Beach, California

ch2m:

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Legend

- AES Huntington Beach Generating Station
- AES Amended Huntington Beach Energy Project
- 1-Mile Radius From Project Site
- ASCON Landfill
- Industrial
- Parks and Open Space
- Urban Development
- Wetland Preserve

Sources:
1. ESRI

N

0 500 1,000
Feet

Figure 5.2-5a. Sheet 07 of 07
Land Cover and Natural Community Types
AES Amended Huntington Beach Energy Project
Huntington Beach, California

ch2m.

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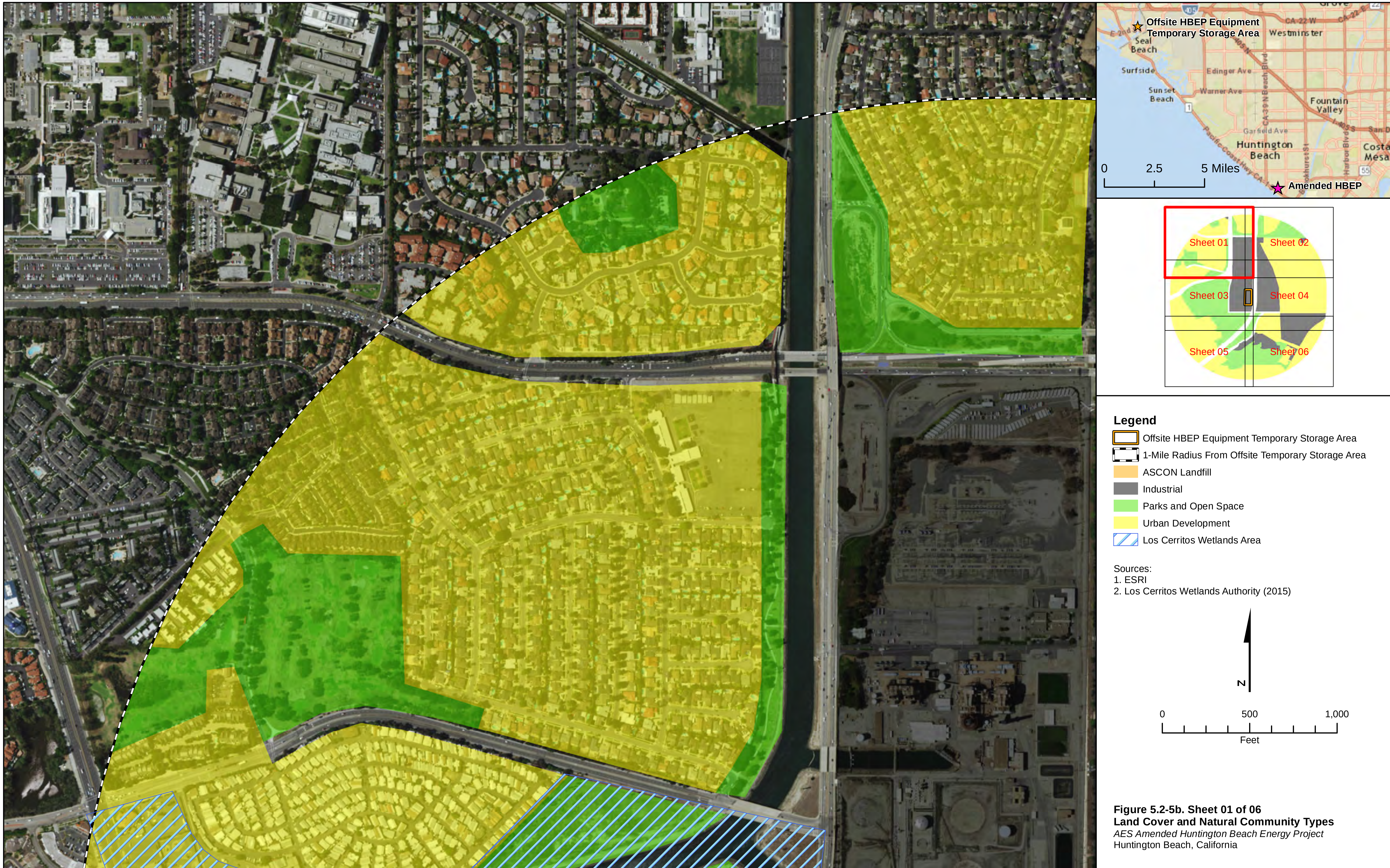

Legend

- Offsite HBEP Equipment Temporary Storage Area
- 1-Mile Radius From Offsite Temporary Storage Area
- ASCON Landfill
- Industrial
- Parks and Open Space
- Urban Development
- Los Cerritos Wetlands Area

Sources:
1. ESRI
2. Los Cerritos Wetlands Authority (2015)

N

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Feet

Figure 5.2-5b. Sheet 01 of 06
Land Cover and Natural Community Types
AES Amended Huntington Beach Energy Project
Huntington Beach, California

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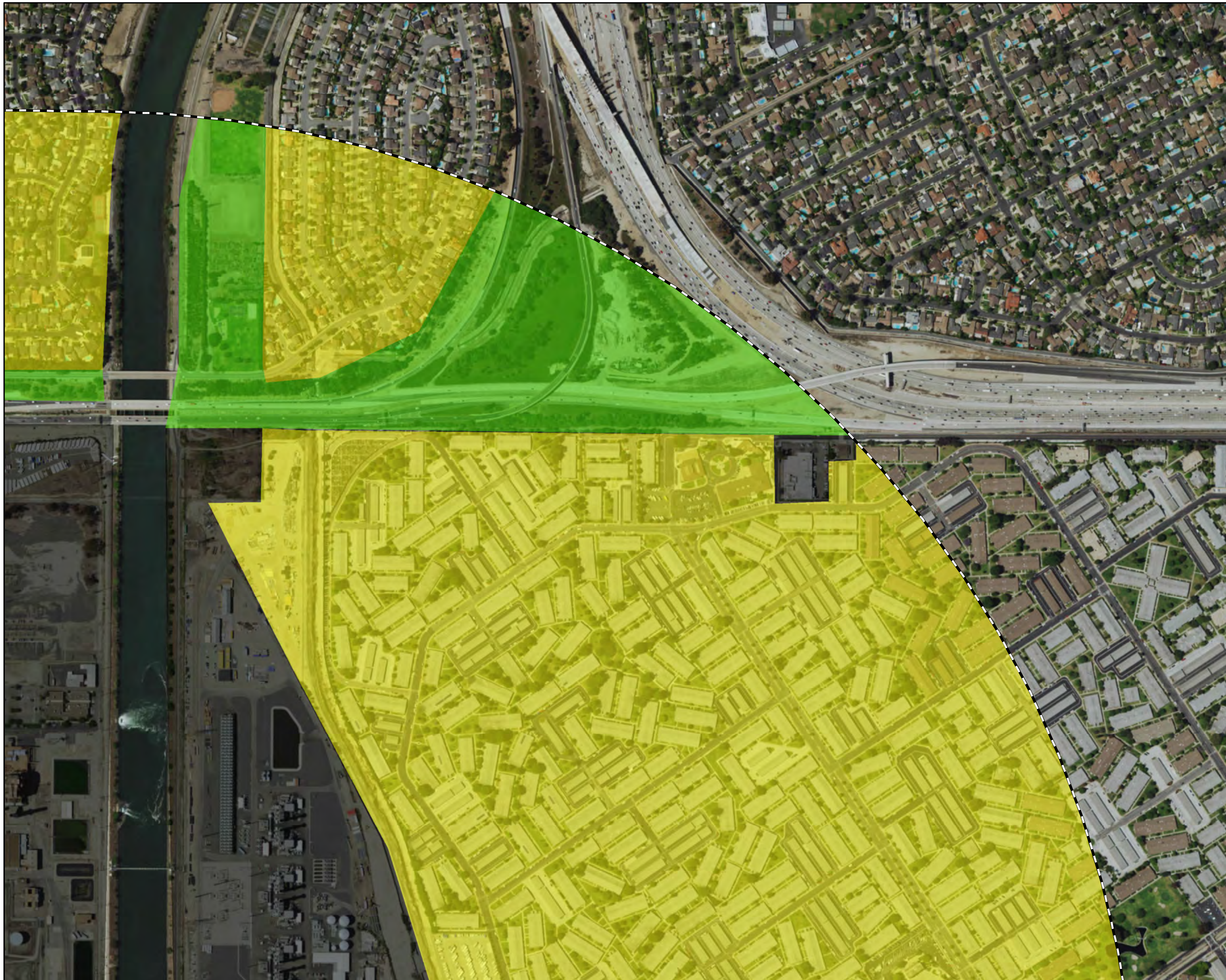

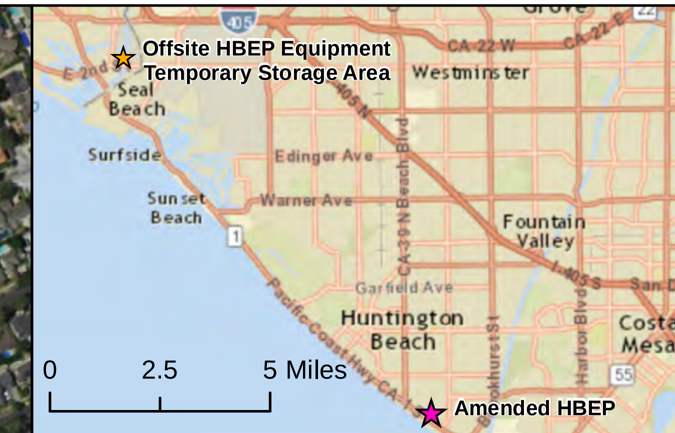

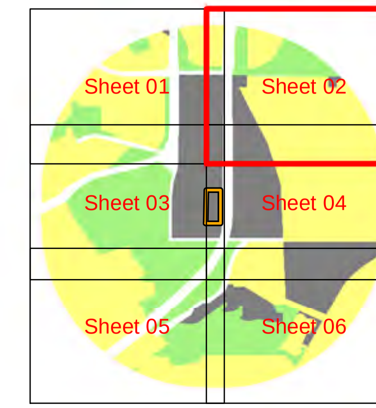

Legend

- Offsite HBEP Equipment Temporary Storage Area
- 1-Mile Radius From Offsite Temporary Storage Area
- ASCON Landfill
- Industrial
- Parks and Open Space
- Urban Development
- Los Cerritos Wetlands Area

Sources:
1. ESRI
2. Los Cerritos Wetlands Authority (2015)

N

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Feet

Figure 5.2-5b. Sheet 02 of 06
Land Cover and Natural Community Types
AES Amended Huntington Beach Energy Project
Huntington Beach, California

ch2m.

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Legend

- Offsite HBEP Equipment Temporary Storage Area
- 1-Mile Radius From Offsite Temporary Storage Area
- ASCON Landfill
- Industrial
- Parks and Open Space
- Urban Development
- Los Cerritos Wetlands Area

Sources:
1. ESRI
2. Los Cerritos Wetlands Authority (2015)

N

0 500 1,000
Feet

Figure 5.2-5b. Sheet 03 of 06
Land Cover and Natural Community Types
AES Amended Huntington Beach Energy Project
Huntington Beach, California

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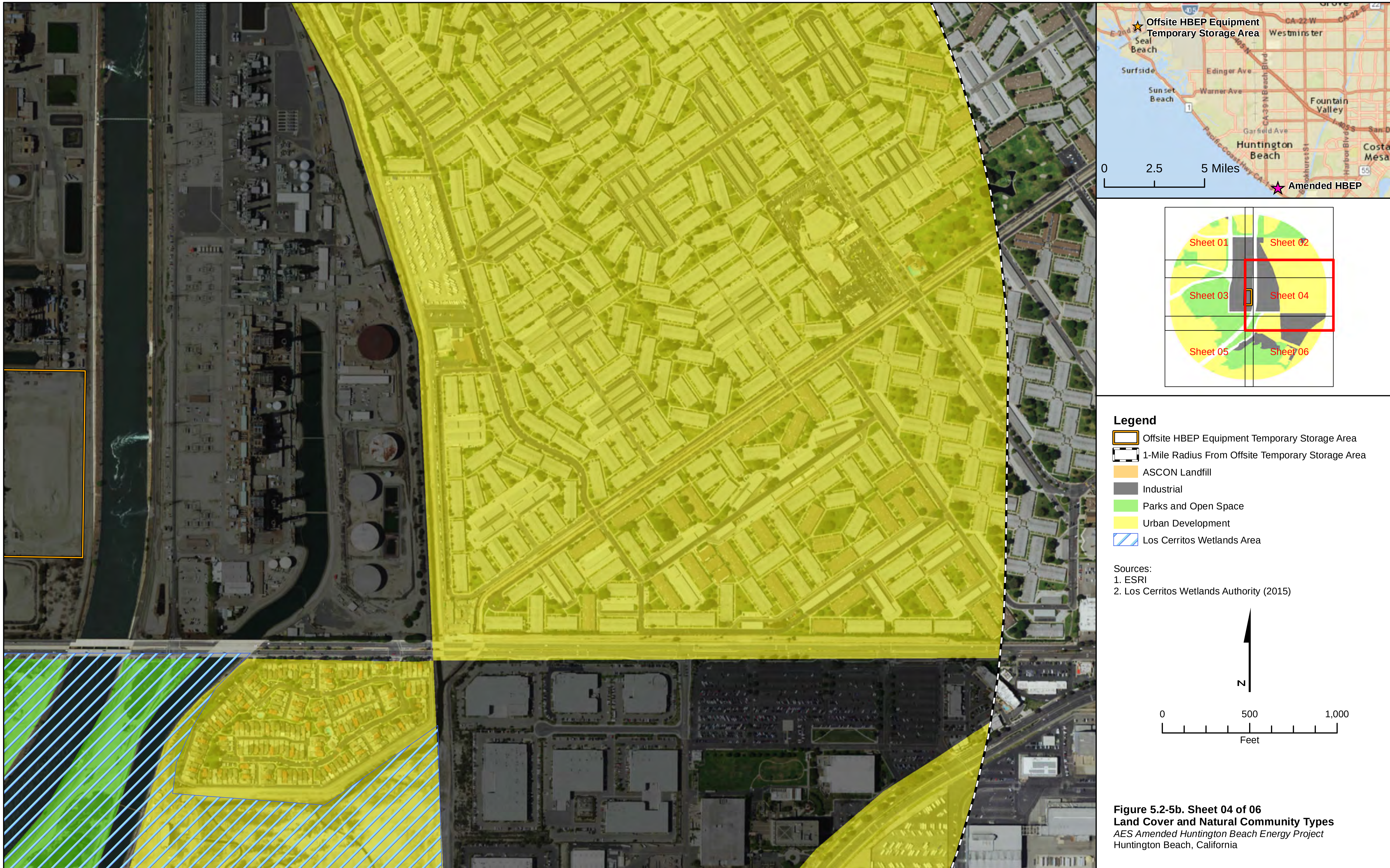

Legend

- Offsite HBEP Equipment Temporary Storage Area
- 1-Mile Radius From Offsite Temporary Storage Area
- ASCON Landfill
- Industrial
- Parks and Open Space
- Urban Development
- Los Cerritos Wetlands Area

Sources:
1. ESRI
2. Los Cerritos Wetlands Authority (2015)

N

0 500 1,000
Feet

Figure 5.2-5b. Sheet 04 of 06
Land Cover and Natural Community Types
AES Amended Huntington Beach Energy Project
Huntington Beach, California

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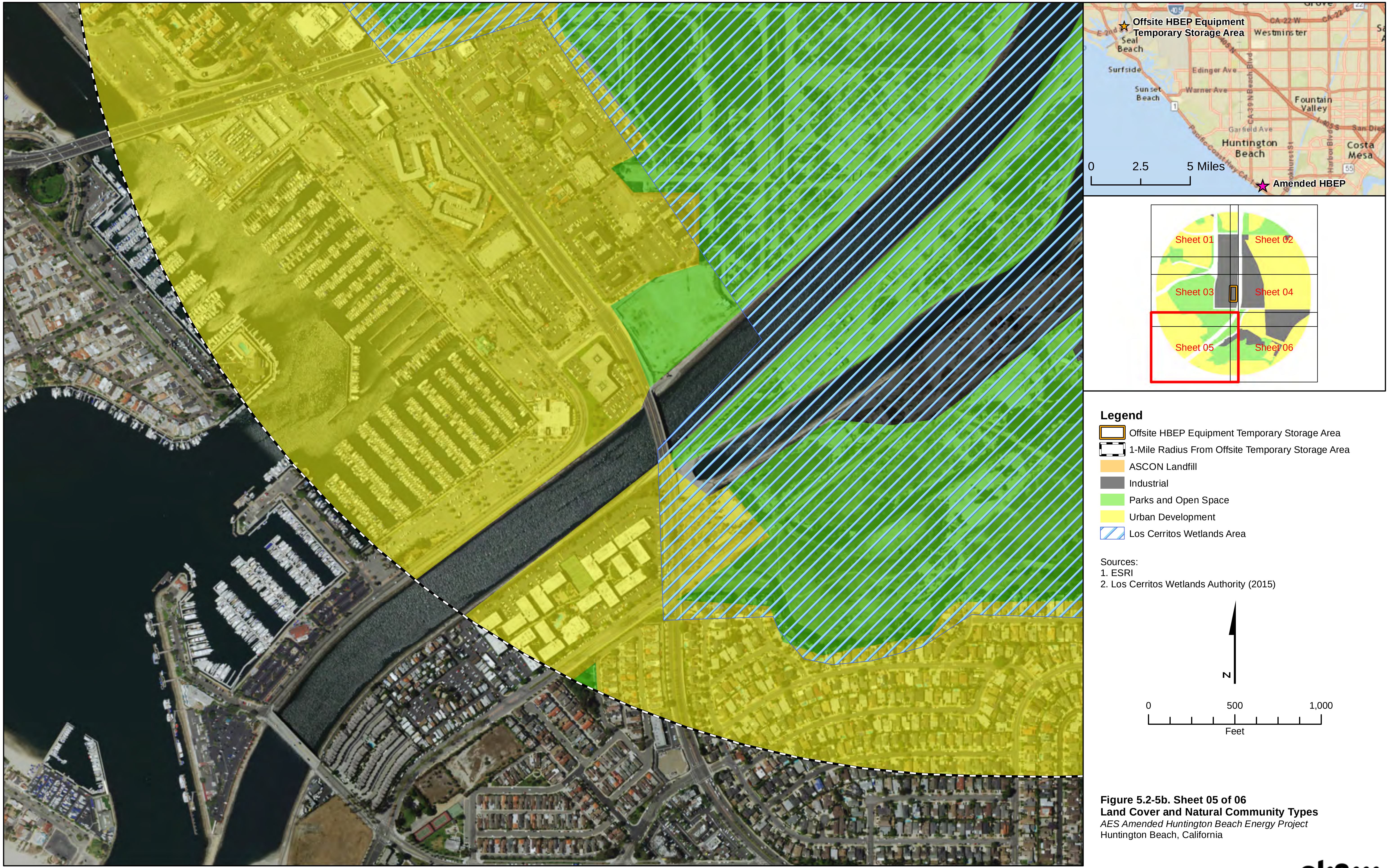

Legend

- Offsite HBEP Equipment Temporary Storage Area
- 1-Mile Radius From Offsite Temporary Storage Area
- ASCON Landfill
- Industrial
- Parks and Open Space
- Urban Development
- Los Cerritos Wetlands Area

Sources:
1. ESRI
2. Los Cerritos Wetlands Authority (2015)

N

0 500 1,000
Feet

Figure 5.2-5b. Sheet 05 of 06
Land Cover and Natural Community Types
AES Amended Huntington Beach Energy Project
Huntington Beach, California

ch2m.

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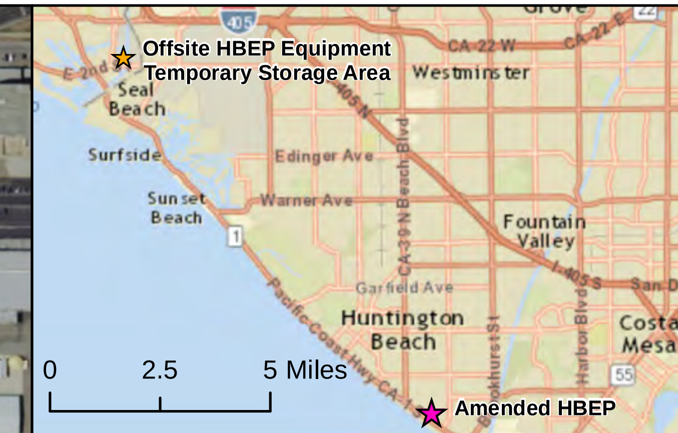

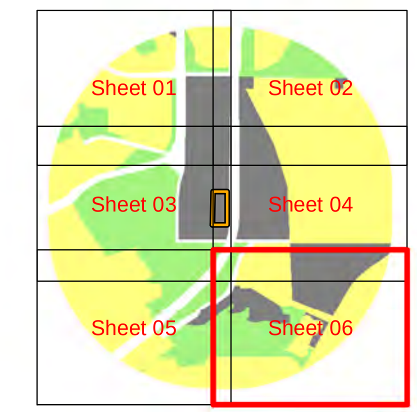

Legend

- Offsite HBEP Equipment Temporary Storage Area
- 1-Mile Radius From Offsite Temporary Storage Area
- ASCON Landfill
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- Parks and Open Space
- Urban Development
- Los Cerritos Wetlands Area

Sources:
1. ESRI
2. Los Cerritos Wetlands Authority (2015)

N

0 500 1,000
Feet

Figure 5.2-5b. Sheet 06 of 06
Land Cover and Natural Community Types
AES Amended Huntington Beach Energy Project
Huntington Beach, California

ch2m.

\\yosemite\proj\AESCorp\491232DiscPhaseRep\AFC_Archive\HBGS\GIS\AES\MapFiles\Huntington_beach\Biological\PTA\Huntington_land_cover_laydown.mxd

5.3 Cultural Resources

This section presents the Project Owner's evaluation of how the Amended HBEP could affect cultural resources and comply with applicable LORS and COCs. The Amended HBEP will not create any new significant impacts from cultural resources that were not previously analyzed during the Licensed HBEP AFC proceedings. The Amended HBEP is consistent with the Licensed HBEP, will meet the approved COCs in the Final Decision, and will comply with all applicable LORS.

5.3.1 Amendment Overview

As discussed in detail in Section 2.0 (Project Description) of this PTA, while similar in nature to the Licensed HBEP, the Amended HBEP differs from the Licensed HBEP in key ways. The Amended HBEP is a natural-gas-fired, combined-cycle and simple-cycle, air-cooled electrical generating facility located at the site of the existing Huntington Beach Generating Station in Huntington Beach, California. The combined-cycle power block will include GE Frame 7FA.05 combined-cycle gas turbines, unfired HRSGs, a steam turbine generator, an air-cooled condenser, a natural-gas-fired auxiliary boiler, and related ancillary equipment. The simple-cycle power block will include two GE LMS-100 simple-cycle units.

The Amended HBEP will be constructed on 30 acres entirely within the site of the existing Huntington Beach Generating Station. As with the Licensed HBEP, the Amended HBEP will reuse existing onsite potable water, natural gas, stormwater, process wastewater, and sanitary pipelines and electrical transmission facilities. No offsite linear developments were required for the Licensed HBEP and no offsite linear developments are required for the Amended HBEP.

Both power blocks will interconnect to the existing onsite SCE 230-kV switchyard.

As with the Licensed HBEP, construction of the Amended HBEP will require the removal of the existing Huntington Beach Generating Station Unit 5 and Units 3 and 4. Demolition of Unit 5 scheduled to occur in 2016, will provide the space for the construction of HBEP Block 1. Construction of Block 1 is expected to take approximately 36 months (including commissioning), with construction scheduled to occur from the first quarter of 2017 through the second quarter of 2020.

As with the Amended HBEP, demolition of existing Huntington Beach Generating Station Units 3 and 4 is not part of the HBEP project description, but is required in advance of the construction of the Amended HBEP simple-cycle power block.

In addition to the construction of the new generating units, upon the commercial operation of the Amended HBEP simple-cycle power block, existing Huntington Beach Generating Station Units 1 and 2 will be decommissioned and demolished to their turbine deck. See Section 2.0 (Project Description) for a description of the decommissioning and demolition of existing Huntington Beach Generating Station Units 1 and 2.

5.3.2 Changes to the Affected Environment

The affected environment remains the same as the Licensed HBEP and potential impacts to cultural resources are the same as previously analyzed. A 1.4-acre triangle-shaped paved parking lot between the SCE substation and the boundary of the Licensed HBEP has been acquired by the Project Owner and is included in the analysis of the Amended HBEP. In addition, construction of the Amended HBEP may require the use of an additional 20 acres beyond the 1.9 acres identified in the Final Decision at the former Plains All American Tank Farm site located adjacent to the HBEP site for construction laydown and construction worker parking (see Figure 5.12-4). Thus, the analysis herein includes 22 acres of the former Plains All American Tank Farm site for construction laydown and construction worker parking.

Access to the construction laydown/construction parking area is via Pacific Coast Highway to Magnolia Boulevard. Access from the construction laydown area to HBEP for equipment and materials will occur via Magnolia Boulevard Pacific Coast Highway, right on Pacific Coast Highway to Newland Street, and right on

Newland Street to the HBEP entrance. As included in the Licensed HBEP, large components of the Amended HBEP power blocks that arrive at the Port of Long Beach/Port of Los Angeles may be stored in a construction storage area at AES's Alamitos Generating Station until they can be transported and installed at the Amended HBEP site.

Construction workers parking at the former Plains All American Tank Farm will walk to the HBEP site via an existing bridge over the Huntington Beach Channel and walking path. The bridge and walking path will be fenced with temporary construction fencing for safety and to avoid impacts to the adjacent wetlands. Construction equipment will be moved from the Plains site to the Amended HBEP site via Magnolia Avenue, the Pacific Coast Highway, and Newland Street. Limited construction worker parking also is available on the Amended HBEP site

On July 7, 2015, CH2M HILL archaeologist, Gloriella Cardenas, M.A., R.P.A., completed an updated literature search of the additional buffer area east of the Plains All American Tank Farm property, which was not included in the original literature search for the HBEP. On July 9, 2015, Natalie Lawson, M.A., R.P.A., performed a pedestrian inventory of the proposed disturbance areas for the Amended HBEP to identify prehistoric or historic cultural resources that would be affected by the above-grade demolition of the tanks. Architectural historian, Amy McCarthy Reid, M.A., also completed an intensive survey of the entire Plains All American Tank Farm and a windshield survey of the adjacent parcels on July 9, 2015. This architectural survey included viewing all buildings and structures, and characterizing the adjacent neighborhood. Figure 5.3-1 shows the HBEP site and the archaeological and the architectural survey areas.

No additional literature search or surveys were completed for the 1.4-acre paved parking lot, as a literature search, an archeological pedestrian survey, and an architectural survey for this area was previously completed for the AFC and reported in that document.

An additional two previous studies were identified in the 1-mile buffer around the Plains All American Tank Farm. These two studies are listed in Table 5.3-1. No cultural resources were identified within the additional buffer area as a result of the literature search.

TABLE 5.3-1
Additional Cultural Resources Reports within 1 Mile of the Extended HBEP Study Area

Report Authors and Date	CHRIS Catalogue NADB Numbers
Langenwalter and Brock, 1985	OR-00801
Ehringer, 2011	OR-04152

The entire tank farm was excavated prior to installation of the tanks and berms are constructed around each tank. The observed surface is entirely disturbed. Scattered modern debris and shell fragments were noted throughout the survey area, but none of the observed shell was deemed cultural, as the area contains fill and is extremely disturbed. The tanks are corrugated metal clad crude oil storage tanks, with a diameter of approximately 300 feet. Each tank has an associated flat roof pump house and valve/manifold structure. As observed on aerial photographs and U.S. Geological Survey topographic quadrangle maps, the tank farm was built between 1965 and 1972. The tank farm, which was constructed just under 50 years ago, does not appear to meet any of the criteria for significance, as it is not related to important events in history or any specific person important to history, and does not possess unique or exemplary construction methods or design. Therefore, none of the buildings and structures in the Amended HBEP area is a significant historic property under Section 106 of the National Historic Preservation Act (NHPA), nor a historical resource for the purposes of the CEQA; accordingly, no impacts to a historical resource are anticipated from implementation of the Amended HBEP.

The windshield survey of the parcels adjacent to the tank farm was also conducted to identify any potential historic resources and to characterize the study area. The parcels adjacent to the tank farm are located on the east side of Magnolia Street. The parcels are part of a suburban neighborhood which consists largely of one- to two-story hipped and cross-gabled ranch style houses. According to the Orange County Assessor's office, all of the residences in the adjacent parcels were built in 1965. These residences are fairly typical mid-60s wood-frame construction. Most of them feature a variously pitched, from low to high, Asian-style gable on hip roof with wide overhanging eaves and a projecting decorative ridge beam. These characteristics were influenced by the Polynesian or Tiki style popular in the mid-1960s. Many of the residences exhibit some sort of modification to the cladding, the roofing, or the fenestration. Some of the residences exhibit modifications so substantial that the buildings now represent other styles, such as Neo-Classical and Neo-Craftsman. One residence has been modified so extensively that it is a Neo Chateauesque/Gothic Revival castle, which is situated at the corner of Magnolia and Bermuda Drive. None of the buildings included in the windshield survey appears to meet any of the criteria for significance, either on an individual basis or collectively as a district. Additionally, the view of the tank farm from these parcels is obscured from the neighborhood by the berms and landscaping.

The modifications discussed in this Petition will not result in any new or potential impacts to cultural resources beyond those previously identified and addressed in the Final Decision. The Amended HBEP is consistent with the Licensed HBEP, will meet the approved COCs in the Final Decision, and will comply with all applicable LORS.

5.3.3 Environmental Analysis

As discussed in Section 2.0 (Project Description), the demolition of the current Huntington Beach Generation Station and the construction of a natural-gas-fired, combined-cycle and simple-cycle, air-cooled electrical generating facility on the site of the Huntington Beach Generation Station will result in similar activities as described in the Final Decision. As noted above, construction of the Amended HBEP may require the use of an additional 20 acres beyond the 1.9 acres identified in the Final Decision at the former Plains All American Tank Farm site located adjacent to the HBEP site for construction laydown, and construction worker parking (see Figure 5.12-4). Removal of the tanks will occur in accordance with an existing Coastal Development Permit and is not part of the Amended HBEP. Moreover, because grading activities required for use of the Plains All American parcel are expected to occur in areas that have been previously disturbed, no impacts beyond those described in the Final Decision are anticipated. Therefore, the resource protection measures included in existing COCs CUL-1 through CUL-8 are adequate to address potential impacts to cultural resources due to the Amended HBEP. All demolition and construction activities of the Amended HBEP will be conducted in accordance with these COCs and all applicable LORS.

5.3.3.1 Construction and Demolition Impacts

The additional literature search and surveys did not identify any cultural resources within the added project footprint. Therefore, no resources are considered significant historic properties under Section 106 of the NHPA, or considered historical resources for the purposes of CEQA within the Amended HBEP. The Final Decision determined that the previous requirements for full time monitoring in certain locations at the site (25,000 sq ft) were neither feasible nor necessary (Final Decision page 5.3-8). The 1.4-acre paved parking area is similarly located in an area with little to no undisturbed soils and the likelihood of finding significant cultural or historical resources in this area is low. Accordingly, no impacts to historical resources are anticipated from project implementation.

5.3.3.2 Operation Impacts

No impacts to cultural or historical resources are anticipated during operation of the Amended HBEP.

5.3.4 Cumulative Effects

The proposed Amended HBEP will result in activities similar to those described in the Final Decision. Subsurface activities required for the Amended HBEP are expected to occur only in areas of the HBEP site that have been previously disturbed as part of historical power plant operations and tank farm installation; thus, no impacts beyond those described in the AFC and the Final Decision are anticipated. Accordingly, the resource protection measures included in existing COCs CUL-1 through CUL-8 are adequate to address potential impacts to cultural resources, and the demolition and construction activities will be conducted in accordance with these COCs and all applicable LORS. Consistent with the findings of the Licensed HBEP, cumulative effects associated with the Amended HBEP are expected to be less than significant.

5.3.5 Consistency with Laws, Ordinances, Regulations, and Standards

The Final Decision found the project to be in compliance with all applicable LORS. No applicable cultural resources LORS have been modified since the licensing of HBEP. The Amendment will not alter the assumptions or conclusions made in the Final Decision. The Amended HBEP is consistent with all applicable cultural resources-related LORS.

5.3.6 Permits and Permit Schedule

Other than certification by the CEC, no state, federal, or local permits are required by the project for the management of cultural resources. Conditions of Certification.

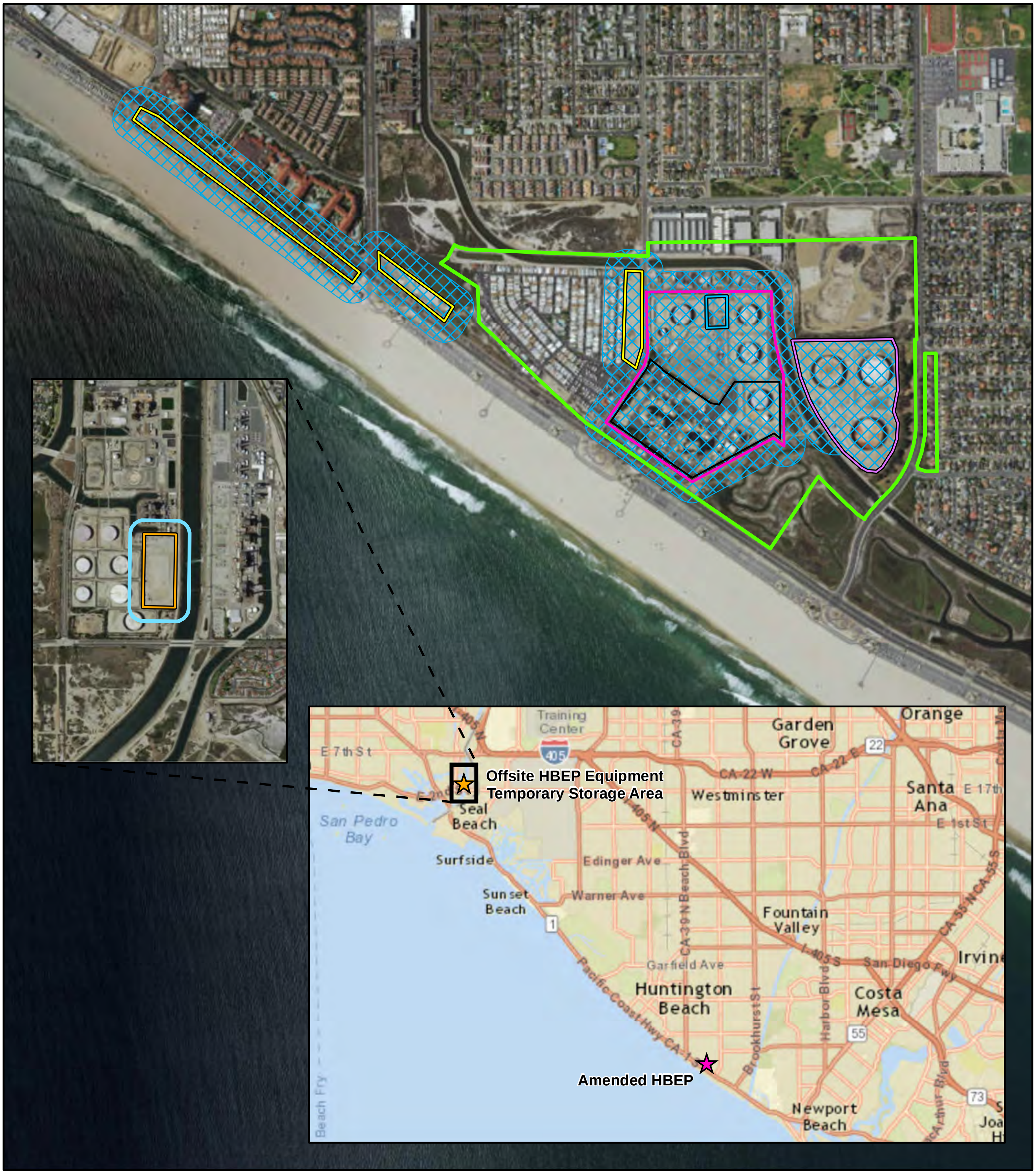
5.3.7 Conditions of Certification

No changes to previously identified cultural resources impacts will result from the approval of this Petition. Therefore, no additional resource protection measures beyond those required in the HBEP Final Decision are necessary.

5.3.8 References

In addition to the reference listed below, the references cited or consulted in the AFC and included in the Final Decision are applicable to the Amended HBEP.

California Energy Commission (CEC). 2014. *Huntington Beach Energy Project Final Decision*. CEC-800-2014-001-CMF. Docket Number 12-AFC-02.



Legend

- Architectural Survey Area
- Archaeological Survey Area
- AES Huntington Beach Generating Station
- AES Amended HBEP
- Offsite HBEP Equipment Temporary Storage Area
- Onsite Construction Parking
- Offsite Construction Parking
- Offsite Construction Parking and Laydown Area

N

0 0.25
Miles

Basemap Source: ESRI
Township 6S,Range 11W, Section 13
Township 6S,Range 11W, Section 24
Quad Name: Newport Beach

Figure 5.3-1. Archaeological and Historic Architectural Survey Area
AES Amended Huntington Beach Energy Project
Huntington Beach, California

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5.4 Geologic Hazards and Resources

This section presents an evaluation of how the Amended HBEP could impact geologic resources of commercial, recreational, or scientific value, and how the Amended HBEP will comply with applicable geologic LORS and COCs. The Amended HBEP will not create any new significant impacts from geologic hazards nor to geologic resources that were not previously identified and mitigated for in the Licensed HBEP. The Amended HBEP is consistent with the Licensed HBEP, will meet the approved COCs in the Final Decision, and will comply with all applicable LORS.

5.4.1 Amendment Overview

As discussed in detail in Section 2.0 (Project Description) of this PTA, while similar in nature to the Licensed HBEP, the Amended HBEP differs from the Licensed HBEP in key ways. The Amended HBEP is a natural-gas-fired, combined-cycle and simple-cycle, air-cooled electrical generating facility located on the site of the existing Huntington Beach Generating Station, in Huntington Beach, California. The combined-cycle power block will include GE Frame 7FA.05 combined-cycle gas turbines, HRSGs, a steam turbine generator, an air-cooled condenser, a natural gas fired auxiliary boiler, and related ancillary equipment. The simple-cycle power block will include two GE LMS-100 simple-cycle units.

The Amended HBEP will be constructed on 30 acres entirely within the site of the existing Huntington Beach Generating Station, an operating power plant. As with the Licensed HBEP, the Amended HBEP will reuse existing onsite potable water, natural gas, stormwater, process wastewater, and sanitary pipelines and electrical transmission facilities. No offsite linear developments were required for the Licensed HBEP and no offsite linear developments are required for the Amended HBEP.

Both power blocks will interconnect to the existing onsite SCE 230-kV switchyard.

As with the Licensed HBEP, construction of the Amended HBEP will require the removal of the existing Huntington Beach Generating Station Unit 5 and Units 3 and 4. Demolition of Unit 5, scheduled to occur in 2016, will provide the space for the construction of HBEP Block 1. Construction of Block 1 is expected to take approximately 36 months (including commissioning), with construction scheduled to occur from the first quarter of 2017 through the second quarter of 2020.

As with the Amended HBEP, demolition of existing Huntington Beach Generating Station Units 3 and 4 is not part of the HBEP project description, but is required in advance of the construction of the Amended HBEP simple-cycle power block.

In addition to the construction of the new generating units, upon the commercial operation of the Amended HBEP simple-cycle power block, existing Huntington Beach Generating Station Units 1 and 2 will be decommissioned and demolished to their turbine deck. See Section 2.0 (Project Description) for a description of the decommissioning and demolition of existing Huntington Beach Generating Station Units 1 and 2.

5.4.2 Changes to the Affected Environment

The affected environment remains the same as the Licensed HBEP. A 1.4-acre triangle-shaped paved parking lot between the SCE substation and the boundary of the Licensed HBEP has been acquired by the Project Owner and is included in the analysis of the Amended HBEP. In addition, construction of the Amended HBEP may require the use of an additional 20 acres beyond the 1.9 acres identified in the Final Decision at the former Plains All American Tank Farm site located adjacent to the HBEP site for construction laydown and construction worker parking (see Figure 5.12-4). Thus, the analysis herein includes 22 acres of the former Plains All American Tank Farm site for construction laydown and construction worker parking.

Access to the construction laydown/construction parking area will occur via Pacific Coast Highway to Magnolia Boulevard. Access from the construction laydown area to HBEP for equipment and materials will occur via Magnolia Boulevard to Pacific Coast Highway, right on Pacific Coast Highway to Newland Street,

and right on Newland Street to the HBEP entrance. As included in the Licensed HBEP, large components of the Amended HBEP power blocks that arrive at the Port of Long Beach/Port of Los Angeles may be stored in a construction storage area at AES's Alamitos Generating Station until they can be transported and installed at the Amended HBEP site.

Construction workers parking at the former Plains All American Tank Farm will walk to the HBEP site via an existing bridge over the Huntington Beach Channel and walking path. The bridge and walking path will be fenced with temporary construction fencing for safety and to avoid impacts to the adjacent wetlands. Construction equipment will be moved from the Plains site to the Amended HBEP site via Magnolia Avenue, the Pacific Coast Highway, and Newland Street. Limited construction worker parking also is available on the Amended HBEP site.

5.4.3 Environmental Analysis

The Amended HBEP will be constructed in accordance with 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. A final geotechnical report will be prepared before completing the final engineering design.

The existing Geologic Hazards and Resources COCs included in the existing HBEP License ensure that construction and demolition-related activities at the project site will comply with appropriate geologic hazard and resource projection plans and applicable LORS. The Amended HBEP will neither result in potential geologic hazards, nor will it result in potential impacts to geologic resources greater than those analyzed in the Final Decision, and no additional COCs are required. The geologic resource protection measures included in the existing License are adequate to address geologic hazards and potential impacts to geologic resources, and the construction and demolition activities of the Amended HBEP will be conducted in accordance with these COCs and applicable LORS. Similar to the Licensed HBEP, the Amended HBEP will not result in significant direct, indirect, or cumulative geology-related impacts.

5.4.3.1 Geologic Hazards

The Amended HBEP will not be likely to cause direct human exposure to ground rupture. Seismic hazards will be minimized by conformance with the recommended seismic design criteria of the 2013 CBC. Liquefaction potential, mass wasting, subsidence, or flooding present at the project site will be considered during project design.

In summary, compliance with the 2013 CBSC requirements (and other state and local LORS) will reduce the exposure of people to the risks associated with large seismic events, liquefaction potential, and expansive soils to less-than-significant levels. Additionally, major structures will be designed to withstand the strong ground motion of a design basis earthquake, as defined by the 2013 CBC. Through compliance with CBC standards, impacts associated with geologic hazards will be less than significant.

5.4.3.2 Geologic Resources

The Amended HBEP will not result in a loss of availability of a known mineral resource that would be of value to the region and the residents of the state. Additionally, HBEP will not result in the loss of availability of a locally important mineral resource recovery site delineated on a local plan, specific plan, or other land use plan. No such resources have been identified on or near the site; therefore, there will be no adverse impacts on geologic resources.

5.4.4 Cumulative Effects

Because structures will be designed to meet seismic requirements of the 2013 CBC, the Amended HBEP will not cause adverse impacts on geologic resources and will not cause an exposure of people or property to geologic hazards. Additionally, there are no minor impacts that could combine cumulatively with those of other projects. Thus, the Amended HBEP will not result in a cumulatively considerable impact and consistent with the findings of the Licensed HBEP, cumulative effects are expected to be less than significant.

5.4.5 Consistency with Laws, Ordinances, Regulations, and Standards

The Final Decision found the project to be in compliance with all applicable LORS. No applicable geologic resources LORS have been modified or adopted since the licensing of HBEP. The Amendment will not alter the assumptions or conclusions made in the Final Decision. The Amended HBEP is consistent with all applicable geologic resources and hazards -related LORS.

5.4.6 Conditions of Certification

No changes to previously identified geologic resources impacts will result from the approval of this Petition. Therefore, no additional geologic resources and hazards related Conditions of Certification beyond those required in the HBEP Final Decision are necessary.

5.4.7 References

In addition to the references listed below, the references cited or consulted in the AFC and included in the Final Decision are applicable to the Amended HBEP.

California Building Standards Code. 2013 Edition. July. Also known as Title 24, California Code of Regulations.

California Energy Commission (CEC). 2014. *Huntington Beach Energy Project Final Decision*. CEC-800-2014-001-CMF. Docket Number 12-AFC-02.

5.5 Hazardous Materials Handling

This section presents the Project Owner's evaluation of how the Amended HBEP could impact human health and the environment from the storage and use of hazardous materials, and how the project will comply with applicable hazardous materials LORS and COCs. The Amended HBEP will not create any new significant impacts from hazardous materials handling that were not previously analyzed during the Licensed HBEP AFC proceedings. The Amended HBEP is consistent with the Licensed HBEP, will meet the approved COCs in the Final Decision, and will comply with all applicable LORS.

5.5.1 Amendment Overview

As discussed in detail in Section 2.0 (Project Description) of this PTA, while similar in nature to the Licensed HBEP, the Amended HBEP differs from the Licensed HBEP in key ways. The Amended HBEP is a natural-gas-fired, combined-cycle and simple-cycle, air-cooled electrical generating facility located on the site of the existing Huntington Beach Generating Station, in Huntington Beach, California. The combined-cycle power block will include GE Frame 7FA.05 combined-cycle gas turbines, a steam turbine generator, an air-cooled condenser, a natural gas fired auxiliary boiler, and related ancillary equipment. The simple-cycle power block will include two GE LMS-100 simple-cycle units.

The Amended HBEP will be constructed on 30 acres entirely within the site of the existing Huntington Beach Generating Station, an operating power plant. As with the Licensed HBEP, the Amended HBEP will reuse existing onsite potable water, natural gas, stormwater, process wastewater, and sanitary pipelines and electrical transmission facilities. No offsite linear developments were required for the Licensed HBEP and no offsite linear developments are required for the Amended HBEP.

Both power blocks will interconnect to the existing onsite SCE 230-kV switchyard.

As with the Licensed HBEP, construction of the Amended HBEP will require the removal of the existing Huntington Beach Generating Station Unit 5 and Units 3 and 4. Demolition of Unit 5, scheduled to occur in the first quarter of 2016 will provide the space for the construction of HBEP Block 1. Construction of Blocks 1 is expected to take approximately 36 months (including commissioning), with construction scheduled to occur from the first quarter of 2017 through the second quarter of 2020.

As with the Amended HBEP, demolition of existing Huntington Beach Generating Station Units 3 and 4 is not part of the HBEP project description, but is required in advance of the construction of the Amended HBEP simple-cycle power block.

In addition to the construction of the new generating units, upon the commercial operation of Amended HBEP simple-cycle power block, existing Huntington Beach Generating Station Units 1 and 2 will be decommissioned and demolished to their turbine deck. See Section 2.0 (Project Description) for a description of the decommissioning and demolition of existing Huntington Beach Generating Station Units 1 and 2.

5.5.2 Changes to the Affected Environment

The affected environment remains the same as the Licensed HBEP. A 1.4-acre triangle-shaped paved parking lot between the SCE substation and the boundary of the Licensed HBEP has been acquired by the Project Owner and is included in the analysis of the Amended HBEP. In addition, construction of the Amended HBEP may require the use of an additional 20 acres beyond the 1.9 acres identified in the Final Decision at the former Plains All American Tank Farm site located adjacent to the HBEP site for construction laydown and construction worker parking (see Figure 5.12-4). Thus, the analysis herein includes 22 acres of the former Plains All American Tank Farm site for construction laydown and construction worker parking.

Access to the construction laydown/construction parking area will occur via Pacific Coast Highway to Magnolia Boulevard. Access from the construction laydown area to HBEP for equipment and materials will occur via Magnolia Boulevard to Pacific Coast Highway, right on Pacific Coast Highway to Newland Street,

and right on Newland Street to the HBEP entrance. As included in the Licensed HBEP, large components of the Amended HBEP power blocks that arrive at the Port of Long Beach/Port of Los Angeles may be stored in a construction storage area at AES's Alamitos Generating Station until they can be transported and installed at the Amended HBEP site.

Construction workers parking at the former Plains All American Tank Farm will walk to the HBEP site via an existing bridge over the Huntington Beach Channel and walking path. The bridge and walking path will be fenced with temporary construction fencing for safety and to avoid impacts to the adjacent wetlands. Construction equipment will be moved from the Plains site to the Amended HBEP site via Magnolia Avenue, the Pacific Coast Highway, and Newland Street. Limited construction worker parking also is available on the Amended HBEP site.

5.5.3 Environmental Analysis

As with the Licensed HBEP, construction and operation of the Amended HBEP will involve the use of various hazardous materials and one regulated substance. The use of these materials and their potential to cause adverse environmental and human health effects are discussed in this section.

5.5.3.1 Hazardous Materials Management

The Amended HBEP will use and store hazardous materials during project construction, demolition, and operation activities. During construction and demolition, the Amended HBEP will use/store same types and volumes of hazardous material as were analyzed for the Licensed HBEP. The project will comply with applicable laws and regulations for the use and storage of these materials to minimize the potential for a release of hazardous materials, and will conduct emergency response planning to address public health concerns regarding hazardous materials storage and use.

Operation of the Amended HBEP will also include the use and storage of the same types of hazardous materials. However, as the Amended HBEP will include a simple-cycle power block, the volumes of some of these hazardous materials will be reduced. Appendix 5.5A presents a list of the hazardous materials required by power block. The potential impacts associated with the use and storage of these hazardous materials will be similar or less than those analyzed during the licensing of HBEP and the mitigation measures contained in the HBEP license ensure the potential impacts are less than significant.

5.5.4 Cumulative Effects

Existing laws and regulations address the handling of hazardous materials and the transportation and use of aqueous ammonia, an acutely hazardous material. Adherence to these laws and regulations will facilitate the safe management of hazardous materials at the Amended HBEP.

Consistent with the findings of the Licensed HBEP, cumulative effects associated with the Amended HBEP are expected to be less than significant.

5.5.5 Consistency with Laws, Ordinances, Regulations, and Standards

The Final Decision found the project to be in compliance with applicable hazardous materials and no additional regulated substances-related LORS have been adopted or modified since the licensing of HBEP. The Amended HBEP will not alter the assumptions or conclusions made in the Final Decision and no additional or revised LORS compliance issues have been identified.

5.5.6 Conditions of Certification

The handling, use, and transport of hazardous materials for Amended HBEP are subject to approved COCs HAZ-1 through HAZ-9 included in the Final Decision, which are adequate to address any new potential impacts from the Amended HBEP. The only modifications to the hazardous materials COCs is to replace the Appendix B reference in Condition HAZ-1 with the tables presented in Appendix 5.5A hereto.

5.5.7 References

In addition to the reference listed below, the references cited or consulted in the AFC and included in the Final Decision are applicable to the Amended HBEP.

California Energy Commission (CEC). 2014. *Huntington Beach Energy Project Final Decision*. CEC-800-2014-001-CMF. Docket Number 12-AFC-02.

5.6 Land Use

This section discusses the environmental and regulatory setting and analyzes the potential land use impacts of the Amended HBEP. The Amended HBEP will not create any new land use-related impacts that were not previously analyzed during the Licensed HBEP AFC proceedings. The Amended HBEP is consistent with the Licensed HBEP, will meet the approved COCs in the Final Decision, and will comply with all applicable LORS.

5.6.1 Amendment Overview

As discussed in detail in Section 2.0 (Project Description) of this PTA, while similar in nature to the Licensed HBEP, the Amended HBEP differs from the Licensed HBEP in key ways. The Amended HBEP is a natural-gas-fired, combined-cycle and simple-cycle, air-cooled electrical generating facility located on the site of the existing Huntington Beach Generating Station in Huntington Beach, California. The combined-cycle power block will include GE Frame 7FA.05 combined-cycle gas turbines, unfired HRSGs, a steam turbine generator, an air-cooled condenser, a natural-gas-fired auxiliary boiler, and related ancillary equipment. The simple-cycle power block will include two GE LMS-100 simple-cycle units.

The Amended HBEP will be constructed on 30 acres entirely within the site of the existing Huntington Beach Generating Station. As with the Licensed HBEP, the Amended HBEP will reuse existing onsite potable water, natural gas, stormwater, process wastewater, and sanitary pipelines and electrical transmission facilities. No offsite linear developments were required for the Licensed HBEP and no offsite linear developments are required for the Amended HBEP.

Both power blocks will interconnect to the existing onsite SCE 230-kV switchyard.

As with the Licensed HBEP, construction of the Amended HBEP will require the removal of the existing Huntington Beach Generating Station Unit 5 and Units 3 and 4. Demolition of Unit 5, scheduled to occur in 2016, will provide the space for the construction of HBEP Block 1. Construction of Block 1 is expected to take approximately 36 months (including commissioning), with construction scheduled to occur from the first quarter of 2017 through the second quarter of 2020.

As with the Licensed HBEP, demolition of existing Huntington Beach Generating Station Units 3 and 4 is not part of the Amended HBEP project description, but is required in advance of the construction of the Amended HBEP simple-cycle power block.

In addition to the construction of the new generating units, upon the commercial operation of the Amended HBEP simple-cycle power block, existing Huntington Beach Generating Station Units 1 and 2 will be decommissioned and demolished to their steam turbine deck. See Section 2.0 (Project Description) for a description of the decommissioning and demolition of existing Huntington Beach Generating Station Units 1 and 2.

5.6.2 Changes to the Affected Environment

The affected environment remains the same as the Licensed HBEP. A 1.4-acre triangle-shaped paved parking lot between the SCE substation and the boundary of the Licensed HBEP has been acquired by the Project Owner and is included in the analysis of the Amended HBEP. In addition, construction of the Amended HBEP may require the use of an additional 20 acres beyond the 1.9 acres identified in the Final Decision at the former Plains All American Tank Farm site located adjacent to the HBEP site for construction laydown and construction worker parking (see Figure 5.12-4). Thus, the analysis herein includes 22 acres of the former Plains All American Tank Farm site for construction laydown and construction worker parking.

Access to the construction laydown/construction parking area will occur via Pacific Coast Highway to Magnolia Boulevard. Access from the construction laydown area to HBEP for equipment and materials will occur via Magnolia Boulevard to Pacific Coast Highway, right on Pacific Coast Highway to Newland Street, and right on Newland Street to the HBEP entrance. As included in the Licensed HBEP, large components of the Amended HBEP power blocks that arrive at the Port of Long Beach/Port of Los Angeles may be stored in a construction storage area at AES's Alamitos Generating Station until they can be transported and installed at the Amended HBEP site.

Construction workers parking at the former Plains All American Tank Farm will walk to the HBEP site via an existing bridge over the Huntington Beach Channel and walking path. The bridge and walking path will be fenced with temporary construction fencing for safety and to avoid impacts to the adjacent wetlands. Construction equipment will be moved from the Plains site to the Amended HBEP site via Magnolia Avenue, the Pacific Coast Highway, and Newland Street. Limited construction worker parking also is available on the Amended HBEP site.

5.6.3 Environmental Analysis

As with the Licensed HBEP site, the Amended HBEP study area encompasses the southerly portion of Huntington Beach in western Orange County, California. Because Huntington Beach is largely built-out, there is limited new development within 1 mile of the HBEP site, although several large-scale, pending redevelopment projects are planned beyond the study area boundary. Figure 5.6-1 shows existing uses in the area of the Amended HBEP and the surrounding area, and Figure 5.6-2 shows the General Plan Land Use Designations within this study area. Figure 5.6-3 depicts the zoning districts in the study area and Figure 5.6-4 depicts the zoning districts in the HBEP's offsite construction laydown area at the AES Alamitos Generating Station site.

As with the Licensed HBEP, the Amended HBEP will not physically divide an established community because it is will be located on land occupied by the existing Huntington Beach Generating Station. The existing Huntington Beach Generating Station is designated for industrial and energy-related uses under the Huntington Beach General Plan and Huntington Beach Zoning Ordinance, which allows coastal-dependent electrical generation and transmission facilities. Therefore, as with the Licensed HBEP, implementation of the Amended HBEP will not divide an established community, affect access to the City or the Amended HBEP area, or introduce incompatible land uses. The project would not involve the displacement of any existing nonindustrial development, nor would it result in new development that would physically divide an existing neighborhood.

The Amended HBEP's impacts on land use remain unchanged from the Licensed HBEP. The project site is located on land that is designated for public uses, including utilities such as energy facilities under the Huntington Beach General Plan (P - Public) and Huntington Beach Zoning Ordinance (PS – Public–Semipublic). This zoning district provides areas for large public or semipublic uses including major utilities, for which approval of a Conditional Use Permit from the City would be required except for the CEC licensing process. The intent of this zoning district in the coastal zone is to implement the Public, Quasi-Public, and Institutional land use designations of the certified Local Coastal Program Land Use Plan. This district is also consistent within the Public General Plan land use designation that currently applies to the Licensed HBEP. Because of the nature of the allowable activities, the Amended HBEP is consistent with applicable City of Huntington Beach's plans, policies, and regulations.

5.6.4 Cumulative Effects

As with the Licensed HBEP, long-term cumulative impacts are not anticipated with the implementation of the Amended HBEP because other projects are also required to comply with CEQA guideline requirements for evaluating potential cumulative impacts, or to obtain approval from the City prior to permitting and construction by demonstrating conformance with existing land use policies.

5.6.5 Consistency with Laws, Ordinances, Regulations, and Standards

The Final Decision found the project to be in compliance with all applicable LORS. No applicable land use LORS have been modified or adopted since the licensing of HBEP. The Amendment will not alter the assumptions or conclusions made in the Final Decision. The Amended HBEP is consistent with all applicable land use-related LORS.

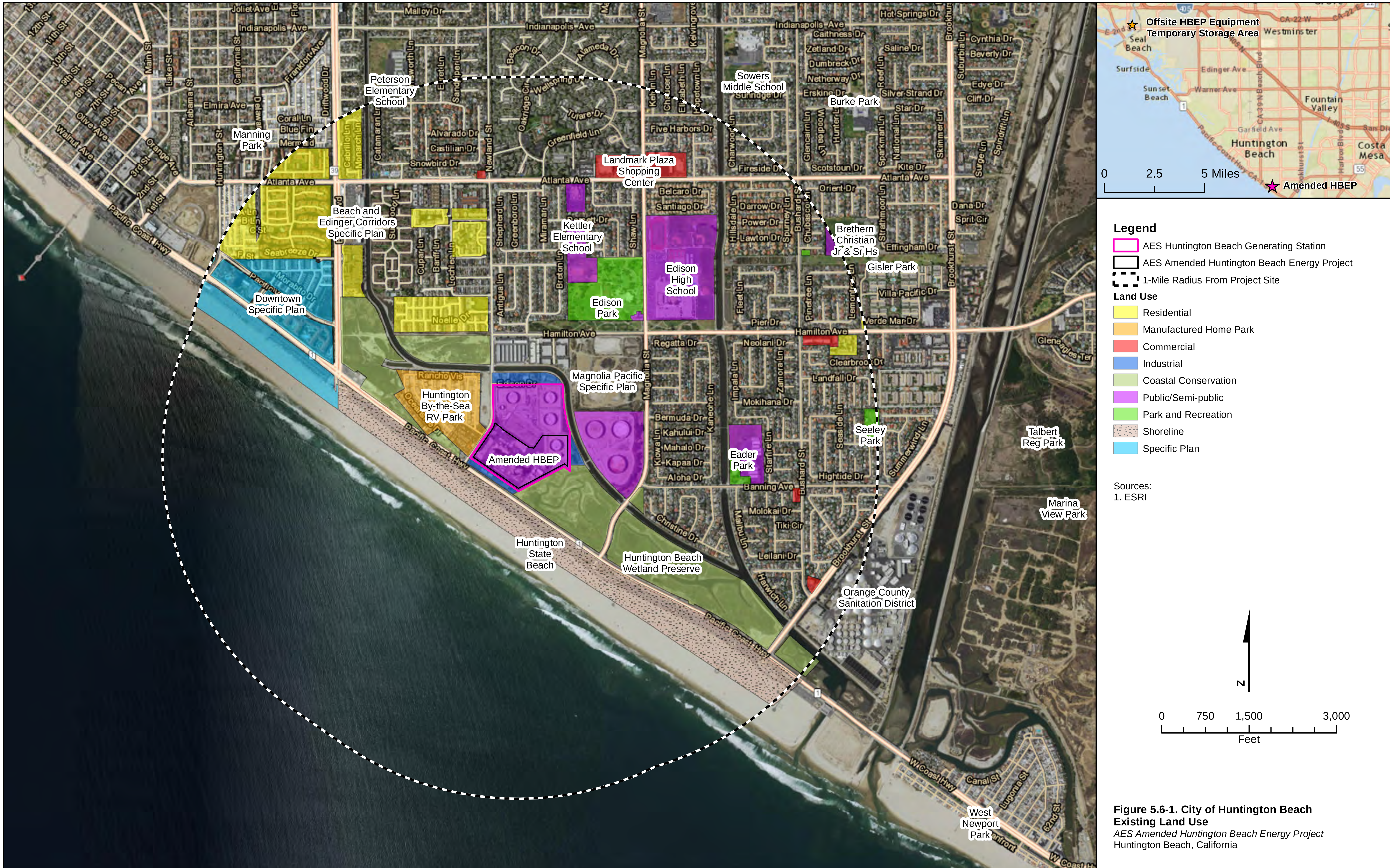
5.6.6 Conditions of Certification

No changes to previously identified land use impacts will result from the approval of this Petition. Therefore, no additional land use Conditions of Certification beyond those required in the HBEP Final Decision are necessary.

5.6.7 References

In addition to the reference listed below, the references cited or consulted in the AFC and included in the Final Decision are applicable to the Amended HBEP.

California Energy Commission (CEC). 2014. *Huntington Beach Energy Project Final Decision*. CEC-800-2014-001-CMF. Docket Number 12-AFC-02.



Legend

- AES Huntington Beach Generating Station
- AES Amended Huntington Beach Energy Project
- 1-Mile Radius From Project Site

Land Use

- Residential
- Manufactured Home Park
- Commercial
- Industrial
- Coastal Conservation
- Public/Semi-public
- Park and Recreation
- Shoreline
- Specific Plan

Sources:
1. ESRI

N

0 750 1,500 3,000
Feet

Figure 5.6-1. City of Huntington Beach Existing Land Use
AES Amended Huntington Beach Energy Project
Huntington Beach, California

ch2m.

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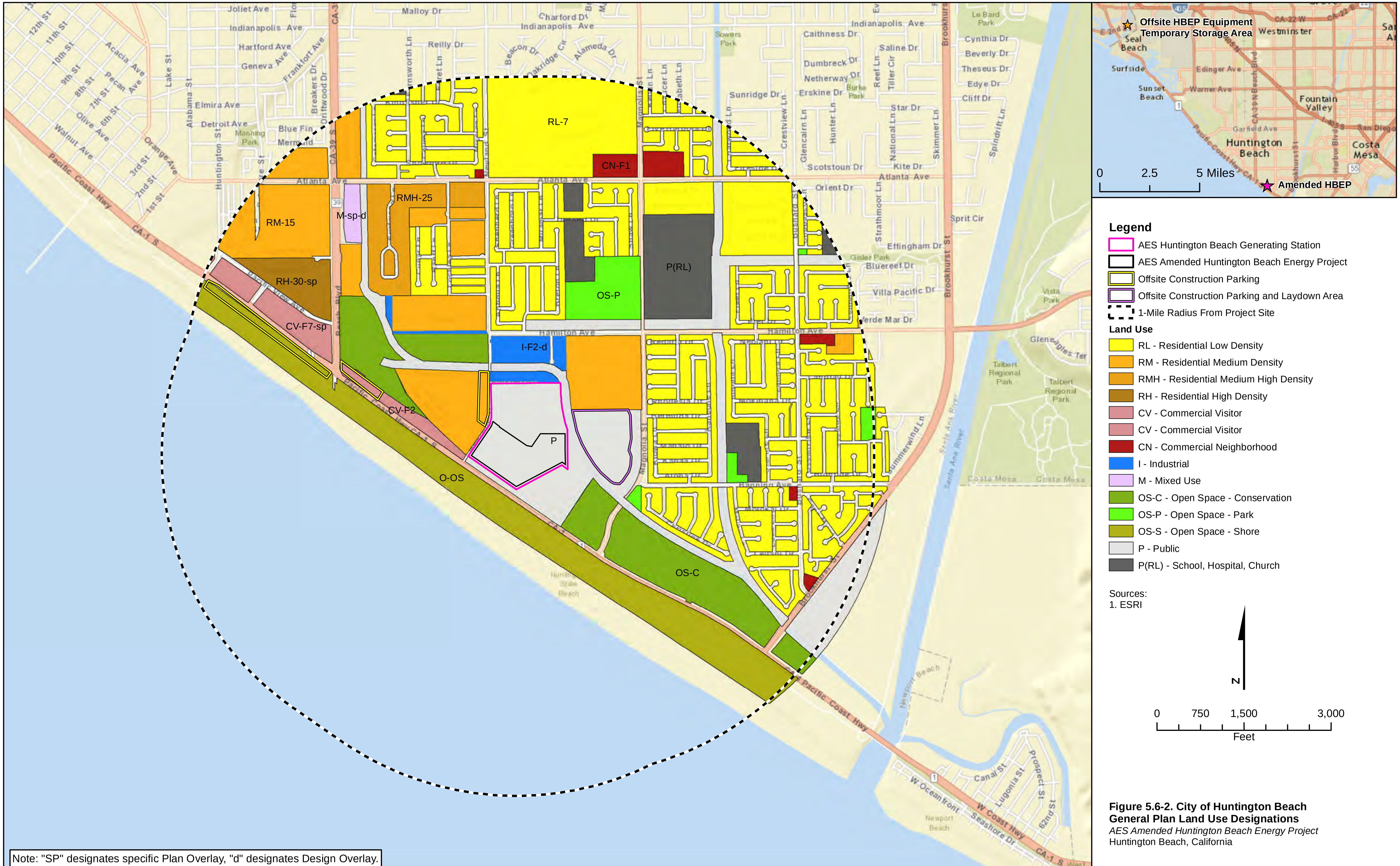

Figure 5.6-2. City of Huntington Beach General Plan Land Use Designations
AES Amended Huntington Beach Energy Project
Huntington Beach, California

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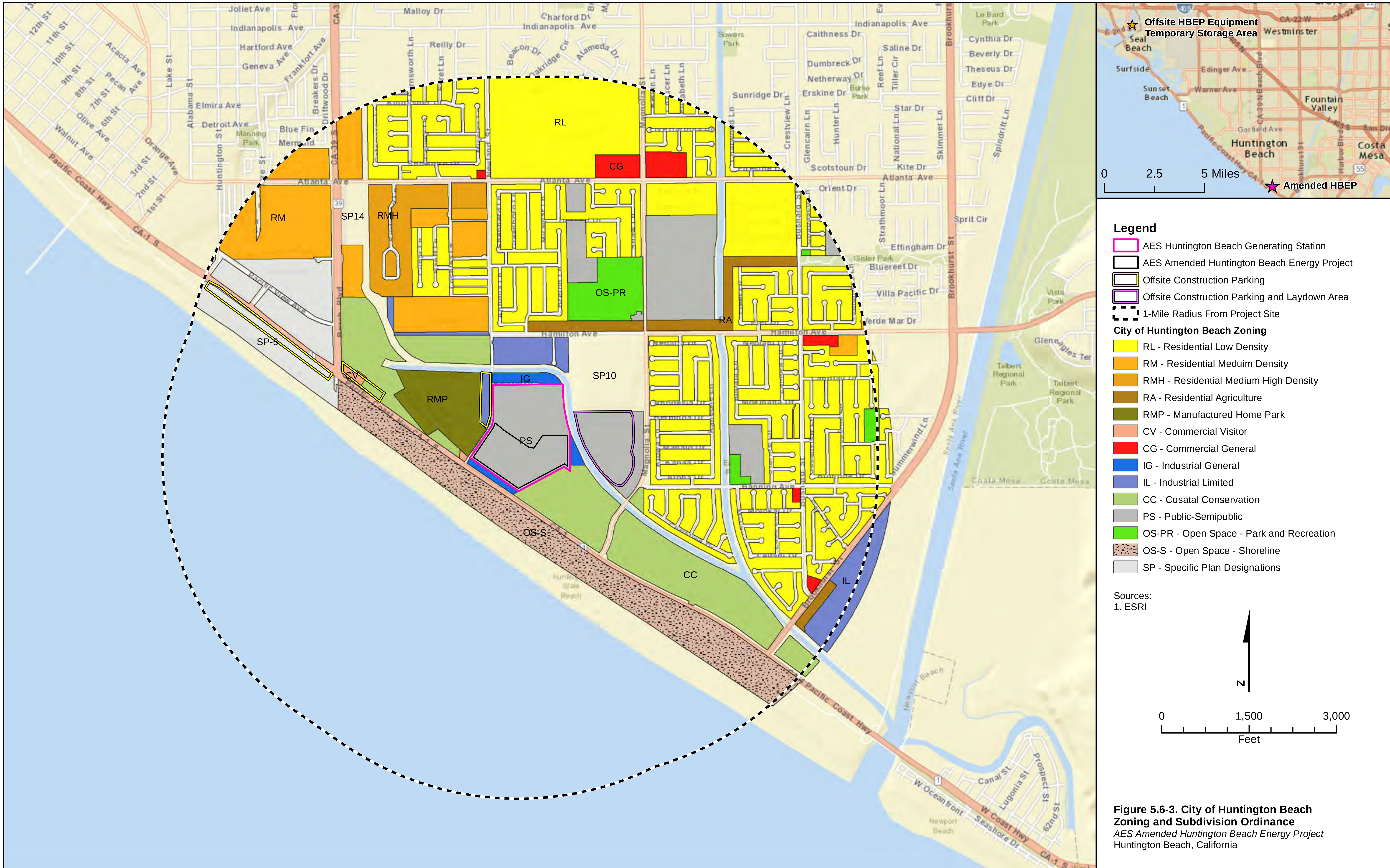

Figure 5.6-3. City of Huntington Beach Zoning and Subdivision Ordinance
AES Amended Huntington Beach Energy Project
Huntington Beach, California

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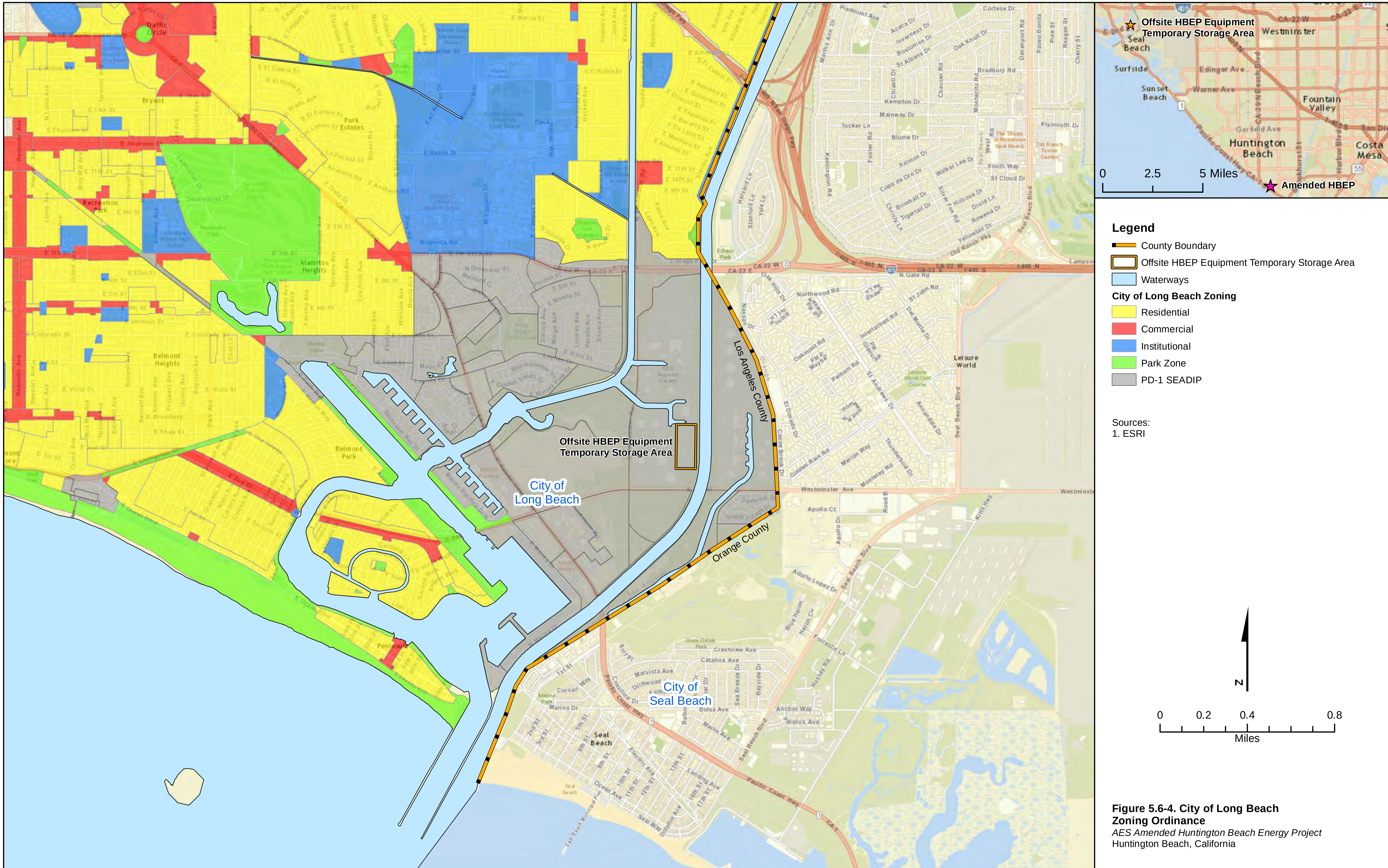

Sources:
1. ESRI

Figure 5.6-4. City of Long Beach Zoning Ordinance
AES Amended Huntington Beach Energy Project
Huntington Beach, California

5.7 Noise and Vibration

This section presents the Project Owner's evaluation of the Amended HBEP in terms of potential effects from noise and vibration, and how the Amended HBEP will comply with the LORS and the COCs in the Licensed HBEP applicable to noise and vibration.

The Amended HBEP will not create any new noise-related impacts that were not previously analyzed during the Licensed HBEP AFC proceedings. The Amended HBEP is consistent with the Licensed HBEP, will meet to the approved COCs in the Final Decision, and complies with applicable LORS.

5.7.1 Amendment Overview

As discussed in detail in Section 2.0 (Project Description) of this PTA, while similar in nature to the Licensed HBEP, the Amended HBEP differs from the Licensed HBEP in key ways. The Amended HBEP is a natural-gas-fired, combined-cycle and simple-cycle, air-cooled electrical generating facility located at the site of the existing Huntington Beach Generating Station in Huntington Beach, California. The combined-cycle power block will include GE Frame 7FA.05 combined-cycle gas turbines, a steam turbine generator, an air-cooled condenser, a natural-gas-fired auxiliary boiler, and related ancillary equipment. The simple-cycle power block will include two GE LMS-100 simple-cycle units.

The Amended HBEP will be constructed on 30 acres entirely within the site of the existing Huntington Beach Generating Station. As with the Licensed HBEP, the Amended HBEP will reuse existing onsite potable water, natural gas, stormwater, process wastewater, and sanitary pipelines and electrical transmission facilities. No offsite linear developments were required for the Licensed HBEP and no offsite linear developments are required for the Amended HBEP.

Both power blocks will interconnect to the existing onsite SCE 230-kV switchyard.

As with the Licensed HBEP, construction of the Amended HBEP will require the removal of the existing Huntington Beach Generating Station Unit 5 and Units 3 and 4. Demolition of Unit 5, scheduled to occur in 2016, will provide the space for the construction of HBEP Block 1. Construction of Block 1 is expected to take approximately 36 months (including commissioning), with construction scheduled to occur from the first quarter of 2017 through the second quarter of 2020.

As with the Amended HBEP, demolition of existing Huntington Beach Generating Station Units 3 and 4 is not part of the HBEP project description, but is required in advance of the construction of the Amended HBEP simple-cycle power block.

In addition to the construction of the new generating units, upon the commercial operation of the Amended HBEP simple-cycle power block, existing Huntington Beach Generating Station Units 1 and 2 will be decommissioned and demolished to their turbine deck. See Section 2.0 (Project Description) for a description of the decommissioning and demolition of existing Huntington Beach Generating Station Units 1 and 2.

5.7.2 Changes to the Affected Environment

The affected environment remains the same as the Licensed HBEP. A 1.4-acre triangle-shaped paved parking lot between the SCE substation and the boundary of the Licensed HBEP has been acquired by the Project Owner and is included in the analysis of the Amended HBEP. In addition, construction of the Amended HBEP may require the use of an additional 20 acres beyond the 1.9 acres identified in the Final Decision at the former Plains All American Tank Farm site located adjacent to the HBEP site for construction laydown and construction worker parking (see Figure 5.12-4). Thus, the analysis herein includes 22 acres of the former Plains All American Tank Farm site for construction laydown and construction worker parking.

Access to the construction laydown/construction parking area will occur via Pacific Coast Highway to Magnolia Boulevard. Access from the construction laydown area to HBEP for equipment and materials will occur via Magnolia Boulevard to Pacific Coast Highway, right on Pacific Coast Highway to Newland Street,

and right on Newland Street to the HBEP entrance. As included in the Licensed HBEP, large components of the Amended HBEP power blocks that arrive at the Port of Long Beach/Port of Los Angeles may be stored in a construction storage area at AES's Alamitos Generating Station until they can be transported and installed at the Amended HBEP site.

Construction workers parking at the former Plains All American Tank Farm will walk to the HBEP site via an existing bridge over the Huntington Beach Channel and walking path. The bridge and walking path will be fenced with temporary construction fencing for safety and to avoid impacts to the adjacent wetlands. Construction equipment will be moved from the Plains site to the Amended HBEP site via Magnolia Avenue, the Pacific Coast Highway, and Newland Street. Limited construction worker parking also is available on the Amended HBEP site.

5.7.3 Environmental Analysis

The land use surrounding the Amended HBEP is unchanged from the land use previously analyzed for the Licensed HBEP. The construction of the Amended HBEP and demolition of existing Huntington Beach Generating Station-related infrastructure will use similar construction equipment and consist of similar activities to those identified for the Licensed HBEP. However, unlike the Licensed HBEP, the anticipated Amended HBEP construction schedule does not involve demolition and construction activities occurring simultaneously. The Amended HBEP will comply with all existing noise and vibration COCs established for the Licensed HBEP, including those that address construction/demolition activities as well as operational noise limits. The Amended HBEP is consistent with the Licensed HBEP, will meet the approved COCs in the Final Decision, and will comply with all applicable LORS. The modifications discussed herein will therefore not result in any new or potential noise and vibration impacts beyond those previously analyzed in the HBEP Final Decision.

5.7.4 Cumulative Effects

No new or pending residential, commercial, and industrial projects in the area have been identified as substantial sources of noise in the project vicinity. The simultaneous construction or demolition activities that may occur in the project area are limited to 8 months when the Plains Tank Farm demolition will occur simultaneously with the Huntington Beach Generating Station Unit 5 and tank demolition. Given that the equipment associated with demolition activities for the Huntington Beach Generating Station and Plains Tank Farm will likely be similar, simultaneous demolition would be expected to result in an increase of 3 decibels (A-weighted scale) compared to levels that would occur separately. The Plains Tank Farm demolition and the Huntington Beach Generating Station Unit 5 and tank demolition will be temporary in nature and will not be cumulative for the entire 8-month period. The status of the Poseidon development is unchanged in that it has not to date received final approval from the California Coastal Commission.

Consistent with the findings of the Licensed HBEP, cumulative effects associated with the Amended HBEP are expected to be less than significant.

5.7.5 Consistency with Laws, Ordinances, Regulations, and Standards

The Final Decision found the project to be in compliance with all applicable LORS. No applicable noise LORS have been modified since the licensing of HBEP. The Amendment will not alter the assumptions or conclusions made in the Final Decision. The Amended HBEP is consistent with all applicable noise-related LORS.

5.7.6 Conditions of Certification

No changes to previously identified noise impacts will result from the approval of this Petition. Therefore, no additional noise resource protection measures beyond those required in the HBEP Final Decision are necessary.

5.7.7 References

In addition to the reference listed below, the references cited or consulted in the AFC and included in the Final Decision are applicable to the Amended HBEP.

California Energy Commission (CEC). 2014. *Huntington Beach Energy Project Final Decision*. CEC-800-2014-001-CMF. Docket Number 12-AFC-02.

5.8 Paleontological Resources

This section presents the Project Owner's evaluation of how the Amended HBEP affects paleontological resources (fossils), and how the project will comply with applicable LORS and COCs.

The Amended HBEP will not create any new significant impacts on paleontological resources that were not previously identified and mitigated for in the Licensed HBEP. The Amended HBEP is consistent with the Licensed HBEP, will meet the approved COCs in the Final Decision, and will comply with all applicable LORS.

5.8.1 Amendment Overview

As discussed in detail in Section 2.0 (Project Description) of this PTA, while similar in nature to the Licensed HBEP, the Amended HBEP differs from the Licensed HBEP in key ways. The Amended HBEP is a natural-gas-fired, combined-cycle and simple-cycle, air-cooled electrical generating facility located on the site of the existing Huntington Beach Generating Station, in Huntington Beach, California. The combined-cycle power block will include GE Frame 7FA.05 combined-cycle gas turbines, HRSGs, a steam turbine generator, an air-cooled condenser, a natural-gas-fired auxiliary boiler, and related ancillary equipment. The simple-cycle power block will include two GE LMS-100 simple-cycle units.

The Amended HBEP will be constructed on 30 acres entirely within the site of the existing Huntington Beach Generating Station. As with the Licensed HBEP, the Amended HBEP will reuse existing onsite potable water, natural gas, stormwater, process wastewater, and sanitary pipelines and electrical transmission facilities. No offsite linear developments were required for the Licensed HBEP and no offsite linear developments are required for the Amended HBEP.

Both power blocks will interconnect to the existing onsite SCE 230-kV switchyard.

As with the Amended HBEP, construction of the Amended HBEP will require the removal of the existing Huntington Beach Generating Station Unit 5 and Units 3 and 4. Demolition of Unit 5, scheduled to occur in 2016, will provide the space for the construction of HBEP Block 1. Construction of Block 1 is expected to take approximately 36 months (including commissioning), with construction scheduled to occur from the first quarter of 2017 through the second quarter of 2020.

As with the Amended HBEP, demolition of existing Huntington Beach Generating Station Units 3 and 4 is not part of the HBEP project description, but is required in advance of the construction of the Amended HBEP simple-cycle power block.

In addition to the construction of the new generating units, upon the commercial operation of Amended HBEP simple-cycle power block, existing Huntington Beach Generating Station Units 1 and 2 will be decommissioned and demolished to their turbine deck. See Section 2.0 (Project Description) for a description of the decommissioning and demolition of existing Huntington Beach Generating Station Units 1 and 2.

5.8.2 Changes to the Affected Environment

The affected environment remains the same as the Licensed HBEP. A 1.4-acre triangle-shaped paved parking lot between the SCE substation and the boundary of the Licensed HBEP has been acquired by the Project Owner and is included in the analysis of the Amended HBEP. In addition, construction of the Amended HBEP may require the use of an additional 20 acres beyond the 1.9 acres identified in the Final Decision at the former Plains All American Tank Farm site located adjacent to the HBEP site for construction laydown and construction worker parking (see Figure 5.12-4). Thus, the analysis herein includes 22 acres of the former Plains All American Tank Farm site for construction laydown and construction worker parking.

Access to the construction laydown/construction parking area will occur via Pacific Coast Highway to Magnolia Boulevard. Access from the construction laydown area to HBEP for equipment and materials will occur via Magnolia Boulevard to Pacific Coast Highway, right on Pacific Coast Highway to Newland Street, and right on Newland Street to the HBEP entrance. As included in the Licensed HBEP, large components of

the Amended HBEP power blocks that arrive at the Port of Long Beach/Port of Los Angeles may be stored in a construction storage area at AES's Alamitos Generating Station until they can be transported and installed at the Amended HBEP site.

Construction workers parking at the former Plains All American Tank Farm will walk to the HBEP site via an existing bridge over the Huntington Beach Channel and walking path. The bridge and walking path will be fenced with temporary construction fencing for safety and to avoid impacts to the adjacent wetlands. Construction equipment will be moved from the Plains site to the Amended HBEP site via Magnolia Avenue, the Pacific Coast Highway, and Newland Street. Limited construction worker parking also is available on the Amended HBEP site.

5.8.3 Environmental Analysis

The paleontological findings remain unchanged from the Final Decision. Because the Amended HBEP will be located entirely on the previously surveyed project site and will reuse the same infrastructure, no new paleontological field surveys were conducted. Excavation activities associated with the Amended HBEP will be confined within the existing project area and, thus, the site disturbance is similar to the Licensed HBEP, and involves the same area previously surveyed. No new impacts to paleontological resources are expected as project activities will occur in disturbed artificial fill material and the existing paleontological resource COCs are sufficient to reduce any potential impacts to less than significant levels in the event that native soils bearing paleontological resources are encountered.

5.8.4 Cumulative Effects

The potential of the Amended HBEP to contribute to cumulative impacts on paleontological resources is low, given the low to moderate paleontological sensitivity of the sediments to be disturbed, and existing COCs. Furthermore, because no subsurface demolition activities are proposed as part of the demolition of Huntington Beach Generating Station Units 3 and 4, no cumulative paleontological impacts are expected. Thus, with the Amended HBEP complying with existing COCs, the contribution of the Amended HBEP to cumulative negative impacts on paleontological resources will be negligible.

5.8.5 Consistency with Laws, Ordinances, Regulations, and Standards

The Final Decision found the project to be in compliance with applicable LORS. No applicable paleontology LORS have been adopted or modified since the licensing of HBEP. The Amended HBEP is consistent with applicable paleontology-related LORS. The Amendment will not alter the assumptions or conclusions made in the Final Decision and no additional or revised LORS compliance issues have been identified.

5.8.6 Conditions of Certification

The Amended HBEP will not result in potential paleontological impacts greater than those analyzed in the Final Decision, and no additions or modifications to the existing COCs are required.

5.8.7 References

In addition to the reference listed below, the references cited or consulted in the AFC and included in the Final Decision are applicable to the Amended HBEP.

California Energy Commission (CEC). 2014. *Huntington Beach Energy Project Final Decision*. CEC-800-2014-001-CMF. Docket Number 12-AFC-02.

5.9 Public Health

This section describes and evaluates the public health effects of the Amended HBEP and how the Amended HBEP will comply with the LORS and COCs in the Licensed HBEP applicable to public health. The Amended HBEP will not create any new public health-related impacts that were not previously analyzed during the Licensed HBEP AFC proceedings. The Amended HBEP is consistent with the Licensed HBEP, will meet the approved COCs in the Final Decision, and will comply with all applicable LORS.

5.9.1 Amendment Overview

As discussed in detail in Section 2.0 (Project Description) of this PTA, while similar in nature to the Licensed HBEP, the Amended HBEP differs from the Licensed HBEP in key ways. The Amended HBEP is a natural-gas-fired, combined-cycle and simple-cycle, air-cooled electrical generating facility located on the site of the existing Huntington Beach Generating Station in Huntington Beach, California. The combined-cycle power block will include GE Frame 7FA.05 combined-cycle gas turbines, unfired HRSGs, a steam turbine generator, an air-cooled condenser, a natural-gas-fired auxiliary boiler, and related ancillary equipment. The simple-cycle power block will include two GE LMS-100 simple-cycle units.

The Amended HBEP will be constructed on 30 acres entirely within the site of the existing Huntington Beach Generating Station. As with the Licensed HBEP, the Amended HBEP will reuse existing onsite potable water, natural gas, stormwater, process wastewater, and sanitary pipelines and electrical transmission facilities. No offsite linear developments were required for the Licensed HBEP and no offsite linear developments are required for the Amended HBEP.

Both power blocks will interconnect to the existing onsite SCE 230-kV switchyard.

As with the Licensed HBEP, construction of the Amended HBEP will require the removal of the existing Huntington Beach Generating Station Unit 5 and Units 3 and 4. Demolition of Unit 5, scheduled to occur in 2016, will provide the space for the construction of HBEP Block 1. Construction of Block 1 is expected to take approximately 36 months (including commissioning), with construction scheduled to occur from the first quarter of 2017 through the second quarter of 2020.

As with the Licensed HBEP, demolition of existing Huntington Beach Generating Station Units 3 and 4 is not part of the Amended HBEP project description, but is required in advance of the construction of the Amended HBEP simple-cycle power block.

In addition to the construction of the new generating units, upon the commercial operation of Amended HBEP simple-cycle power block, existing Huntington Beach Generating Station Units 1 and 2 will be decommissioned and demolished to their turbine deck. See Section 2.0 (Project Description) for a description of the decommissioning and demolition of existing Huntington Beach Generating Station Units 1 and 2.

5.9.2 Affected Environment

The affected environment remains the same as the Licensed HBEP. In addition, construction of the Amended HBEP may require the use of an additional 20 acres beyond the 1.9 acres identified in the Final Decision at the former Plains All American Tank Farm site located adjacent to the HBEP site for construction laydown and construction worker parking (see Figure 5.12-4). A 1.4-acre area located within the Huntington Beach Generating Station site and adjacent to the SCE switchyard has also been acquired by AES and will become part of the Amended HBEP site. This area was included in the Final Decision as a construction parking/laydown area and will be part of the Amended HBEP site and area where the combined-cycle power block will be constructed. Thus, the analysis herein includes 22 acres of the former Plains All American Tank Farm site for construction laydown and construction worker parking and the newly acquired AES land within the Huntington Beach Generating Station site.

Access to the construction laydown/construction parking area will occur via Pacific Coast Highway to Magnolia Boulevard. Access from the construction laydown area to HBEP for equipment and materials will occur via Magnolia Boulevard to Pacific Coast Highway, right on Pacific Coast Highway to Newland Street, and right on Newland Street to the HBEP entrance. As included in the Licensed HBEP, large components of the Amended HBEP power blocks that arrive at the Port of Long Beach/Port of Los Angeles may be stored in a construction storage area at AES's Alamitos Generating Station until they can be transported and installed at the Amended HBEP site.

Construction workers parking at the former Plains All American Tank Farm will walk to the HBEP site via an existing bridge over the Huntington Beach Channel and walking path. The bridge and walking path will be fenced with temporary construction fencing for safety and to avoid impacts to the adjacent wetlands. Construction equipment will be moved from the Plains site to the Amended HBEP site via Magnolia Avenue, the Pacific Coast Highway, and Newland Street. Limited construction worker parking also is available on the Amended HBEP site.

Based on the Environmental Data Resources (EDR) *Offsite Receptor Report* (EDR, 2012), approximately 353,173 residents live within a 6-mile radius of the Amended HBEP. Sensitive receptors include infants and children, the elderly, the chronically ill, and any other member of the general population who is more susceptible to the effects of exposure than the population at large. Therefore, schools (public and private), daycare facilities, convalescent homes, and hospitals are of particular concern. Consistent with the Licensed HBEP, sensitive receptors within a 6-mile radius of the Amended HBEP site identified in the EDR *Offsite Receptor Report* include:

- 275 preschool/daycare centers
- 12 nursing homes
- 81 schools
- 579 hospitals, clinics, and/or pharmacies
- 7 colleges

To capture changes in development surrounding the Huntington Beach Generating Station site since HBEP licensing, a supplemental list of sensitive receptors within a 6-mile radius of the Amended HBEP site was developed based on an internet data search (Yahoo Yellowpages, 2015) and aerial imagery (Google Earth, 2015). The supplemental list is provided in Appendix 5.9A. With this additional survey, 43 schools/preschools/daycares, 6 hospitals, and 31 senior care facilities were identified within a 6-mile radius of the Amended HBEP site.

As was the case during the HBEP AFC proceeding, the nearest sensitive receptor is a daycare facility located 0.3 mile east of the Amended HBEP site. The nearest school is the Edison High School, located approximately 0.5 mile to the northeast of the Amended HBEP site. The nearest resident is approximately 250 feet west-northwest of the facility along Newland Street. The nearest businesses are located along Edison Drive, just north of the Amended HBEP site.

A search of available health studies concerning the potentially affected populations within a 6-mile radius is required. In October 1997, the Multiple Air Toxics Exposure Study (MATES) II study was initiated as part of the Environmental Justice Initiatives adopted by the South Coast Air Quality Management District (SCAQMD) Governing Board. It consisted of a comprehensive monitoring program, an updated emissions inventory, and a modeling effort to characterize health risks associated with human exposures to ambient concentrations of toxic air contaminants (TAC) in the South Coast Air Basin (Basin). The results of the MATES II study estimated that the excess lifetime carcinogenic risk from exposures to airborne TACs in the Basin averages about 1,400 in 1 million (1.4×10^{-3}), meaning that an individual exposed over a 70-year lifetime would have about a 0.14 percent additional chance of contracting cancer. Estimated carcinogenic risk was found to be rather uniform across the Basin. For example, risk ranged from about 1,120 in 1 million to about 1,740 in 1 million for the sites monitored.

The MATES II study showed that mobile sources (for example, cars, trucks, trains, ships, and aircraft) represent the greatest contributors to the estimated risks. About 70 percent of all carcinogenic risk is attributed to diesel particulate matter (DPM) emissions; about 20 percent is attributed to other toxics associated with mobile sources (including benzene, butadiene, and formaldehyde); and about 10 percent of all risk is attributed to emissions from stationary sources (which include industries and other businesses, such as dry cleaners and chrome plating operations). Updating the findings of MATES II, SCAQMD completed the MATES III study by issuing a final report in September 2008. Similar to the earlier MATES II study, the MATES III study found that mobile sources continued to dominate cancer risk in the Basin by accounting for an estimated 94 percent of the overall cancer risk. Diesel emissions alone accounted for 84 percent of the cancer risk. Overall, the general trend in risk exposure has been decreasing with the estimated cancer risk from exposure to airborne toxics reduced to 1,200 in 1 million. The MATES III study found that nondiesel risk has been lowered from the MATES II estimates by 50 percent.

Updating the findings of MATES III, SCAQMD completed the MATES IV study by issuing a final report in May 2015. Similar to the earlier MATES III study, the MATES IV study found that mobile sources continued to dominate cancer risk in the Basin by accounting for an estimated 90 percent of the overall cancer risk. Diesel emissions alone accounted for 68 percent of the cancer risk. Again, the general trend in risk exposure was found to be decreasing with the estimated cancer risk from exposure to airborne toxics reduced by approximately 60 percent to 480 in 1 million.[22]

5.9.3 Environmental Analysis

The following sections describe the emission sources that have been evaluated, the results of the health risk assessment (HRA) to assess the potential public health impacts and exposure associated with airborne emissions from the proposed demolition/construction and routine operation of the Amended HBEP, and an evaluation of the Amended HBEP's compliance with the applicable regulations. These analyses were designed to confirm that the Amended HBEP's design features lead to less-than-significant impacts. A comparison of impacts for the Amended HBEP and the Licensed HBEP are also presented, as appropriate.

5.9.3.1 Air Toxics Emission Estimates

Demolition and Construction Emissions. Air toxics emissions associated with demolition and construction of the Amended HBEP will consist primarily of combustion byproducts generated during movement of onsite and offsite construction equipment and onsite and offsite movement (vehicular miles traveled) of vehicles associated with the demolition and construction activities for the Amended HBEP. The primary air toxic pollutant of concern associated with demolition and construction activities is DPM.

The total DPM exhaust emissions from demolition and construction activities were estimated consistent with the methodology described in Section 5.1.5.1.1, Demolition and Construction Emissions, of this PTA. Per Section 7.1, Approach, of the *Dispersion Modeling Protocol for the Amended Huntington Beach Energy Project* (Modeling Protocol; see Appendix 5.1F), the total DPM exhaust emissions were averaged over the demolition and construction period and spatially distributed in: (1) the site's eastern area, which is associated with the demolition of Huntington Beach Generating Station Unit 5, preparation of the former Plains All American tank farm area, and construction of the combined-cycle power block; (2) the site's western area, which is associated with construction of the simple-cycle power block; and (3) the site's southern area, which is associated with demolition of Huntington Beach Generating Station Units 1 and 2. These emission rates are presented in Table 5.9-1. Detailed calculations are provided in Appendix 5.1A.

[22] Note that with implementation of the Office of Environmental Health Hazard's (OEHHA) updated methods for estimating cancer risks, the estimated cancer risk from exposure to airborne toxics is closer to 1,000 in 1 million.

TABLE 5.9-1
Maximum Daily and Annual Emissions from Demolition and Construction[a]

	DPM Exhaust Emissions	
Demolition and Construction Areas	**Total (tons/project)**	**Annualized (lb/yr)[a]**
East	136	13.6
West	28.1	2.80
South	51.3	5.13

[a] Annualized emissions were calculated by averaging the total emissions over the entire demolition and construction period.

Note:

lb/yr = pound(s) per year

Operation Emissions. Air toxics emissions associated with operation of the Amended HBEP will consist of combustion byproducts produced by two GE 7FA.05s, two LMS-100 PBs, and one auxiliary boiler. Unless otherwise noted below, these emissions were estimated per the methodology described in Section 7.1, Approach, of the Modeling Protocol (see Appendix 5.1F).

Combustion Turbines. Air toxics emission factors for the combustion turbines were obtained from U.S. Environmental Protection Agency's (EPA) *AP-42* (EPA, 2000), with the exception of ammonia and formaldehyde. The ammonia emission factor was based on an operating exhaust ammonia limit of 5 parts per million by volume (ppmv) at 15 percent oxygen and an F-factor of 8,710. The SCAQMD's emission factor of 3.6×10^{-4} pounds per million British thermal unit (lb/MMBtu) was used to estimate formaldehyde emissions. Additionally, polycyclic aromatic hydrocarbons (PAH) emissions were conservatively assumed to be controlled up to 50 percent through the use of an oxidation catalyst (EPA, 2000), which is proposed for use with both the GE 7FA.05s and GE LMS-100PBs.

A summary of the air toxics emissions resulting from operation of the combustion turbines is presented in Table 5.9-2. These estimates conservatively assumed that the GE 7FA.05s would operate 6,100 hours per turbine per year with 500 startups and shutdowns (estimated at 512 hours) per turbine per year and that the GE LMS-100PBs would operate 1,150 hours per turbine per year with 350 startups and shutdowns (estimated at 251 hours) per turbine per year. Detailed calculations are provided in Appendix 5.1B.

TABLE 5.9-2
Air Toxic Emission Rates for Combustion Turbines at the Amended HBEP

		GE 7FA.05 Emissions (per turbine)		GE LMS-100PB Emissions (per turbine)	
Pollutant	**CAS Registry Number**	**lb/hr**	**lb/yr**	**lb/hr**	**lb/yr**
Ammonia [a]	7664417	15.2	100,290	6.14	8,595
Acetaldehyde	75070	0.091	595	0.035	49.6
Acrolein	107028	0.015	95.1	0.0057	7.94
Benzene	71432	0.027	178	0.011	14.9
1,3-Butadiene	106990	0.0010	6.39	0.00038	0.53
Ethylbenzene	100414	0.073	476	0.028	39.7
Formaldehyde [b]	50000	0.82	5,351	0.32	446
Naphthalene	91203	0.0030	19.3	0.0012	1.61
PAHs [c]	1151	0.0025	16.4	0.0010	1.36
Propylene Oxide	75569	0.066	431	0.026	36.0

TABLE 5.9-2
Air Toxic Emission Rates for Combustion Turbines at the Amended HBEP

Pollutant	CAS Registry Number	GE 7FA.05 Emissions (per turbine)		GE LMS-100PB Emissions (per turbine)	
		lb/hr	lb/yr	lb/hr	lb/yr
Toluene	108883	0.30	1,932	0.12	161
Xylene	1330207	0.15	951	0.057	79.4

[a] Based on an operating exhaust ammonia limit of 5 ppmv at 15 percent oxygen and an F-factor of 8,710.

[b] Emission factor was modified to reflect the SCAQMD's formaldehyde emission factor of 3.6 x 10^{-4}.

[c] Per Section 3.1.4.3 of *AP-42* (EPA, 2000), PAH emissions were conservatively assumed to be controlled up to 50 percent through the use of an oxidation catalyst.

Notes:

CAS = Chemical Abstracts Service

lb/hr = pound(s) per hour

Auxiliary Boiler. A summary of the air toxics emissions resulting from operation of the auxiliary boiler is presented in Table 5.9-3. Air toxics emission factors for the auxiliary boiler were obtained from EPA's *AP-42* (EPA, 1998). Similar to the combustion turbines, the maximum hourly emissions were estimated based on the maximum heat input rating. The annual emissions were estimated based on 120 startups and the maximum heat input rating. Detailed calculations are provided in Appendix 5.1B.

TABLE 5.9-3
Air Toxic Emission Rates for the Auxiliary Boiler at the Amended HBEP

Pollutant	CAS Registry Number	Auxiliary Boiler Emissions	
		lb/hr	lb/yr
2-Methylnaphthalene	91576	1.67E-06	7.30E-03
3-Methylchloranthrene	56495	1.25E-07	5.47E-04
7,12-Dimethylbenz(a)anthracene	57976	1.11E-06	4.86E-03
Acenaphthene	83329	1.25E-07	5.47E-04
Acenaphthylene	208968	1.25E-07	5.47E-04
Anthracene	120127	1.67E-07	7.30E-04
Benz(a)anthracene	56553	1.25E-07	5.47E-04
Benzene	71432	1.46E-04	6.38E-01
Benzo(a)pyrene	50328	8.33E-08	3.65E-04
Benzo(b)fluoranthene	205992	1.25E-07	5.47E-04
Benzo(g,h,i)perylene	191242	8.33E-08	3.65E-04
Benzo(k)fluoranthene	207089	1.25E-07	5.47E-04
Butane[a]	106978	1.46E-01	6.38E+02
Chrysene	218019	1.25E-07	5.47E-04
Dibenzo(a,h)anthracene	53703	8.33E-08	3.65E-04
Dichlorobenzene	25321226	8.33E-05	3.65E-01

TABLE 5.9-3
Air Toxic Emission Rates for the Auxiliary Boiler at the Amended HBEP

Pollutant	CAS Registry Number	Auxiliary Boiler Emissions	
		lb/hr	lb/yr
Ethane[a]	74840	2.15E-01	9.42E+02
Fluoranthene	206440	2.08E-07	9.12E-04
Fluorene	86737	1.94E-07	8.51E-04
Formaldehyde	50000	5.21E-03	2.28E+01
Hexane	110543	1.25E-01	5.47E+02
Indeno(1,2,3-cd)pyrene	193395	1.25E-07	5.47E-04
Naphthalene	91203	4.23E-05	1.85-01
Pentane[a]	109660	1.80E-01	7.90E+02
Phenanathrene	85018	1.18E-06	5.17E-03
Propane[a]	74986	1.11E-01	4.86E+02
Pyrene	129000	3.47E-07	1.52E-03
Toluene	108883	2.36E-04	1.03E+00
Arsenic	7440382	1.39E-05	6.08E-02
Barium	7440393	3.05E-04	1.34E+00
Beryllium	7440417	8.33E-07	3.65E-03
Cadmium	7440439	7.64E-05	3.34E-01
Chromium	7440473	9.72E-05	4.26E-01
Cobalt	7440484	5.83E-06	2.55E-02
Copper	7440508	5.90E-05	2.58E-01
Manganese	7439965	2.64E-05	1.16E-01
Mercury	7439976	1.80E-05	7.90E-02
Molybdenum[a]	7439987	7.64E-05	3.34E-01
Nickel	7440020	1.46E-04	6.38E-01
Selenium	7782492	1.67E-06	7.30E-03
Vanadium	7440622	1.60E-04	6.99E-01
Zinc	7440666	2.01E-03	8.82E+00

[a] Although emissions were calculated for these reportable toxics, they did not contribute to the predicted impacts as they do not have any health risk values associated with them.

5.9.3.2 Health Risk Assessment

An HRA was conducted to assess the potential public health impacts and exposure associated with airborne emissions from the proposed demolition/construction and routine operation of the Amended HBEP. Unless otherwise noted below, the HRA was performed per the methodology in Section 7, Human Health Risk Assessment, of the Modeling Protocol (see Appendix 5.1F). As applicable, the HRA results were also compared to the limits for excess cancer risk, cancer burden, and noncancer chronic and acute hazard indices contained within SCAQMD Rule 1401. A comparison to the Licensed HBEP impacts is also provided, where appropriate.

Demolition and Construction Health Risk Assessment. The demolition/construction HRA estimated the rolling cancer risks for each 10-year period during a 30-year exposure duration (starting with exposure during the third trimester), aligned with the expected construction duration, at the Point of Maximum Impact (PMI), Maximum Exposed Individual Resident (MEIR), Maximum Exposed Individual Worker (MEIW), and maximum exposed sensitive receptor. The excess cancer risks were estimated using the following:

- Equations 5.4.1.1 and 8.2.4A from the *Air Toxic Hot Spots Guidance Manual for Preparation of Health Risk Assessments* (OEHHA, 2015) for residential exposure
- Equations 5.4.1.2A, 5.4.1.2B, and 8.2.4B from the *Air Toxic Hot Spots Guidance Manual for Preparation of Health Risk Assessments* (OEHHA, 2015) for worker exposure
- The maximum annual ground-level concentrations used to estimate risk were determined through dispersion modeling with AERMOD
- The AERMOD modeling approach followed that used to prepare the criteria pollutant modeling analysis, except that the receptor grid included census and sensitive receptors and excluded receptors located within AES-controlled property (see Appendix 5.9B for the AERMOD setup)
- The demolition/construction emission estimates modeled are presented in Table 5.9-1

Chronic risks were also estimated for the PMI, MEIR, MEIW, and maximum exposed sensitive receptor, based on the same emission rates and ground-level concentrations described above. To calculate chronic risk, as characterized by a health index, the maximum annual ground-level concentration was divided by the DPM Reference Exposure Level of 5 micrograms per cubic meter ($\mu g/m^3$) (OEHHA, 2015).

The results of the demolition/construction HRA show that the excess cancer risk at the PMI, MEIR, MEIW, and maximum exposed sensitive receptor are 5.22, 4.23, 0.25, and 0.48, respectively, which is less than the significant threshold of 10 in 1 million. Similarly, the chronic hazard indices at the PMI, MEIR, MEIW, and maximum exposed sensitive receptor are 0.0021, 0.0017, 0.0021, and 0.00019, respectively, which is less than the significant threshold of 1.0. Therefore, predicted impacts associated with the finite demolition and construction activities are less than significant. This conclusion is consistent with that for the Licensed HBEP. Detailed calculations are provided in Appendix 5.9B. The model input and output files are included with this submission on compact disc.

Operational Health Risk Assessment. The emissions used to perform the operational HRA are presented in Tables 5.9-2 and 5.9-3. As noted in Section 7.2, Model Selection, of the Modeling Protocol, the *Hotspots Analysis Reporting Program Version 2* was used to perform the HRA, based on model inputs similar to those used for the criteria pollutant modeling, with the following SCAQMD-specific triggers:

- Mandatory minimum pathways (inhalation, dermal, soil ingestion, and mother's milk) were selected to evaluate cancer risk and chronic hazard index at the PMI, if at a nonresidential location
- Mandatory minimum pathways and homegrown pathways were selected to evaluate cancer risk and chronic hazard index at the MEIR and sensitive receptor
- Worker pathways (inhalation, dermal, and soil) were selected to evaluate cancer risk and chronic hazard index at the MEIW
- The Draft Risk Management Policy (RMP) Derived method was used to calculate cancer risk at the PMI, MEIR, and sensitive receptor, consistent with SCAQMD guidance (SCAQMD, 2015); the OEHHA Derived method was used for all remaining scenarios

A summary of the excess cancer risk and chronic and acute hazard indices at the PMI, as well as the maximum predicted public health impacts for worker, residential, and sensitive receptors, has been included in Tables 5.9-4 and 5.9-5. The results in Table 5.9-4 represent a comparison of the total predicted Amended HBEP impact to the SCAQMD California Environmental Quality Act (CEQA) significance thresholds, while the results in Table 5.9-5 represent the predicted risk for each individual emission unit in accordance with SCAQMD Rule 1401. The model input and output files are included with this submission on compact disc.

As shown in Table 5.9-4, predicted impacts for the Amended HBEP are below the significance thresholds of 10 in 1 million for excess cancer risk and chronic and acute hazard index of 1.0. Therefore, the predicted health risks associated with the Amended HBEP will be less than significant. This conclusion is consistent with that of the Licensed HBEP.

TABLE 5.9-4
Operational Health Risk Assessment Summary: Facility[a]

Risk[b]	Receptor Number	Receptor Coordinates (UTM, m)		Value
		Easting	Northing	
Cancer Risk at the PMI (per million) [c]	31	409566.2	3723313	7.43
Cancer Risk at the MEIR (per million) [c]	783	410000	3723650	6.33
Cancer Risk at a Sensitive Receptor (per million) [c]	12905	409969.5	3724223	3.39
Cancer Risk at the MEIW (per million) [d]	31	409566.2	3723313	0.43
Chronic Hazard Index at the PMI	32	409566.5	3723284	0.036
Chronic Hazard Index at the MEIR	783	410000	3723650	0.013
Chronic Hazard Index at a Sensitive Receptor	12905	409969.5	3724223	0.0051
Chronic Hazard Index at the MEIW	32	409566.5	3723284	0.031
Acute Hazard Index at the PMI	583	409600	3723350	0.080
Acute Hazard Index at the MEIR	751	410000	3723600	0.021
Acute Hazard Index at a Sensitive Receptor	12902	410027.1	3723140	0.015
Acute Hazard Index at the MEIW	583	409600	3723350	0.080

[a] The results in Table 5.9-4 represent the combined predicted risk for all five combustion units operating simultaneously.

[b] A facility with an excess cancer risk less than 10 in 1 million individuals is considered to be less than significant. A chronic or acute hazard index less than 1.0 for the facility is considered to be a less-than-significant health risk.

[c] Cancer risk values are based on the Draft RMP methodology.

[d] Cancer risk values are based on the OEHHA Derived methodology.

Notes:

m = meter(s)

UTM = Universal Transverse Mercator

As shown in Table 5.9-5, the GE 7FA.05s exceed the incremental increase in cancer risk threshold of 1 in 1 million; therefore, best available control technology for toxics (T-BACT) will be required for these units. The GE LMS-100PB gas turbines and auxiliary boiler do not trigger the regulatory requirement for T-BACT as their predicted impacts are below the incremental increase in cancer risk threshold of 1 in 1 million. Although not required in all cases, the emission control technologies included in the Amended HBEP for all emission sources are considered to be T-BACT. All sources have predicted impacts below the chronic and acute hazard index of 1.0. This impact is higher than that of the Licensed HBEP, but still less-than-significant with controls.

TABLE 5.9-5
Operational Health Risk Assessment Summary: Individual Units [a]

Risk [b]	GE 7FA.05-01	GE 7FA.05-02	GE LMS-100PB-01	GE LMS-100PB-02	Auxiliary Boiler
Cancer Risk at the PMI (per million) [c]	2.29	4.62	0.069	0.069	0.88
Cancer Risk at the MEIR (per million) [c]	2.76	3.29	0.090	0.083	0.18
Cancer Risk at a Sensitive Receptor (per million) [c]	1.49	1.73	0.070	0.070	0.033
Cancer Risk at the MEIW (per million) [d]	0.13	0.26	0.0039	0.0039	0.057
Chronic Hazard Index at the PMI	0.0056	0.011	0.00017	0.00017	0.020
Chronic Hazard Index at the MEIR	0.0035	0.0042	0.00012	0.00011	0.0049
Chronic Hazard Index at a Sensitive Receptor	0.0019	0.0022	0.000090	0.000089	0.00089
Chronic Hazard Index at the MEIW	0.0056	0.011	0.00017	0.00017	0.015
Acute Hazard Index at the PMI	0.033	0.048	0.0019	0.0019	0.0029
Acute Hazard Index at the MEIR	0.0090	0.011	0.0014	0.0013	0.0010
Acute Hazard Index at a Sensitive Receptor	0.0053	0.0079	0.00086	0.00087	0.00089
Acute Hazard Index at the MEIW	0.033	0.048	0.0019	0.0019	0.0029

[a] The results in Table 5.9-5 represent the predicted excess risk for each individual emission unit in accordance with SCAQMD Rule 1401.

[b] A source with an excess cancer risk less than 1 in 1 million individuals is considered to be less than significant. A source with an excess cancer risk less than 10 in 1 million is considered less than significant if T-BACT is installed. A chronic or acute hazard index less than 1.0 for each source is considered to be a less-than-significant health risk.

[c] Cancer risk values are based on the Draft RMP Derived methodology.

[d] Cancer risk values are based on the OEHHA Derived methodology.

It should be noted that the maximum impacts reported in Table 5.9-4 represent the maximum predicted impacts at one receptor from all sources combined. In contrast, the maximum impacts reported for each individual source in Table 5.9-5 may occur at different receptors. Therefore, the Amended HBEP totals in Table 5.9-5 are not directly additive and should not be directly compared to the results presented in Table 5.9-4.

Because the predicted cancer risk, per individual unit, is greater than 1 in 1 million, the cancer burden was calculated for each census block receptor consistent with SCAQMD guidance (SCAQMD, 2015). The cancer burden for the Amended HBEP was estimated at 8.8 x 10^{-8}, which is well below the significance threshold of 0.5. Therefore, the Amended HBEP will not significantly increase cancer burden in the vicinity of the site.

5.9.4 Cumulative Effects

5.9.4.1 Demolition and Construction Effects

The excess cancer risk predicted at the PMI associated with demolition and construction activities is 5.22 in 1 million, which is below the significance threshold of 10 in 1 million. Similarly, the maximum chronic hazard index at the PMI is 0.0021, which is below the significance threshold of 1.0. Additionally, the Amended HBEP construction activities and the existing Huntington Beach Generating Station's demolition activities would be finite, and best available emission control techniques would be used throughout the demolition and construction period to control pollutant emissions. Impacts from the demolition of existing Huntington Beach Generating Station's units would be further reduced with implementation of the construction mitigation measures presented in Section 5.1.7.1, Demolition and Construction Mitigation. Therefore, the potential cumulative health risk impacts from demolition and construction are expected to be less than significant. This conclusion is consistent with that of the Licensed HBEP.

5.9.4.2 Operational Effects

As previously discussed, the MATES II, MATES III, and MATES IV studies consisted of a comprehensive monitoring program, an updated emissions inventory, and a modeling effort to characterize health risks associated with human exposures to ambient concentrations of TACs in the Basin. In the MATES II study, the estimated cancer risk was found to be rather uniform across the Basin, ranging from about 1,120 in 1 million to about 1,740 in 1 million for the sites monitored. The MATES III study was completed in September 2008. Similar to the earlier MATES II study, the MATES III study found that mobile sources continued to dominate cancer risk in the Basin by accounting for an estimated 94 percent of the overall cancer risk, with diesel emissions alone accounting for 84 percent. The MATES III study also found that the estimated cancer risk from exposure to airborne toxics had decreased to 1,200 in 1 million. The MATES IV study was completed in May 2015 and again found that mobile sources dominated cancer risk in the Basin by accounting for an estimated 90 percent of the overall cancer risk, with diesel emissions alone accounting for 68 percent. The MATES IV study found that the estimated cancer risk had decreased by approximately 60 percent from the MATES III study to 480 in 1 million.

The facility-wide excess cancer risk predicted at the PMI is 7.43 in 1 million. The maximum facility-wide chronic and acute hazard indices at the PMI are 0.036 and 0.080, respectively. These levels are below the significance threshold for cancer risk of 10 in 1 million and the chronic and acute hazard index of 1.0. Furthermore, the results of the MATES IV study indicate that the cumulative background cancer risk from exposure to airborne toxics is approximately 480 in 1 million[23], with an estimated 90 percent of the overall cancer risk due to mobile sources. Therefore, facility-wide stationary source emissions from the Amended HBEP are expected to contribute to approximately less than 1.5 percent of the background risk in the vicinity of the site. T-BACT emission control technologies will also be installed as part of the Amended HBEP, which will reduce the TAC emissions to the extent technically feasible. The removal/demolition of the existing Huntington Beach Generating Station units will also offset a portion of the potential impacts from operation of the Amended HBEP relative to the existing background levels. Therefore, it is concluded that operation of the Amended HBEP will not have a significant cumulative health risk impact. This conclusion is consistent with that of the Licensed HBEP.

5.9.5 Mitigation Measures

5.9.5.1 Demolition and Construction Mitigation

As presented in Section 5.9.3.2.1, the excess cancer risk predicted at the PMI, MEIR, MEIW, and maximum exposed sensitive receptor associated with demolition and construction are 5.22, 4.23, 0.25, and 0.48 in 1 million, respectively. The predicted chronic hazard indices at the PMI, MEIR, MEIW, and maximum exposed sensitive receptor are 0.0021, 0.0017, 0.0021, and 0.00019, respectively. These levels are below the significance threshold for cancer risk of 10 in 1 million and the chronic hazard index of 1.0. Additionally, the demolition and construction activities would be finite and best available emission control techniques would be used throughout the demolition and construction period to control air toxics emissions. Construction impacts would be further reduced with implementation of the mitigation measures presented in Section 5.1.7.1, Demolition and Construction Mitigation.

5.9.5.2 Operational Mitigation

As presented in Section 5.9.3.2.2, the maximum excess cancer risk per emission unit predicted at the PMI, MEIR, MEIW, and maximum exposed sensitive receptor are 4.62, 3.29, 0.26, and 1.73 in 1 million, respectively. Although these levels are, in some cases, above the per unit emission significance threshold for cancer risk of 1 in 1 million, the Amended HBEP will incorporate T-BACT emission control technologies,

[23] Note that with implementation of OEHHA's updated methods for estimating cancer risks, the estimated cancer risk from exposure to airborne toxics is closer to 1,000 in 1 million.

which will reduce impacts to a less-than-significant level. Additionally, the cancer burden for the Amended HBEP was estimated at 8.8 x 10^{-8}, which is well below the significance threshold of 0.5. Therefore, the Amended HBEP will only require the installation of T-BACT.

The facility-wide excess cancer risk predicted at the PMI, MEIR, MEIW, and maximum exposed sensitive receptors are 7.43, 6.33, 0.43, and 3.39 in 1 million, respectively. The facility-wide chronic and acute hazard indices are 0.036 and 0.080, respectively. These levels are below the facility significance threshold for cancer risk of 10 in 1 million and the chronic and acute hazard index of 1.0. Therefore, additional mitigation measures will not be required.

5.9.6 Consistency with Laws, Ordinances, Regulations, and Standards

The Final Decision found the project to be in compliance with all applicable LORS. No applicable public health LORS have been modified since the licensing of HBEP. The Amendment will not alter the assumptions or conclusions made in the Final Decision. The Amended HBEP is consistent with all applicable public health-related LORS.

5.9.7 Permits and Permit Schedule

Consistent with the CEC siting regulations, SCAQMD is responsible for issuing the required operating permits related to public health. Section 5.1.10, Permits and Permit Schedule, includes a summary of the SCAQMD and EPA permits required and expected issuance schedule.

5.9.8 Conditions of Certification

No changes to previously identified public health impacts will result from the approval of this Petition. Therefore, no additional resource protection measures beyond those required in the HBEP Final Decision are necessary.

5.9.9 References

In addition to the references listed below, the references cited or consulted in the AFC and included in the Final Decision are applicable to the Amended HBEP.

California Energy Commission (CEC). 2014. *Huntington Beach Energy Project Final Decision*. CEC-800-2014-001-CMF. Docket Number 12-AFC-02.

Environmental Data Resources (EDR). 2012. *Offsite Receptor Report*. March 12.

Google Earth. 2015. Aerial view of 6 miles surrounding the Amended HBEP, 21730 Newland Street, Huntington Beach, CA 92646. Viewed August 2015.

Office of Environmental Health Hazard Assessment (OEHHA). 2015. *Air Toxic Hot Spots Guidance Manual for Preparation of Health Risk Assessments*. March.

South Coast Air Quality Management District (SCAQMD). 2015. *Supplemental Guidelines for Preparing Risk Assessments for the Air Toxics "Hot Spots" Information and Assessment Act*. June.

U.S. Environmental Protection Agency (EPA). 1998. *AP-42, Fifth Edition, Volume I*. Chapter 1, Section 1.4, Natural Gas Combustion. July.

U.S. Environmental Protection Agency (EPA). 2000. *AP-42, Fifth Edition, Volume I*. Chapter 3, Section 3.1, Stationary Gas Turbines. April.

Yahoo Yellowpages (Yahoo). 2015. Search focused on 6 miles surrounding the Amended HBEP, 21730 Newland Street, Huntington Beach, CA 92646. Schools/Preschools/Daycares, Hospitals, and Senior Care Facilities. Available online at: http://www.yellowpages.com. Accessed August 2015.

5.10 Socioeconomics

This section describes and evaluates the socioeconomic effects of the Amended HBEP and how the Amended HBEP will comply with applicable socioeconomic LORS and COCs. The Amended HBEP will not create any new socioeconomic-related impacts that were not previously analyzed during the Licensed HBEP AFC proceedings. The Amended HBEP is consistent with the Licensed HBEP, will meet the approved COCs in the Final Decision, and will comply with all applicable LORS.

5.10.1 Amendment Overview

As discussed in detail in Section 2.0 (Project Description) of this PTA, while similar in nature to the Licensed HBEP, the Amended HBEP differs from the Licensed HBEP in key ways. The Amended HBEP is a natural-gas-fired, combined-cycle and simple-cycle, air-cooled electrical generating facility located on the site of the existing Huntington Beach Generating Station in Huntington Beach, California. The combined-cycle power block will include two GE Frame 7FA.05 combined-cycle gas turbines, two HRSGs, a steam turbine generator, an air-cooled condenser, a natural-gas-fired auxiliary boiler, and related ancillary equipment. The simple-cycle power block will include two GE LMS-100 simple-cycle units.

The Amended HBEP will be constructed on 30 acres entirely within the site of the existing Huntington Beach Generating Station. As with the Licensed HBEP, the Amended HBEP will reuse existing onsite potable water, natural gas, stormwater, process wastewater, and sanitary pipelines and electrical transmission facilities. No offsite linear developments were required for the Licensed HBEP and no offsite linear developments are required for the Amended HBEP.

Both power blocks will interconnect to the existing onsite SCE 230-kV switchyard.

As with the Licensed HBEP, construction of the Amended HBEP will require the removal of the existing Huntington Beach Generating Station Unit 5 and Units 3 and 4. Demolition of Unit 5, scheduled to occur in 2016, will provide the space for the construction of HBEP Block 1. Construction of Block 1 is expected to take approximately 36 months (including commissioning), with construction scheduled to occur from the first quarter of 2017 through the second quarter of 2020.

As with the Licensed HBEP, demolition of existing Huntington Beach Generating Station Units 3 and 4 is not part of the Amended HBEP project description, but is required in advance of the construction of the Amended HBEP simple-cycle power block.

In addition to the construction of the new generating units, upon the commercial operation of Amended HBEP simple-cycle power block, existing Huntington Beach Generating Station Units 1 and 2 will be decommissioned and demolished to their turbine deck. See Section 2.0 (Project Description) for a description of the decommissioning and demolition of existing Huntington Beach Generating Station Units 1 and 2.

5.10.2 Changes to the Affected Environment

The affected environment remains the same as the Licensed HBEP. A 1.4-acre triangle-shaped paved parking lot between the SCE substation and the boundary of the Licensed HBEP has been acquired by the Project Owner and is included in the analysis of the Amended HBEP. In addition, construction of the Amended HBEP may require the use of an additional 20 acres beyond the 1.9 acres identified in the Final Decision at the former Plains All American Tank Farm site located adjacent to the HBEP site for construction laydown and construction worker parking. Thus, the analysis herein includes 22 acres of the former Plains All American Tank Farm site for construction laydown and construction worker parking.

Access to the construction laydown/construction parking area will occur via Pacific Coast Highway to Magnolia Boulevard. Access from the construction laydown area to HBEP for equipment and materials will occur via Magnolia Boulevard to Pacific Coast Highway, right on Pacific Coast Highway to Newland Street, and right on Newland Street to the HBEP entrance. As included in the Licensed HBEP, large components of

the Amended HBEP power blocks that arrive at the Port of Long Beach/Port of Los Angeles may be stored in a construction storage area at AES's Alamitos Generating Station until they can be transported and installed at the Amended HBEP site.

Construction workers parking at the former Plains All American Tank Farm will walk to the HBEP site via an existing bridge over the Huntington Beach Channel and walking path. The bridge and walking path will be fenced with temporary construction fencing for safety and to avoid impacts to the adjacent wetlands. Construction equipment will be moved from the Plains site to the Amended HBEP site via Magnolia Avenue, the Pacific Coast Highway, and Newland Street. Limited construction worker parking also is available on the Amended HBEP site.

The Amended HBEP will not result in new effects or modifications to the potential environmental justice effects previously identified and addressed in the Final Decision.

The region of influence for purposes of evaluating the new or revised socioeconomic impacts associated with the Amended HBEP is the City of Huntington Beach and Orange County.

5.10.2.1 Population

Orange County is located in the densely populated Southern California region. It is bordered by Los Angeles County to the northwest, San Bernardino County to the northeast, Riverside County to the East, San Diego County to the south, and the Pacific Ocean to the west (California State Association of Counties, 2012).

Huntington Beach, with an estimated January 1, 2015, population of 198,389 is the fifth largest city in Orange County (California Department of Finance [DOF], 2015). The City of Huntington Beach was incorporated in 1909 (City of Huntington Beach, 2012). Historical population data for Huntington Beach, Orange County, and the state of California are summarized in Table 5.10-1. Annual average compounded population growth rates are summarized in Table 5.10-2. During the 1990s, Orange County's population increased at an average annual rate of 1.7 percent. The average annual growth rate for the 15 years from 2000 to 2015 was 0.3 percent for Huntington Beach and 0.7 percent for Orange County.

TABLE 5.10-1
Historical and Projected Populations

Area	1990[a]	2000[a]	2015[b]	2020(p)[c]	2030(p)[c]
City of Huntington Beach	181,519	189,627	198,389	NA	NA
Orange County	2,410,668	2,846,289	3,147,655	3,520,265	3,705,322
State of California	29,758,213	33,873,086	38,714,725	44,135,923	49,240,891

[a] DOF, 2012a
[b] DOF, 2015
[c] DOF, 2012b

Notes: Population projections rounded to nearest 100.

(p) = projected
NA = Not available

TABLE 5.10-2
Historical and Projected Annual Average Compounded Population Growth Rates

Area	1990-2000 (%)	2000-2015 (%)	2015-2020 (%)	2020-2030 (%)
City of Huntington Beach	0.4	0.3	N/A	N/A
Orange County	1.7	0.7	2.3	0.5
State of California	1.3	0.9	2.7	1.1

Note: N/A = Not applicable

5.10.2.2 Housing

As of January 1, 2015, Orange County and the City of Huntington Beach had a total of 1,069,450 and 79,896 housing units, respectively (DOF, 2015). Within Orange County, single-family homes accounted for 670,585 units; multiple-family dwellings accounted for 365,324 units; and mobile homes accounted for 33,535 units (DOF, 2015). Within Huntington Beach, single-family homes accounted for 48,184 units; multiple-family dwellings accounted for 28,625 units; and mobile homes accounted for 3,087 units. The median home price in Orange County in July 2015 was $695,500 (Zillow, 2015). As of January 1, 2015, vacancy rates for Orange County and the City of Huntington Beach were 5.3 percent and 4.8 percent, respectively (DOF, 2015).

As such, housing supply is considered to be limited in Huntington Beach, based on the federal standard vacancy rate of 5.0 percent. Table 5.10-3 provides housing estimates by city, county, and state as of January 1, 2015.

TABLE 5.10-3
Housing Estimates by City, County, and State, January 1, 2015

Area	Total Units	Single-Family	Multi-Family	Manufactured Homes	Percent Vacant
City of Huntington Beach	79,896	48,184	28,625	3,087	4.8
Orange County	1,069,450	670,585	365,324	33,535	5.3
California	13,914,715	9,041,758	4,312,544	560,407	7.8

Source: DOF, 2015

5.10.2.3 Economy and Employment

Orange County is part of Santa Ana-Anaheim-Irvine Metropolitan District (MD). Between 2011 and 2014, employment in the Santa Ana-Anaheim-Irvine MD increased by 113,300 jobs, or about 8 percent. This 8 percent increase is about the same (8.9 percent) increase in employment at the state level over the same period (California Employment Development Department [CEDD], 2015a). The services, retail trade, government, and manufacturing sectors were the largest contributors to employment in 2011 and 2015. These four sectors accounted for about 80 percent of the total industry employment in the MD.

Unlike the period (2000 through 2011) reported in the Licensed HBEP where there were employment losses, the period shown in Table 5.10-4 shows that there have been employment gains in all sectors except Agriculture and Transportation, Warehousing, and Utilities. As shown in Table 5.10-4, on an average annual growth rate basis, the Construction sector experienced the largest average annual increase (at 5.8 percent) in employment followed by the Mining and Logging sector (at 5.3 percent). The Services sector had the third highest average annual growth rate at 3.8 percent.

TABLE 5.10-4
Employment Distribution in the Santa Ana-Anaheim-Irvine MD, 2011 to 2014

	2011		2014		2011-2014	
Industry	**Number of Employees**	**Employment Share**	**Number of Employees**	**Employment Share**	**Percentage Change**	**Average Annual Compound Growth Rate**
Agriculture	3,200	0.2%	2,800	0.2%	-12.5%	-4.4%
Mining and Logging	600	0.0%	700	0.0%	16.7%	5.3%
Construction	69,200	5.0%	82,000	5.5%	18.5%	5.8%
Manufacturing	154,300	11.1%	158,800	10.6%	2.9%	1.0%
Wholesale Trade	77,300	5.6%	81,700	5.5%	5.7%	1.9%
Retail Trade	142,600	10.3%	148,700	9.9%	4.3%	1.4%
Transportation, Warehousing and Utilities	27,500	2.0%	26,600	1.8%	-3.3%	-1.1%
Information	23,800	1.7%	24,200	1.6%	1.7%	0.6%
Financial Activities	104,800	7.6%	114,100	7.6%	8.9%	2.9%
Services	632,900	45.7%	707,300	47.2%	11.8%	3.8%
Government	149,300	10.8%	151,900	10.1%	1.7%	0.6%
Total Employment	**1,385,500**	**100.0%**	**1,498,800**	**100.0%**	**8.2%**	**2.7%**

Source: CEDD, 2015a

Table 5.10-5 provides details on the characteristics of the labor force. The table shows 2014 annual employment data for Huntington Beach and Orange County compared to California. Huntington Beach and Orange County had lower unemployment rates than the state. The CEDD does not project future unemployment rates; therefore, a projection of the future unemployment rate for Huntington Beach and Orange County are not available.

TABLE 5.10-5
Employment Data, 2014

Area	Labor Force	Employment	Unemployment	Unemployment Rate
City of Huntington Beach	106,200	100,600	5,600	5.3%
Orange County	1,573,800	1,487,400	86,400	5.50%
California	18,811,400	17,397,100	1,414,300	7.50%

Source: CEDD, 2015b; 2015c

5.10.3 Environmental Analysis

Local socioeconomic environmental impacts were determined by comparing project demands during construction and operation with the socioeconomic resources of the region of influence (for the purpose of this analysis it is assumed the primary region of socioeconomic influence is Orange County; however, the project could have minor socioeconomic influence within surrounding neighboring counties). A power-generating facility such as the Amended HBEP could affect employment, population, housing, public services and utilities, and schools. Impacts could be local and regional, though generally impacts tend to be more local (city/county) than regional.

5.10.3.1 Construction Impacts

Amended HBEP construction of the combined-cycle power block is expected to take approximately 36 months (including commissioning) and is scheduled to occur between the second quarter of 2017 and the second quarter of 2020. The construction of the simple-cycle block is expected to take approximately 24 months (including commissioning) and is scheduled to occur between the first quarter of 2022 and the fourth quarter of 2023.

Construction Workforce. The primary trades required for Amended HBEP construction and demolition will include craft personnel such as boilermakers, carpenters, electricians, ironworkers, laborers, millwrights, operators, and pipefitters. Appendix 5.10A provide estimates of construction personnel requirements for the combined-cycle power block and the simple-cycle block. These estimates are presented separately and the regional economic impacts associated with their construction analyzed separately because there is a gap between their construction schedules owing to the need to demolish Huntington Beach Generating Station Units 3 and 4.

Total construction and demolition personnel requirements for combined-cycle power block will be approximately 6,562 person-months. Construction personnel requirements will peak at approximately 306 workers in July 2019. Average workforce over the construction and demolition period will be 124 workers. The total construction personnel requirements for the simple-cycle block will be approximately 1,838 person-months. Construction personnel requirements will peak at approximately 231 workers in January 2023. Average workforce over the construction and demolition period will be 92 workers.

Available skilled labor in the Santa Ana-Anaheim-Irvine Metropolitan Statistical Area (MSA) was evaluated by checking with CEDD (Table 5.10-6), which shows that the workforce in Santa Ana-Anaheim-Irvine MSA will be adequate to fulfill Amended HBEP’s construction and demolition labor requirements. Therefore, the project will not place an undue burden on the local workforce. Additionally, workforce requirement by the Amended HBEP would not be expected to place undue burden on the local and regional workforce because Huntington Beach is within the major employment centers of Southern California such as the Los Angeles-Long Beach-Glendale MD, Riverside-San Bernardino-Ontario MSA, and the San Diego-Carlsbad-San Marcos MSA, all of which have a large available construction workforce. Finally, the Amended HBEP peak construction needs are less than one percent of the total of the regionally available construction workforce shown in Table 5.10-4. As a result, the construction and demolition activities associated with the Amended HBEP will not result in a significant adverse impact on the construction labor supply in the area.

TABLE 5.10-6
Available Labor by Skill in Santa Ana-Anaheim-Irvine Metropolitan Statistical Area, 2008-2018

Occupational Title	Annual Averages 2008	Annual Averages 2018	Absolute Change	Percentage Change	Average Annual Compounded Growth Rate (%)
Carpenters	11,260	14,610	3,350	29.8	2.6
Cement Masons and Concrete Finishers	2,160	2,880	720	33.3	2.9
Painters, Construction, and Maintenance	4,970	7,110	2,140	43.1	3.6
Sheet Metal Workers	1,560	1,870	310	19.9	1.8
Electricians	5,500	6,950	1,450	26.4	2.4

TABLE 5.10-6
Available Labor by Skill in Santa Ana-Anaheim-Irvine Metropolitan Statistical Area, 2008-2018

Occupational Title	Annual Averages 2008	Annual Averages 2018	Absolute Change	Percentage Change	Average Annual Compounded Growth Rate (%)
Industrial Truck and Tractor Operators	2,960	3,150	190	6.4	0.6
Operating Engineers and Other Construction Equipment Operators	2,400	2,850	450	18.8	1.7
Helpers, Construction Trades	2,110	2,900	790	37.4	3.2
Construction Laborers	12,170	15,530	3,360	27.6	2.5
Plumbers, Pipefitters, and Steamfitters	3,590	4,560	970	27.0	2.4
Administrative Services Managers	4,560	5,210	650	14.3	1.3
Mechanical Engineers	2,440	2,450	10	0.4	0.0
Electrical Engineers	1,800	1,800	0	0.0	0.0
Engineering Technicians	4,620	4,490	-130	-2.8	-0.3
Plant and System Operators	1,020	1,130	110	10.8	1.0

Source: CEDD, 2015d

Impacts to the Local Economy and Employment. While it is expected that the majority of materials and supplies will be purchased in the greater Southern California area, for the purpose of this analysis the estimated value of materials and supplies that are assumed to be purchased locally in Orange County during construction and demolition is $38.55 million and $17.81 million, respectively, for the combined power block and the simple-cycle block. All cost estimates are in constant 2015 dollars, as are the economic benefits figures cited later in this section.

The Amended HBEP will provide about $243 million and $36.3 million, respectively, in construction and demolition payroll for the combined-cycle power block and the simple-cycle block. The average construction labor rate, for both the combined-cycle power block and the simple-cycle block, is estimated at $105 per hour, including benefits. The anticipated payroll for employees, as well as the purchase of materials and supplies during construction, will have a beneficial, though temporary, impact in Orange County as well as in the surrounding neighboring counties. Assuming conservatively that 90 percent of the construction workforce will reside in Orange County, it is expected that approximately $218.7 million of the construction payroll of the combined-cycle power block will stay in Orange County during the construction and demolition period. In the case of the simple-cycle block, about $32.7 million of the construction payroll is assumed to stay in Orange County during the construction and demolition period. These additional funds will result in a temporary beneficial impact by creating additional employment opportunities for workers in other service areas in Orange County, such as transportation and retail. No significant adverse impacts are expected to result related to the local economy and employment.

Indirect and Induced Economic Impacts from Construction. As previously stated, the regional economic impacts associated with the construction and demolition of the Amended HBEP combined-cycle power block and with the construction of the simple-cycle block were evaluated separately because of the 2-year gap between their construction schedules. Amended HBEP construction and demolition activities will result in secondary economic impacts (indirect and induced impacts) within Orange County. Indirect and induced employment effects include the purchase of goods and services by firms involved with construction, and induced employment effects include construction workers spending their income within the Orange County.

In addition to these secondary employment impacts, indirect and induced income effects arise from construction.

Indirect and induced impacts associated with the construction of the combined-cycle power block (including the demolition of the peaker and tank and other site improvements) were estimated using an IMPLAN Input-Output model of the Orange County economy. IMPLAN is an economic modeling software program. The estimated indirect and induced employment within Orange County would be 33 and 227 jobs, respectively. These additional jobs result from the $12.85[24] million in annual local construction expenditures and the $51.0 million in spending by local construction workers. The $51.0 million represents the disposable portion of the annual construction payroll (here assumed to be 70 percent of $72.9[25] million). Assuming an average direct construction employment of 124 for the construction of the combined-cycle power block, the employment multiplier associated with the construction and demolition phase of the project is approximately 3.1 (i.e., [124 + 33 + 227]/124). This project construction and demolition phase employment multiplier is based on a Type SAM model.

Indirect and induced income impacts associated with the construction of the combined-cycle power block (including the demolition of the peaker and tank and the site preparation [grading] of the Plains All American Tank Farm) were estimated at $2,005,690 and $12,832,640, respectively. Assuming a total annual local construction expenditure in Orange County (payroll, materials, and supplies) of $58.7 million ($51.0 million in disposable payroll + $8.7 million in materials and supplies), the project's construction and demolition phase income multiplier based on a Type SAM model is approximately 1.4 (i.e., [$43,390,190 + $2,005,690 + $12,832,640]/$43,390,190).

Indirect and induced impacts associated with the construction of the simple-cycle block were also estimated using an IMPLAN Input-Output model of the Orange County economy. The estimated indirect and induced employment within Orange County would be 40 and 83 jobs, respectively. These additional jobs result from the approximately $19.3[26] million in annual local construction expenditures and the $11.4 million in spending by local construction workers. The $11.4 million represents the disposable portion of the annual construction payroll (here assumed to be 70 percent of $16.3[27] million). Assuming an average direct construction employment of 92 for the construction of the simple-cycle block, the employment multiplier associated with the construction and demolition phase of the project is approximately 2.3 (i.e., [92 + 40 + 83]/92). This project construction and demolition phase employment multiplier is based on a Type SAM model.

Indirect and induced income impacts associated with the construction of the simple-cycle block were estimated at $2,445,430 and $5,448,120, respectively. Assuming a total annual local construction expenditure in Orange County (payroll, materials, and supplies) of $30.7 million ($11.4 million in disposable payroll + $19.3 million in materials and supplies), the project's construction and demolition phase income multiplier based on a Type SAM model is approximately 1.3 (i.e., [$24,396,580 + $2,445,430 + $5,448,120]/$24,396,580).

Fiscal Impacts. The Amended HBEP's estimated capital costs for the plant and equipment (for both the combined-cycle power block and the simple-cycle block) are estimated to be $770 to $880 million; of this, materials and supplies are estimated at approximately $56.36 million. Similar to the Licensed HBEP, the majority of materials and supplies for the Amended HBEP are assumed to be purchased in Orange County. Thus, all of the estimated $56.36 million in local purchases of materials and supplies during construction of

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[24] Annual portion of local construction expenditures = $38.55 million / (36 months/12 months) = $12.85.

[25] Annual local portion of construction payroll = $243 million / (36 months/12 months) x 90% = $72.9 million. The disposable portion of the annual local construction payroll = $72.9 million x 70% = $51.03 million.

[26] Annual portion of local construction expenditures = $38.55 million / (24 months/12 months) = $19.3 million.

[27] Annual local portion of construction payroll = $36.27 million / (24 months/12 months) x 90% = $16.3 million. The disposable portion of the annual local construction payroll = $16.3 million x 70% = $11.4 million.

Amended HBEP (for both the combined-cycle power block and the simple-cycle block) are assumed to be within Orange County. For the purpose of this analysis it is assumed the City of Huntington Beach will be the point of sale for the $56.36 million in local purchases of materials and supplies and will, as such, realize the associated sales tax revenues on the purchases of these materials and supplies.

The sales tax rate in the City of Huntington Beach is 8 percent (as of July 1, 2015). Of this, 6.5 percent goes to the State; 0.25 percent goes to the County; 0.75 percent goes to the place of sale; and 0.5 percent goes to the Orange County Local Transportation Authority (State Board of Equalization [BOE], 2015). The total sales tax expected to be generated during the Amended HBEP construction is $4,508,726 (i.e., 8 percent of local sales). Assuming all local sales are made in the City of Huntington Beach, the maximum total sales tax revenues the City could receive would be $422,693 (0.75 percent of $56.36 million) during the construction and demolition period. No significant adverse fiscal impacts are expected to result from the Amended HBEP construction and demolition.

5.10.3.2 Operation Impacts

The operation impacts under the Amended HBEP are similar to those in the Licensed HBEP.

5.10.4 Environmental Justice

Although there has been an update to the 2010 ACS 5-year estimates dataset used to characterize the presence of a low-income population, the 2010 U.S. Census data are the most recent source of information on minority population distributions for census blocks (U.S. Census Bureau, 2010a and 2010b). As such, the minority and low-income population distribution used in the screening-level analysis for the Amended HBEP is the same as those included in the Licensed HBEP. According to this analysis, the Licensed HBEP does not create significant and adverse impacts. The environmental justice analysis and finding for the Licensed HBEP will not result in environmental justice impacts and remains applicable and valid for the Amended HBEP. Therefore, no high and adverse human health or environmental impacts are likely to fall disproportionately on minority and low-income members of the community.

5.10.5 Cumulative Effects

Cumulative socioeconomic impacts may occur when more than one project has an overlapping construction schedule that creates a demand for workers that cannot be met by local labor, resulting in an influx of nonlocal workers and their dependents and ensuing excessive demand on public services. As was found for the Licensed HBEP, Amended HBEP cumulative socioeconomic impacts are unlikely, as the Amended HBEP's effect on housing, schools, and public services will be negligible.

5.10.6 Consistency with Laws, Ordinances, Regulations, and Standards

The Final Decision found the project to be in compliance with all applicable LORS. No applicable socioeconomic LORS have been modified since the licensing of HBEP. The Amendment will not alter the assumptions or conclusions made in the Final Decision. The Amended HBEP is consistent with all applicable socioeconomic-related LORS.

5.10.7 Conditions of Certification

No changes to previously identified socioeconomic impacts will result from the approval of this Petition. Therefore, no additional socioeconomic measures beyond those required in the HBEP Final Decision are necessary.

5.10.8 References

In addition to the references listed below, the references cited or consulted in the AFC and included in the Final Decision are applicable to the Amended HBEP.

California Board of Equalization (BOE). 2015. *California City and County Sales and Use Tax Rates Publication 71*. Internet site: http://www.boe.ca.gov/pdf/boe105.pdf. Accessed August 23, 2015.

California Department of Finance (DOF). 2012a. *E-4 Revised Historical City, County and State Population Estimates, 1991-2000, with 1990 and 2000 Census Counts*. Internet site: http://www.dof.ca.gov/research/demographic/reports/estimates/e-4/1991-2000/. Accessed March 7, 2012.

California Department of Finance (DOF). 2012b. *Population Projections by Race/ Ethnicity for California and its Counties 2000-2050*. Internet site: http://www.dof.ca.gov/research/demographic/reports/projections/p-1/. Accessed March 7, 2012.

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5.11 Soil and Water Resources

This section discusses the environmental and regulatory setting and analyzes the soil and water resources impacts of the Amended HBEP.

The Amended HBEP will not create any new soil- and water resources-related impacts that were not previously analyzed during the Licensed HBEP AFC proceedings. The Amended HBEP is consistent with the Licensed HBEP, will meet the approved COCs in the Final Decision, and will comply with all applicable LORS.

5.11.1 Amendment Overview

As discussed in detail in Section 2.0 (Project Description) of this PTA, while similar in nature to the Licensed HBEP, the Amended HBEP differs from the Licensed HBEP in key ways. The Amended HBEP is a natural-gas-fired, combined-cycle and simple-cycle, air-cooled electrical generating facility located on the site of the existing Huntington Beach Generating Station in Huntington Beach, California. The combined-cycle power block will include GE Frame 7FA.05 combined-cycle gas turbines, unfired HRSGs, a steam turbine generator, an air-cooled condenser, a natural-gas-fired auxiliary boiler, and related ancillary equipment. The simple-cycle power block will include two GE LMS-100 simple-cycle units.

The Amended HBEP will be constructed on 30 acres entirely within the site of the existing Huntington Beach Generating Station. As with the Licensed HBEP, the Amended HBEP will reuse existing onsite potable water, natural gas, stormwater, process wastewater, and sanitary pipelines and electrical transmission facilities. No offsite linear developments were required for the Licensed HBEP and no offsite linear developments are required for the Amended HBEP.

Both power blocks will interconnect to the existing onsite SCE 230-kV switchyard.

As with the Licensed HBEP, construction of the Amended HBEP will require the removal of the existing Huntington Beach Generating Station Unit 5 and Units 3 and 4. Demolition of Unit 5, scheduled to occur in 2016, will provide the space for the construction of HBEP Block 1. Construction of Block 1 is expected to take approximately 36 months (including commissioning), with construction scheduled to occur from the first quarter of 2017 through the second quarter of 2020.

As with the Licensed HBEP, demolition of existing Huntington Beach Generating Station Units 3 and 4 is not part of the Amended HBEP project description, but is required in advance of the construction of the Amended HBEP simple-cycle power block.

In addition to the construction of the new generating units, upon the commercial operation of the Amended HBEP simple-cycle power block, existing Huntington Beach Generating Station Units 1 and 2 will be decommissioned and demolished to their steam turbine deck. See Section 2.0 (Project Description) for a description of the decommissioning and demolition of existing Huntington Beach Generating Station Units 1 and 2.

5.11.2 Changes to the Affected Environment

The affected environment remains the same as for the Licensed HBEP. A 1.4-acre triangle-shaped paved parking lot between the SCE substation and the boundary of the Licensed HBEP has been acquired by the Project Owner and is included in the analysis of the Amended HBEP. In addition, construction of the Amended HBEP may require the use of an additional 20 acres beyond the 1.9 acres identified in the Final Decision at the former Plains All American Tank Farm site located adjacent to the HBEP site for construction laydown and construction worker parking. Thus, the analysis herein includes 22 acres of the former Plains All American Tank Farm site for construction laydown and construction worker parking.

Access to the construction laydown/construction parking area will occur via Pacific Coast Highway to Magnolia Boulevard. Access from the construction laydown area to HBEP for equipment and materials will occur via Magnolia Boulevard to Pacific Coast Highway, right on Pacific Coast Highway to Newland Street, and right on Newland Street to the HBEP entrance. As included in the Licensed HBEP, large components of

the Amended HBEP power blocks that arrive at the Port of Long Beach/Port of Los Angeles may be stored in a construction storage area at AES's Alamitos Generating Station until they can be transported and installed at the Amended HBEP site.

Construction workers parking at the former Plains All American Tank Farm will walk to the HBEP site via an existing bridge over the Huntington Beach Channel and walking path. The bridge and walking path will be fenced with temporary construction fencing for safety and to avoid impacts to the adjacent wetlands. Construction equipment will be moved from the Plains site to the Amended HBEP site via Magnolia Avenue, the Pacific Coast Highway, and Newland Street. Limited construction worker parking also is available on the Amended HBEP site. `

5.11.3 Environmental Analysis

The Final Decision for HBEP evaluated the project's impacts on soil and water resources, including key issues of water supply and water quality. In terms of water supply, it was determined that the project's water use will not adversely affect local water supplies primarily because overall water use will be less than existing water Huntington Beach Generating Station use. In fact, the Final Decision stated that the approved project will create a net beneficial impact on local water supplies. Notwithstanding this determination, alternative water supplies were evaluated by the Project Owner in detail. Primarily, the potential use of treated wastewater from the nearby Orange County Sanitation District's Plant No. 2 continues to be economically unsound and environmentally undesirable. Recent inquiries into recycled water availability throughout the region indicate no changes from the conditions at the time of the Final Decision other than alternative water supply sources. As described for the Licensed HBEP, the Amended HBEP will use the existing 8-inch City of Huntington Beach potable water pipeline. Overall water use for the Amended HBEP will be less than indicated for the Licensed HBEP, with a new proposed cap that no more than 120 acre-feet per year of potable water will be used. Average and peak water balances are presented in Chapter 2.0 (Project Description) Figures 2.1-5a and 2.1-5b.

Potential impacts to water quality as a result of project construction were evaluated in the Final Decision, and were determined to be less than significant with the use of standard construction practices for water quality control, to be documented in a Stormwater Pollution Prevention Plan and Drainage, Erosion, and Sediment Control Plan. These same plans will be prepared for the Amended HBEP, and the standard construction measures will be installed and implemented throughout the modified site, and construction and staging areas.

Potential impacts to water quality as a result of Amended HBEP operation will be unchanged from the Licensed HBEP. As described in the Final Decision, the Licensed HBEP will discharge its industrial wastewater through the existing ocean outfall system, consistent with Order No. R8-2006-0011 (NPDES No. CA0001163). Existing Huntington Beach Generating Station discharges are approximately 300,750 acre-feet per year, whereas the Licensed HBEP will discharge only 36 acre-feet per year – a beneficial impact. The existing ocean outfall system also will be used for the Amended HBEP with similar wastewater quantity and quality. In addition, the existing stormwater collection system will be used to collect and process stormwater from the site for discharge to the outfall. As shown in the average and peak water balances, discharge quantity will be less than indicated for the Licensed HBEP.

5.11.4 Cumulative Effects

Similar to the Licensed HBEP, the Amended HBEP will create a net benefit for local water supplies when considered cumulatively with other projects. For this reason, there will be no cumulative water supply impacts.

Similar to the Licensed HBEP, the Amended HBEP will result in a net benefit in waste discharges to the Pacific Ocean when considered cumulatively with other projects. For this reason, there will be no cumulative water quality impacts.

5.11.5 Consistency with Laws, Ordinances, Regulations, and Standards

The Final Decision found the project to be in compliance with all applicable LORS. No applicable soil and water resources LORS have been modified since the licensing of HBEP. The Amendment will not alter the assumptions or conclusions made in the Final Decision. The Amended HBEP is consistent with all applicable soil- and water resources-related LORS.

5.11.6 Conditions of Certification

A proposed modification of COC Soil&Water 6 is presented below.

SOIL&WATER-6: WATER USE AND REPORTING

Water supply for project operation and construction shall be potable water supplied from the city of Huntington Beach. Water use for operation of the Huntington Beach Energy Project shall not exceed **120** ~~134~~ AFY; water use for construction shall not exceed 22 AFY. A monthly summary of water use shall be submitted to the CPM.

VERIFICATION: The project owner shall record HBEP operation water use on a daily basis and shall notify the CPM within 14 days upon forecast to exceed the maximum annual use as described above. Prior to exceeding the maximum use, the owner shall provide a plan to modify operations.

The project owner shall record HBEP construction water use on a daily basis and shall notify the CPM within 14 days upon forecast to exceed the maximum annual use of 22 AFY of potable water. Prior to exceeding the maximum use, the owner shall provide a plan to modify construction practices or offset excess water use.

The project owner shall submit a water use summary report to the CPM monthly during construction and annually in the ACR during operations for the life of the project. The annual report shall include calculated monthly range, monthly average, daily maximum within each month 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 water used by the project.

5.11.7 References

In addition to the reference listed below, the references cited or consulted in the AFC and included in the Final Decision are applicable to the Amended HBEP.

California Energy Commission (CEC). 2014. *Huntington Beach Energy Project Final Decision*. CEC-800-2014-001-CMF. Docket Number 12-AFC-02.

5.12 Traffic and Transportation

This section presents the Project Owner's evaluation of the Amended HBEP/s potential impacts on traffic and transportation. The Amended HBEP will not create any new significant transportation-related impacts that were not previously analyzed during the Licensed HBEP AFC proceedings. The Amended HBEP is consistent with the Licensed HBEP, will meet the approved COCs in the Final Decision, and will comply with all applicable LORS.

5.12.1 Amendment Overview

As discussed in detail in Section 2.0 (Project Description) of this PTA, while similar in nature to the Licensed HBEP, the Amended HBEP differs from the Licensed HBEP in key ways. The Amended HBEP is a natural-gas-fired, combined-cycle and simple-cycle, air-cooled electrical generating facility located at the site of the existing Huntington Beach Generating Station in Huntington Beach, California. The combined-cycle power block will include GE Frame 7FA.05 combined-cycle gas turbines, a steam turbine generator, an air-cooled condenser, a natural gas fired auxiliary boiler, and related ancillary equipment. The simple-cycle power block will include two GE LMS-100 simple-cycle units.

The Amended HBEP will be constructed on 30 acres entirely within the site of the existing Huntington Beach Generating Station. As with the Licensed HBEP, the Amended HBEP will reuse existing onsite potable water, natural gas, stormwater, process wastewater, and sanitary pipelines and electrical transmission facilities. No offsite linear developments were required for the Licensed HBEP and no offsite linear developments are required for the Amended HBEP.

Both power blocks will interconnect to the existing onsite SCE 230-kV switchyard.

As with the Licensed HBEP, construction of the Amended HBEP will require the removal of the existing Huntington Beach Generating Station Unit 5 and Units 3 and 4. Demolition of Unit 5, scheduled to occur in 2016 will provide the space for the construction of HBEP Block 1. Construction of Blocks 1 is expected to take approximately 36 months (including commissioning), with construction scheduled to occur from the first quarter of 2017 through the second quarter of 2020.

As with the Amended HBEP, demolition of existing Huntington Beach Generating Station Units 3 and 4 is not part of the HBEP project description, but is required in advance of the construction of the Amended HBEP simple-cycle power block.

In addition to the construction of the new generating units, upon the commercial operation of Amended HBEP simple-cycle power block, existing Huntington Beach Generating Station Units 1 and 2 will be decommissioned and demolished to their turbine deck. See Section 2.0 (Project Description) for a description of the decommissioning and demolition of existing Huntington Beach Generating Station Units 1 and 2.

5.12.2 Changes to the Affected Environment

The affected environment remains the same as the Licensed HBEP A 1.4-acre triangle-shaped paved parking lot between the SCE substation and the boundary of the Licensed HBEP has been acquired by the Project Owner and is included in the analysis of the Amended HBEP. In addition, construction of the Amended HBEP may require the use of an additional 20 acres beyond the 1.9 acres identified in the Final Decision at the former Plains All American Tank Farm site located adjacent to the HBEP site for construction laydown and construction worker parking (see Figure 5.12-4). Thus, the analysis herein includes 22 acres of the former Plains All American Tank Farm site for construction laydown and construction worker parking.

Access to the construction laydown/construction parking area will occur via Pacific Coast Highway to Magnolia Boulevard. Access from the construction laydown area to HBEP for equipment and materials will occur via Magnolia Boulevard to Pacific Coast Highway, right on Pacific Coast Highway to Newland Street, and right on Newland Street to the HBEP entrance. As included in the Licensed HBEP, large components of

the Amended HBEP power blocks that arrive at the Port of Long Beach/Port of Los Angeles may be stored in a construction storage area at AES's Alamitos Generating Station until they can be transported and installed at the Amended HBEP site.

Construction workers parking at the former Plains All American Tank Farm will walk to the HBEP site via an existing bridge over the Huntington Beach Channel and walking path. The bridge and walking path will be fenced with temporary construction fencing for safety and to avoid impacts to the adjacent wetlands. Construction equipment will be moved from the Plains site to the Amended HBEP site via Magnolia Avenue, the Pacific Coast Highway, and Newland Street. Limited construction worker parking also is available on the Amended HBEP site.

5.12.2.1 Existing Regional and Local Transportation Facilities

No major changes to the existing transportation infrastructure have occurred since preparation of the AFC (07-AFC-06C) and the HBEP AFC Figures 5.12-1 and 5.12-2 continue to represent current regional and local transportation facilities (provided in Appendix 5.12A for convenience). However, there have been minor changes (both increases and decreases) in traffic on the local roadways since the preparation of the AFC. The current roadway volumes are presented below and are based on the Citywide Traffic Count Program conducted in 2014 (Stantec, 2014).

Regional access to the project site is provided from the north via Beach Boulevard (State Route 39) and from the east, south, and west via Pacific Coast Highway. Local access to the project site is primarily provided from Newland Street, just north of the intersection of Pacific Coast Highway and Newland Street. Construction workers and HBEP employees (for operations) traveling to the project site will primarily use the roadways noted below. An emergency site access road is also identified off of Edison Drive. Construction materials for direct delivery to the project site will also use the roadways noted below.

Newland Street. Newland Street is a two- to four-lane, north-south secondary arterial that connects Pacific Coast Highway in the south to the city boundary in the north. The speed limit along Newland Street is 35 miles per hour (mph) and on-street bike lanes are provided. Traffic volumes along Newland Street average up to 13,000 vehicles per day, south of Indianapolis Avenue.

Pacific Coast Highway (State Highway 1). Pacific Coast Highway is a four- to six-lane major arterial that connects to Interstate 5 in Dana Point and to cities and counties along the Pacific coast to the north. The speed limit along Pacific Coast Highway near the project site is 50 mph and off-street and on-street bicycle facilities are provided. Traffic volumes along Pacific Coast Highway in the vicinity of the project site average from 32,000 to 43,000 vehicles per day.

Magnolia Street. Magnolia Street is a four-lane, north-south primary arterial that connects Pacific Coast Highway in the south to Interstate-405 (I-405) and destinations to the north. The speed limit along Magnolia Street is 40 mph and on-street bike lanes are provided. Traffic volumes along Magnolia Street average from 6,000 vehicles per day near the project site to 23,000 vehicles per day near Garfield Avenue.

Brookhurst Street. Brookhurst Street is a six-lane, north-south major arterial that connects Pacific Coast Highway in the south to I-405 and Fountain Valley to the north. The speed limit along Brookhurst Street is 50 mph. No bicycle facilities are provided along Brookhurst Street near the project site. Traffic volumes along Brookhurst Street average from 11,000 vehicles per day near the project site to 34,000 vehicles per day near Garfield Avenue.

Beach Boulevard/State Route 39. Beach Boulevard/State Route 39 is a six- to eight-lane principal arterial that connects Pacific Coast Highway in the south to I-405 and Westminster to the north. The speed limit along Beach Boulevard is 50 mph. No bicycle facilities are provided along Beach Boulevard. Traffic volumes along Beach Boulevard average from 29,000 vehicles per day near the project site up to 69,000 vehicles per day near I-405.

Hamilton Avenue. Hamilton Avenue is a two- to four-lane, east-west primary arterial that connects Newland Street in the west to Victoria Street and Costa Mesa in the east. The speed limit on Hamilton Avenue is 45 mph and on-street bike lanes are provided. Traffic volumes along Hamilton Avenue average from 9,000 vehicles per day near the project site up to 17,000 vehicles per day near Brookhurst Street.

Atlanta Avenue. Atlanta Avenue is a four-lane, east-west primary arterial that connects downtown Huntington Beach in the west to the Brookhurst Street in the east. The speed limit along Atlanta Avenue is 45 mph and on-street bike lanes are provided. Traffic volumes along Atlanta Avenue average from 10,000 to 18,000 vehicles per day.

Adams Avenue. Adams Avenue is a six-lane, east-west major arterial that connects downtown Huntington Beach in the west to Fairview Road in the City of Costa Mesa in the east. The speed limit along Adams Avenue is 45 mph. No bicycle facilities are provided along Adams Avenue near the project site. Traffic volumes along Adams Avenue average from 18,000 up to 38,000 vehicles per day.

5.12.2.2 Heavy/Oversized Loads Haul Route

There are no changes to the previously identified heavy/oversized haul route for the Licensed HBEP. While this discussion notes heavy and oversized loads, as for the Licensed HBEP, for the Amended HBEP the majority of such loads are expected to be classified as oversized loads and not heavy loads, though the permitting and routing requirements are the same.

5.12.3 Environmental Analysis

This section assesses the traffic and transportation effects associated with the Amended HBEP construction and demolition activities. Consistent with the Licensed HBEP, a quantitative traffic analysis was not conducted for operation of the Amended HBEP because the operational workforce will generate a low volume of daily trips that will have a relatively minor impact on the study area roadways.

The potential traffic impacts and compliance related to the transport of hazardous materials, public safety, air traffic, and emergency vehicle access will be the same for the Amended HBEP as those previously identified and addressed in the Final Decision. Therefore, no further analysis of these areas has been conducted.

Should the parking for the construction workers be distributed among all of the construction parking lots noted for the Amended HBEP, the potential transportation impacts for the Amended HBEP will be the same or potentially less than the Licensed HBEP. The inclusion of additional construction worker parking on the Plains All American site for the Amended HBEP will not result in a change in the level of potential transportation impacts from the Licensed HBEP. The Amended HBEP will result in potential differences in the construction project trip generation and project trip distribution. Implementation of the Amended HBEP will result in fewer construction trips than for the Licensed HBEP. Based on the proposed construction activities and workforce estimates, the Amended HBEP will generate 638 daily one-way trips and 312 peak hour trips. In comparison, the Licensed HBEP was estimated to generate 734 daily trips and 343 peak hour trips. To be conservative, for the purposes of this PTA analysis it has been assumed that 100 percent of the construction workers will park at the Plains All American lot (located east of the project site on Magnolia Street), instead of distributing the parking among the additional three parking areas. Therefore, the following analysis evaluates the potential effects on roadway and intersection level of service (LOS) and parking as a result of the change in project trip generation and project trip distribution.

5.12.3.1 Construction Traffic Generation

Traffic impacts associated with the Amended HBEP peak construction traffic were analyzed. The estimated project construction trips are summarized in Table 5.12-1 and discussed in further detail following the table.

TABLE 5.12-1
Construction Trip Generation Estimate

Trip Type	ADT	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Delivery/Haul Trucks	17	2	2	4	2	2	4
PCE (1.5)	26	3	3	6	3	3	6
Workers	612	306	-	306	-	306	306
Total Construction Traffic in PCE	638	309	3	312	3	309	312

Notes:

ADT = Average Daily Traffic
PCE = Passenger Car Equivalents

Based on the proposed construction activities and workforce estimates, the Amended HBEP will generate 638 daily one-way trips (306 workers X 2 trips per worker = 612 total trips) during the peak construction month. Consistent with the Licensed HBEP, it is conservatively assumed that none of the construction workers will carpool. In comparison, the Licensed HBEP was estimated to generate 734 daily trips and 343 peak hour trips.

The greatest number of truck trips expected during construction of the project is approximately 17 daily one-way truck trips; it was assumed that two deliveries will be made during each peak hour. The truck trips were converted to Passenger Car Equivalent (PCE) units at a ratio of 1.5 passenger cars for each truck, consistent with the 2010 *Highway Capacity Manual* guidelines.

5.12.3.2 Construction Traffic Distribution

The project trip distribution pattern for the Amended HBEP is assumed to be the same as previously analyzed for the Licensed HBEP, as follows:

- One-third of trips will come from Long Beach and communities located northwest of the HBEP site.
- One-third will come from Garden Grove, Anaheim, and communities located to the north of the HBEP site.
- One-third will come from Irvine and communities located to the southeast of the HBEP site.

5.12.3.3 Roadway and Intersection LOS

As previously stated, for the purposes of this analysis, it is assumed that 100 percent of the construction workers will park at the Plains All American site; therefore, it is also assumed that a higher percentage of the project traffic will be distributed to Magnolia Street than what was previously evaluated in the original AFC.

Table 5.12-2 is a summary of the daily traffic volumes and volume-to-capacity (V/C) ratio for the existing plus project conditions on Magnolia Street. As shown in the table, Magnolia Street will continue to operate at LOS C assuming that 100 percent of the workforce will use this roadway.

TABLE 5.12-2
Construction Roadway Segment LOS Analysis Summary

Local Facility	Number of Lanes	Annual Average Daily Volume	Construction Volume	Total Construction Volume	Construction V/C Ratio[b]	Construction LOS
Magnolia Street[a]						
Between Garfield Avenue and Yorktown Avenue	4	23,000	638	23,638	0.79	C

[a] Magnolia Street is classified as a Primary Arterial with a daily vehicle capacity of 30,000 Average Daily Traffic (ADT).

[b] V/C is volume-to-capacity ratio, which is an indicator of traffic conditions, speeds, and driver maneuverability.

Note:

LOS = level of service

The City of Huntington Beach's *Draft Existing Circulation Conditions Technical Report Traffic Study* (Stantec, 2014), prepared as part of the City's General Plan Update (City of Huntington Beach, 2014) was reviewed to assess the operating conditions of the intersections on Magnolia Street closest to the Plains All American Tank Farm. Table 5.12-3 summarizes the existing AM and PM peak hour intersection LOS for three intersections on Magnolia Street. As shown in the table, the intersections currently operate at LOS A.

TABLE 5.12-3
Existing Intersection LOS

Intersection	AM Peak Hour		PM Peak Hour	
	ICU[a]	LOS	ICU[a]	LOS
Magnolia Street at Atlanta Avenue	0.53	A	0.49	A
Magnolia Street at Hamilton Avenue	0.49	A	0.55	A
Magnolia Street at Pacific Coast Highway	0.56	A	0.57	A

[a] For signalized intersections, the intersection capacity utilization (ICU) methodology is used by the City to evaluate the intersection level of service (LOS). This methodology sums the V/C ratios for the critical movements of an intersection and results in a total V/C for an intersection, which correlates to a LOS for the intersection.

Note:
Source: Stantec, 2014.

It is estimated that the intersections along Magnolia Street have sufficient capacity to accommodate the short-term increase in project-related trips during both peak hours. Impacts to these intersections will be less than significant.

5.12.3.4 Parking

The Plains All American site is approximately 22 acres (958,320 square feet), not including the landscaped bermed area along Magnolia Street that will not be affected by the HBEP construction parking and laydown area. For the purpose of this analysis, it is assumed that approximately half of the land will be used for construction laydown and half of the land will be used for construction worker parking. Construction workers will access the project site by walking across the bridge and walking path that connects the Plains All American Tank Farm site to the project site.

The number of parking spaces that could be provided within the Plains All American site was estimated by averaging the number of spaces per square foot that are provided at the Huntington Beach Generating Station, the lot on Newland Street, and the lot on the corner of Pacific Coast Highway and Beach Boulevard.

The three lots have an average of 1 space per 482 square feet (1 space per 503 square feet at the Huntington Beach Generating Station, 1 space per 436 square feet at the parking lot on Newland Street, and 1 space per 507 square feet at the parking lot on the corner of Pacific Coast Highway and Beach Boulevard). Based on this average, it is assumed that up to 994 parking spaces could be made available for the construction workforce at the Plains All American site. This is ample space to accommodate the maximum of 330 parking spaces needed for construction of the project, as well as construction laydown area for the Amended HBEP that will located on the Plains All American site.

5.12.4 Cumulative Effects

The Amended HBEP will not result in any significant cumulative impacts to traffic and transportation beyond those addressed in the Final Decision. The Amended HBEP will generate fewer construction-related trips than the Licensed HBEP. Furthermore, Conditions TRANS-1 through TRANS-7 for the Licensed HBEP are included as part of the Amended HBEP to ensure that any potentially significant traffic impacts associated with Amended HBEP construction are reduced to less than significant levels.

5.12.5 Consistency with Laws, Ordinances, Regulations, and Standards

The Final Decision found the project to be in compliance with applicable LORS. As described in this PTA, the Amended HBEP is consistent with applicable traffic and transportation-related LORS. The Amendment will not alter the assumptions or conclusions made in the Final Decision. The Amended HBEP is consistent with all applicable traffic and transportation -related LORS.

5.12.6 Conditions of Certification

Existing Conditions TRANS-1 through TRANS-7 included in the Final Decision are adequate to address any potential impacts from the Amended HBEP. The project owner finds that no modifications to, nor new Traffic and Transportation COCs, are necessary for the Amended HBEP.

5.12.7 References

In addition to the references listed below, the references cited or consulted in the AFC and included in the Final Decision are applicable to the Amended HBEP.

California Energy Commission (CEC). 2014. *Huntington Beach Energy Project Final Decision*. CEC-800-2014-001-CMF. Docket Number 12-AFC-02.

City of Huntington Beach. 1996. *City of Huntington Beach General Plan*. Infrastructure and Community Services Chapter—*Circulation Element*. Web site: http://www.huntingtonbeachca.gov/files/users/planning/circulation_element.pdf. Accessed July 2015.

Stantec. 2014. *Draft Existing Circulation Conditions Technical Report Traffic Study*. Huntington Beach General Plan Update. December 19.

Transportation Research Board. 2010. *Highway Capacity Manual*.

Legend

- AES Huntington Beach Generating Station
- AES Amended Huntington Beach Energy Project
- Offsite HBEP Equipment Temporary Storage Area
- Onsite Construction Parking
- Offsite Construction Parking
- Offsite Construction Parking and Laydown Area

Basemap Source: ESRI

N

0 4
Miles

Figure 5.12-1. Regional Transportation Setting
AES Amended Huntington Beach Energy Project
Huntington Beach, California

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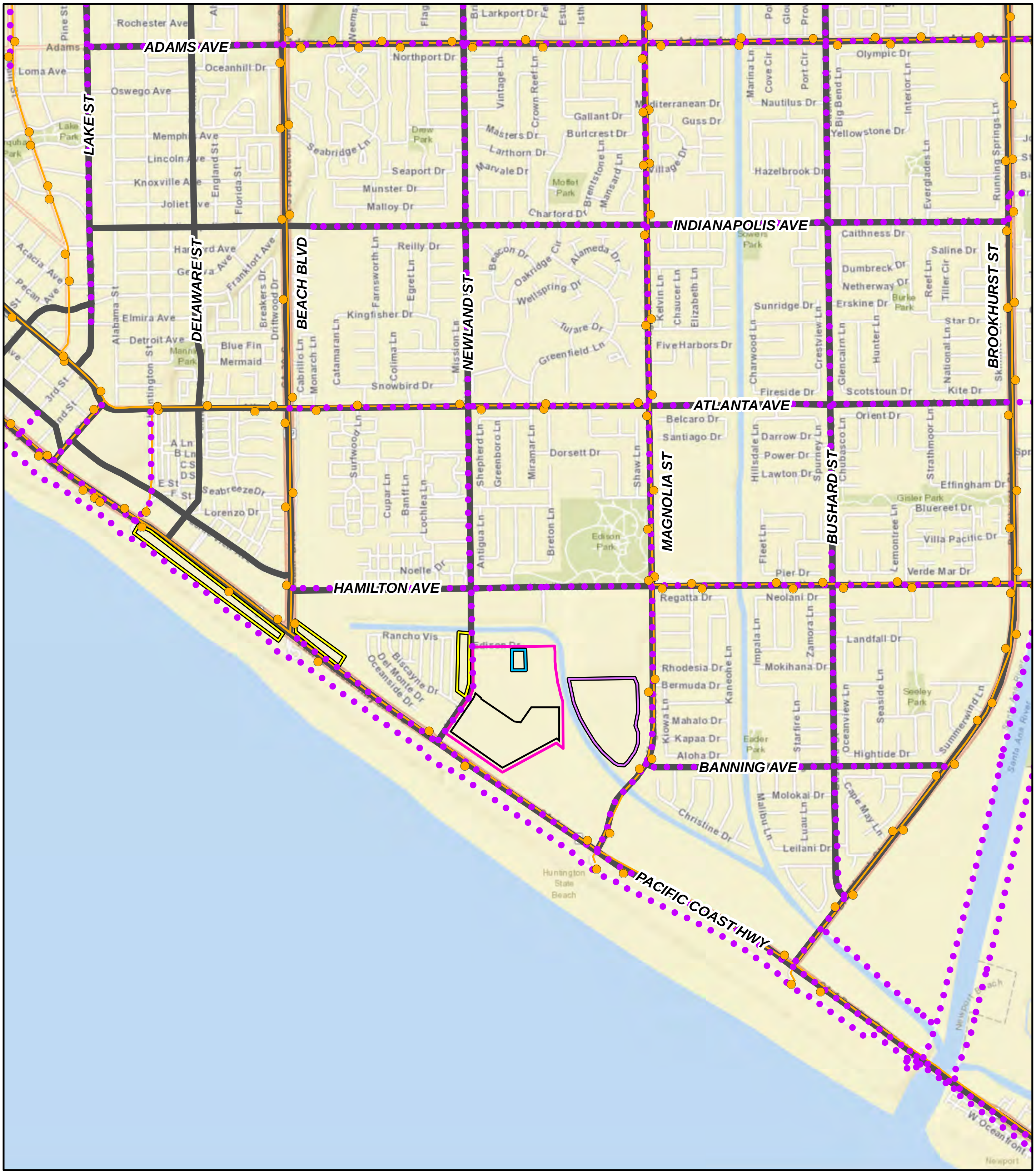

Sources: ESRI (Basemap); Orange County Transportation Authority (OCTA)

Legend

- Bus Stop
- Bus Route
- Bikeway
- Arterial Highway
- AES Huntington Beach Generating Station
- AES Amended Huntington Beach Energy Project
- Onsite Construction Parking
- Offsite Construction Parking
- Offsite Construction Parking and Laydown Area

N

0 2,000
Feet

Figure 5.12-2. Local Transportation Setting
AES Amended Huntington Beach Energy Project
Huntington Beach, California

ch2m

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Figure 5.12-3. Heavy Haul Route
AES Amended Huntington Beach Energy Project
Huntington Beach, California

Legend

- Construction Parking Shuttle Route
- AES Huntington Beach Generating Station
- AES Amended Huntington Beach Energy Project
- Onsite Construction Parking
- Offsite Construction Parking
- Offsite Construction Parking and Laydown Area

Basemap Source: ESRI

N

0 1,250
Feet

Figure 5.12-4. HBEP Construction Parking Areas
AES Amended Huntington Beach Energy Project
Huntington Beach, California

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5.13 Visual Resources

Visual resources are the natural and cultural features of the environment that can be seen and that contribute to the public's enjoyment of the environment. Visual resource or aesthetic impacts are generally defined in terms of a project's physical characteristics and potential visibility, and the extent that the project's presence will change the visual character and quality of the environment in which it will be located. This section presents the Project Owner's evaluation of how the Amended HBEP could impact visual resources, and how the project will comply with applicable visual resources LORS and COCs.

Generally, the Amended HBEP will have a positive visual effect on views toward the project site and is thus not likely to create any new impacts to visual resources that were not previously analyzed during the Licensed HBEP AFC proceedings. The Amended HBEP is consistent with the Licensed HBEP, will comply with the COCs in the Final Decision, and is consistent with all applicable LORS.

5.13.1 Amendment Overview

As discussed in detail in Section 2.0 (Project Description) of this PTA, while similar in nature to the Licensed HBEP, the Amended HBEP differs from the Licensed HBEP in key ways. The Amended HBEP is a natural-gas-fired, combined-cycle and simple-cycle, air-cooled electrical generating facility located on the site of the existing Huntington Beach Generating Station in Huntington Beach, California. The combined-cycle power block will include GE Frame 7FA.05 combined-cycle gas turbines, unfired HRSGs, a steam turbine generator, an air-cooled condenser, a natural-gas-fired auxiliary boiler, and related ancillary equipment. The simple-cycle power block will include two GE LMS-100 simple-cycle units.

The Amended HBEP will be constructed on 30 acres entirely within the site of the existing Huntington Beach Generating Station. As with the Licensed HBEP, the Amended HBEP will reuse existing onsite potable water, natural gas, stormwater, process wastewater, and sanitary pipelines and electrical transmission facilities. No offsite linear developments were required for the Licensed HBEP and no offsite linear developments are required for the Amended HBEP.

Both power blocks will interconnect to the existing onsite SCE 230-kV switchyard.

As with the Licensed HBEP, construction of the Amended HBEP will require the removal of the existing Huntington Beach Generating Station Unit 5 and Units 3 and 4. Demolition of Unit 5, scheduled to occur in 2016, will provide the space for the construction of HBEP Block 1. Construction of Block 1 is expected to take approximately 36 months (including commissioning), with construction scheduled to occur from the first quarter of 2017 through the second quarter of 2020.

As with the Licensed HBEP, demolition of existing Huntington Beach Generating Station Units 3 and 4 is not part of the Amended HBEP project description, but is required in advance of the construction of the Amended HBEP simple-cycle power block.

In addition to the construction of the new generating units, upon the commercial operation of Amended HBEP simple-cycle power block, existing Huntington Beach Generating Station Units 1 and 2 will be decommissioned and demolished to their turbine deck.

Other equipment and facilities to be constructed and shared by both power blocks of the Amended HBEP include natural gas compressors, water treatment facilities, emergency services, and administration and maintenance buildings. The Amended HBEP will be constructed on 30 acres entirely within the footprint of the existing Huntington Beach Generating Station. The expected commercial operational date for the Amended HBEP is May 2020, with the SCGT power block COD at the third quarter of 2023.

- In the Licensed HBEP, Power Block 1, which was to be located in the northeast corner of the project site, consisted of a three-on-one combined-cycle unit with Mitsubishi Heavy Industry 501DA gas turbine generators with HRSGs, one single-pressure condensing turbine steam generator, and an air-cooled condenser. The design of this power block will be changed. Under the Amended HBEP, Power Block 1 will consist of a two-on-one combined-cycle unit with GE Frame 7FA.05 gas turbines and an unfired HRSG with an air-cooled condenser, and related ancillary equipment, with nominal summer capacity of 644 MWs (net). To support the combined-cycle power block, the project will use a natural-gas-fired auxiliary boiler.

- In the Licensed HBEP, Power Block 2, a three-on-one combined-cycle unit with the same design as Power Block 1 would have been located in the southwest corner of the site in the area now occupied by Units 3 and 4. Under the Amended HBEP, Power Block 2 will be replaced by two GE LMS-100 simple-cycle units with a nominal capacity of 200 MWs. These simple-cycle units will be considerably smaller in scale than the combined-cycle power block originally licensed for this area, and significantly, do not require an air-cooled condenser.
- A substantial change will occur in the routing of the 230-kV transmission lines required to transport power from the power blocks to the adjacent SCEsubstation. Under the Amended HBEP, the transmission lines will be shorter in length and in contrast to the Licensed HBEP, will not extend across the western side of the site closest to Pacific Coast Highway and the beach.
- As part of the Licensed HBEP, the existing Units 1 and 2 structures would have been completely removed. Under the Amended HBEP, these structures will be removed to the top of the steam turbine deck, which will leave concrete structures that are approximately 30 feet in height on the footprint of these units.
- As part of the Licensed HBEP, a portion of the Plains All American Tank Farm site to the east of the project site was to have been used for construction worker parking. As part of the Amended HBEO, a larger portion of this site will be used as an equipment laydown area in addition to construction worker parking.

The proposed layout of the Amended HBEP is shown in Figure 2.1-1. The offsite construction parking areas approved under the current license, which are indicated in Figure 2.3-3, will remain the same. The exception is the offsite construction parking area on the Plains All American Tank Farm site, which has been increased to approximately 22 acres and includes areas for construction equipment laydown as well as part of the Amended HBEP.

HBEP will reuse existing onsite potable water, natural gas, stormwater, process wastewater, and sanitary pipelines and electrical transmission facilities. No changes to the Licensed HBEP offsite linear developments are proposed as part of the Amended HBEP.

Tables 5.13-1 and 5.13-2 summarize the dimensions of the facilities at the sites of Power Blocks 1 and 2 that have been approved under the current license and proposed in the Amended HBEP.

TABLE 5.13-1
Dimensions of Licensed Power Block 1 and Amended Project GE Frame 7FA.05

	Licensed Project Power Block 1			Amended Project GE Frame 7FA.05		
Project Feature	**Length (feet)**	**Width (feet)**	**Height (feet)**	**Length (feet)**	**Width (feet)**	**Height (feet)**
Combustion Gas Turbine (CGT)	89	32	34	40	18	30
CGT Generator Enclosure	16	39	34	65	24	30
Steam Turbine Generator Enclosure	59	55	40	NA	NA	NA
HRSG	77	44	92	140	32	94
Stack	—	—	120	—	—	150

TABLE 5.13-1
Dimensions of Licensed Power Block 1 and Amended Project GE Frame 7FA.05

	Licensed Project Power Block 1			Amended Project GE Frame 7FA.05		
Project Feature	**Length (feet)**	**Width (feet)**	**Height (feet)**	**Length (feet)**	**Width (feet)**	**Height (feet)**
CGT Air Intake System	40	17	38	62	18	75
Fuel Gas Compressor Building	144	75	25	107	40	25
Air-cooled Condenser	209	127	104	420	128	110
Control/Administration Building	100	72	40			
Administration Building				100	50	25
Control Building				100	50	25
Maintenance/Warehouse Building	72	60	35	100	50	25
Transformer Wall	53	42	30			
Transmission Structure	—	—	85–135	—	—	
Transmission Dead-End Structure	—	—	75	—	—	

TABLE 5.13-2
Dimensions of Licensed Power Block 2 and Amended Project LMS-100

	Licensed Project Power Block 2			Amended Project LMS-100		
Project Feature	**Length (feet)**	**Width (feet)**	**Height (feet)**	**Length (feet)**	**Width (feet)**	**Height (feet)**
Combustion Gas Turbine (CGT)	89	32	34	40	35	30
CGT Generator Enclosure	16	39	34	24	20	20
Steam Turbine Generator Enclosure	59	55	40	NA	NA	NA
HRSG/Exhaust Transition	77	44	92	45	25	40
Stack	—	—	120	—	—	80
CGT Air Intake System	40	17	38	50	15	47
Fuel Gas Compressor Building	144	75	25	107	58	25
Air-cooled Condenser/Fin Fan Cooler	209	127	104	110	102	24
Control/Administration Building	100	72	40			
Mechanical Building				107	58	25
Electrical Building				170	42	15
Maintenance/Warehouse Building	72	60	35			
Warehouse/Administration Building				270	138	17
Transformer Wall	53	42	30	70	53	25
Transmission Structure	—	—	85–135	—	—	

TABLE 5.13-2
Dimensions of Licensed Power Block 2 and Amended Project LMS-100

	Licensed Project Power Block 2			Amended Project LMS-100		
Project Feature	**Length (feet)**	**Width (feet)**	**Height (feet)**	**Length (feet)**	**Width (feet)**	**Height (feet)**
Transmission Dead-End Structure	—	—	75	—	—	75

5.13.2 Changes to the Affected Environment

The affected environment remains the same as the Licensed HBEP. A 1.4-acre triangle-shaped paved parking lot, between the SCE substation and the boundary of the Licensed HBEP, has been acquired by the Project Owner and is included in the analysis of the Amended HBEP. In addition, construction of the Amended HBEP may require the use of an additional 20 acres beyond the 1.9 acres identified in the Final Decision at the former Plains All American Tank Farm site located adjacent to the HBEP site for construction laydown and construction worker parking (see Figure 5.12-4). Thus, the analysis herein includes 22 acres of the former Plains All American Tank Farm site for construction laydown and construction worker parking.

Access to the construction laydown/construction parking area will occur via Pacific Coast Highway to Magnolia Boulevard. Access from the construction laydown area to HBEP for equipment and materials will occur via Magnolia Boulevard to Pacific Coast Highway, right on Pacific Coast Highway to Newland Street, and right on Newland Street to the HBEP entrance. As included in the Licensed HBEP, large components of the Amended HBEP power blocks that arrive at the Port of Long Beach/Port of Los Angeles may be stored in a construction storage area at AES's Alamitos Generating Station until they can be transported and installed at the Amended HBEP site.

Construction workers parking at the former Plains All American Tank Farm will walk to the HBEP site via an existing bridge over the Huntington Beach Channel and walking path. The bridge and walking path will be fenced with temporary construction fencing for safety and to avoid impacts to the adjacent wetlands. Construction equipment will be moved from the Plains site to the Amended HBEP site via Magnolia Avenue, the Pacific Coast Highway, and Newland Street. Limited construction worker parking also is available on the Amended HBEP site.

5.13.3 Environmental Analysis

5.13.3.1 Analysis Procedure

Visual analyses prepared for the Licensed HBEP determined that the visual effects of the project, with mitigation, will be less than significant. Because the Amended HBEP appearance will differ somewhat from the Licensed HBEP, an analysis was conducted to determine whether the Amended HBEP will alter the visual conditions at the HBEP site in a way that will change this finding of less-than-significant impact. To make this determination, updated visual simulations were prepared to depict the conditions that will exist with the Licensed HBEP and the visual conditions that will exist with implementation of the Amended HBEP. A systematic comparison was made of the simulations depicting the baseline views (i.e., the views with development of the Licensed HBEP) with the views depicting the Amended HBEP. The goal of the comparison is to determine whether the changes brought about by the Amended HBEP will adversely affect the appearance of the site and create impacts that will exceed those of the Licensed HBEP to the extent that they will be so substantial as to potentially represent a significant visual resources impact. Comparisons were made of the visual conditions in the views from each Key Observation Point (KOP) seen in the simulations of the Licensed HBEP with the visual conditions that will be created by the Amended HBEP. In addition, an overall assessment was made of the visual changes that will be brought about by the Amended HBEP in terms of the four questions the CEQA Guidelines have established to determine the significance of visual impacts.

The analysis evaluated the effects of the Licensed HBEP and the Amended HBEP on the views from the five KOPs used to prepare the 2012 AFC Visual Resources Analysis and from two additional KOPs that were added in response to CEC Data Requests as part of the CEC staff's evaluation of the Licensed HBEP. Figure 5.13-1 is a map of the project area that depicts the layout of the Amended HBEP on the project site, and the locations of the KOPs used as the basis for the analysis. Figures 5.13-2 through 5.13-8 present the simulations of the baseline views (the views as they will appear with the Licensed HBEP in place), and of the Amended HBEP. The simulation of the existing baseline view with the Licensed HBEP is the "A" image on each of these figures. The simulations of the views as they will appear with the Amended HBEP in place are presented as the "B" image. The visual impacts of the Amended HBEP were identified based on assessment of the visual simulations, and these impacts were compared to those of the Licensed HBEP set forth in the Final Decision. This provided a basis for determining whether the Amended HBEP will alter any of the conclusions that the Commission made about the Licensed HBEP.

The simulations used in this analysis were developed based on the photographs that had been used to prepare the simulations for the KOP 1 through 4 views included in the 2012 AFC. For the KOP 5 view, the photograph had been employed to create a revised simulation of the KOP 5 view that was submitted after the filing of the HBEP AFC in response to a CEC Data Request. For KOPs 6 and 7, the photographs had been employed as the basis for preparing the simulations submitted to the CEC in response to Data Requests. The simulations of the Licensed HBEP include the landscaping that had been proposed in the landscape plan submitted in response to a Data Request. The simulations of the Licensed HBEP do not include the architectural and color treatments that the Project Owner had developed in collaboration with the City of Huntington Beach. The simulations of the Amended HBEP include the landscaping identified in the landscape plan submitted in response to the Data Request for the Licensed HBEP.

The simulations used in conducting the analysis were produced in accordance with standard protocols for simulation preparation. The photographs used as the basis for preparing the simulations were taken with a single-lens reflex digital camera set to take photographs with a focal length equivalent to that of photographs taken with a 35-millimeter (mm) camera with a 50-mm lens (view angle 40 degrees).[28] Computer modeling and rendering techniques were used to produce the simulated images of the views of the site as they will appear with the Amended HBEP. Existing topographic and site data provided the basis for developing an initial digital model. The project engineers provided site plans and digital data for the amended generation facility and site plans, and typical elevations for the components of the electrical transmission interconnections to the SCE substation located within the project site. These data were used to create three-dimensional digital models of these facilities. These models were combined with the digital site model to produce a complete computer model of the generating facility and the overhead transmission system.

For each viewpoint, viewer location was identified based on electronic location coordinates, and the eye level was assumed to be 5 feet. Computer "wire-frame" perspective plots were then overlaid on the photographs of the views from the KOPs to verify scale and viewpoint location. Digital visual simulation images were produced as a next step, based on computer renderings of the three-dimensional model combined with high-resolution digital versions of base photographs. The final "hardcopy" visual simulation images that appear in this PTA were produced from the digital image files using a color printer.

The images depicting the simulated views of the Licensed HBEP and Amended HBEP within this section are shown "vertically stacked" on 11x17 pages. As requested by CEC's visual resources staff, 11x17 versions of the simulations of the Licensed HBEP and Amended HBEP are included in Appendix 5.13A.

[28] The exception to this approach was the simulation for KOP 5, which was prepared using a widened view created by splicing together two photos that had been taken with a camera set to take photos equivalent to photos taken using a 35-mm camera with a 50-mm lens. In this case, the widened view was essential to provide an understanding of the visual changes that would be occurring in the view seen from this location.

5.13.3.2 Assessment of Visual Effects from Key Observation Points

The visual effects of the Licensed HBEP and Amended HBEP were evaluated using the seven KOPs considered in the visual resources analysis in the Final Staff Assessment and the Final Decision. These KOPs and the differences in visual effects between the conditions that will exist with the Licensed HBEP and the Amended HBEP are described below.

KOP-1—View Toward the HBEP Site from Huntington State Beach. KOP-1 is a viewpoint located at Huntington State Beach, directly across the Pacific Coast Highway from the project site. KOP-1 is representative of close views of the existing Huntington Beach Generating Station from Huntington State Beach. The Pacific Coast Highway and Huntington State Beach facilities can be seen in the foreground of the view.

This viewpoint was selected because it is representative of views from the recreational area closest to the project site. This view is seen by visitors to the beach. The viewpoint is set back approximately 300 feet from the Pacific Coast Highway. Because this viewpoint provides one of the closest and least obstructed views of the project site, it serves as the basis for developing a worst-case assessment of the Amended HBEP's visual effects on this area. Viewer sensitivity at Huntington State Beach is high.

Figure 5.13-2a depicts the baseline view from KOP 1, that is, the view as it will appear with development of the Licensed HBEP. In this view, the Licensed HBEP will be visible to the east of the Pacific Coast Highway, in the area behind the Huntington Beach Wetland Conservancy's Wetlands and Wildlife Care Center. The three HRSGs and the air-cooled condenser that are a part of the Licensed HBEP's Power Block 2 will be visible on the left side of the view. The Power Block 1 HRSGs and air-cooled condenser will be visible on the view's right side. Several tall, single-pole transmission structures will be visible in the center of the view. Low concrete block walls located in the area in front of the Power Block 2 HRSGS will screen most of the facility's lower equipment from view. A border of tall shrubs and palm trees along the project site's perimeter on the left side of the view and a row of tall Norfolk Island pines along the project perimeter on the right side of the view will provide a moderate amount of screening and will help to visually integrate the facility into the view.

Figure 5.13-2b depicts the view from KOP 1 as it will appear with the Amended HBEP in place. On the left side of the view, the area where the Licensed HBEP's Power Block 2 will be located will instead be occupied by two GE LMS-100 simple-cycle power block, the most visible elements of which will be the 80-foot exhaust stacks, and 47-foot-high air intake units. Very importantly, in contrast to the Licensed HBEP's Power Block 2, the simple-cycle power block installation will not require an air-cooled condenser. Because of the smaller scale of the elements of the simple-cycle power block and the absence of a large, bulky air-cooled condenser, there will be less structural mass in this portion of the view than will be the case with the Licensed HBEP. This portion of the view will appear more open, and because of the substantially lower heights of the equipment, the proposed landscaping along the site's perimeter will be better able to screen and visually integrate the installation proposed for this portion of the view. On the right side of the view, the elements of the Amended HBEP's Power Block 1 combined-cycle facility will appear somewhat larger and more massive than those of the Licensed HBEP's Power Block 1. Although the combined effect of the Amended HBEP's Power Block 1 air-cooled condenser, air intake units, and HRSGs will be to add a solid appearing mass to the view, this mass will be only slightly taller in perceived height than the Licensed HBEP's features, and the overall length of the array will be shorter. As a consequence, in terms of its height, the Amended HBEP Power Block 1 combined-cycle array will relate well to the height of the other elements in the view, and because the length of the array is shorter, it will permit views at its right and left sides toward the ridgeline in the distance.

An importance difference between the Licensed and Amended HBEP seen in this view is that the tall tubular steel transmission structures that were visually prominent in the Licensed HBEP as seen in this view have been replaced in the Amended HBEP with H-frame transmission structures that are considerably shorter and that create a much lower degree of visual contrast. The elements of the Amended HBEP seen in this view will combine to create a largely horizontal composition whose parts relate well to each other, creating a strong sense of visual unity. Taking all of these factors into account, overall, the effect of the Amended HBEP on the visual character and quality of this view will be the same as or slightly less than that of the Licensed HBEP, and the impact of the project on this view will continue to be less than significant.

KOP-2—View from Huntington Beach Pier. Figure 5.13-3 presents a simulation of the view toward the project site from Huntington Beach Pier as it will appear with the Licensed HBEP (Figure 5.13-3a) and a simulation of the view as it will appear with the Amended HBEP (Figure 5.13-3b). Comparison of the view with the Licensed HBEP with the view with the Amended HBEP indicates that the Amended HBEP's simple-cycle power block will be considerably smaller and less visible than the Licensed HBEP's Power Block 2 combined-cycle unit's HRSGs and air-cooled condenser that will occupy the same area on the right side of Figure 5.13-3. However, the Amended HBEP's Power Block 1 air-cooled condenser, HRSGs, and stacks seen on the site's left side will appear slightly larger and somewhat more massive than those of the Licensed HBEP's Power Block 1. Because the individual features of the Amended HBEP's Power Block 1 will appear as an orderly and well-integrated whole, the overall visual unity of the Amended HBEP's elements as seen in this view will be somewhat higher than those of the Licensed HBEP. Overall, the visibility of the Amended HBEP in this view may be slightly greater than that of the Licensed HBEP. However, like the Licensed HBEP, compared to the existing view, the effect of the Amended HBEP will be positive, and, like the Licensed HBEP, the Amended HBEP will not have a significant adverse impact on this view.

KOP-3—View from Edison Park. The upper image in Figure 5.13-4 is a simulation of the view toward the HBEP site from Edison Park as it will appear with the Licensed HBEP (Figure 5.13-4a). The lower image is a simulation of the view as it will appear with the Amended HBEP (Figure 5.13-4b). Comparison of the simulation of the Licensed HBEP with the simulation of the Amended HBEP indicates that the Power Block 2 air-cooled condenser that will appear in the center of the view of the Licensed HBEP does not appear in the simulation of the Amended HBEP. In the view of the Amended HBEP, only tops of the features of the simple-cycle power block array that will be located in this portion of the site will be visible above the berm located in the far foreground of this view. The bulk and massing of the air-cooled condensers visible on the left edge of this view in the simulations of both the Licensed HBEP and the Amended HBEP will be very similar. Overall, the features of the Amended HBEP will be less visible in this view than the features of the Licensed HBEP and as a consequence, the Amended HBEP's visual impacts on this view will be less than those of the Licensed HBEP, which the Commission found to be low to moderate and less than significant.

KOP-4—View from Magnolia Street. Figure 5.13-5 presents simulations of views looking east toward the project site across Magnolia Marsh from KOP 4, a location along Magnolia Street about halfway between Pacific Coast Highway and Hamilton Avenue. The upper image (Figure 5.13-5a) is a simulation of the view as it will appear with the Licensed HBEP. The lower image (Figure 5.13-5b) is a simulation of the view as it will appear with the Amended HBEP. In Figure 5.13-5a, the Licensed HBEP's Power Block 2 air-cooled condenser, HRSGs stacks, and transformer walls can be seen at the left side of the view, and the Power Block 1 elements on the right side. In Figure 5.13-5b, the simulation of the view of the Amended HBEP, the Power Block 2 features seen on the left side of the simulation of the Licensed HBEP are gone, replaced by the considerably smaller, lower, and visually simpler elements of the simple-cycle power block. On the right side of the view, the combined-cycle power block that will be part of the Amended HBEP will differ somewhat in appearance from that of the Power Block 1 combined-cycle installation at this location in the Licensed HBEP. In the view of the Amended HBEP, two HRSGs and stacks will be visible to the right of the center of the view, the air-cooled condenser will be visible to their right, and a tall sound wall will be constructed between these features, the row of trees and the decorative perimeter wall that will be located along the perimeter of the project site that borders the marsh. The two exhaust stacks and HRSGs and the air-cooled condenser will have dimensions that are somewhat larger than those of the Licensed HBEP's combined-cycle installation at this location, and the tall sound wall will represent an additional visual change. The heights and overall mass of the features in this portion of the view will be somewhat larger than that of the features in this part of the view in the Licensed HBEP. However, taking into account the lower level of development in the left side of the view, the elimination of the tall transmission structures that were a part of the Licensed HBEP, the orderly appearance of the combined-cycle components, and the spaces between them that retain views toward the sky behind them, the overall effect of the Amended HBEP on this view will be generally similar to that of the Licensed HBEP. Overall, the Amended HBEP's visual impacts on this view will be similar to those of the Licensed HBEP, and as a consequence, there will be no change to the CEC's Final Decision that the impact will be less than significant with implementation of COCs VIS-1 and VIS-2.

KOP-5—View from Huntington-By-The-Sea Mobile Estates and RV Park. Figure 5.13-6 presents simulations of the view looking east toward the project site from the driveway that provides access into and out of the Huntington-By-The-Sea Mobile Estates and RV Park, which is located on Newland Street across the street from the site. Comparison of the simulation of the view with the Licensed HBEP in place (Figure 5.13-6a) and the simulation of the view of the Amended HBEP (Figure 5.13-6b) provides a basis for assessing the differences in the aesthetic effects of the two scenarios. In the simulation of the Licensed HBEP, the Power Block 2 air-cooled condenser and one of its HRSGs and exhaust stacks are readily visible in the center of the view out the driveway. In the simulation of the view of the Amended HBEP, the Power Block 2 structures are gone, leaving the portion of the project site directly across from the driveway open, except for the one-story electrical building, which is partially visible behind the decorative wall along Newland Street. The two exhaust stacks that are a part of the simple-cycle power block installation that the Amended HBEP will place on the west side of the site and one of its air inlet filters will be partially visible on the right side of the view. Because these features are relatively small in scale and low in height, they are integrated into the view and partially screened by existing trees and trees that will be planted on the site as a part of the project. To the left of the center of the view, one of the Power Block 1 air inlet, HRSG and exhaust stack can be seen, but its visibility is partially attenuated by project landscaping. The Amended HBEP's Power Block 1 air-cooled condenser and transmission infrastructure is located on the left side of the view where it is screened to a large degree by palm trees that line the north side of the mobile estate's driveway. Overall, the visual effect of the Amended HBEP compared to the Licensed HBEP is positive, in that large structures will no longer dominate the center of the view, and the structures that will be present at the periphery of the view will be smaller in scale and will be partially screened by existing trees and by trees that will be installed on the site. Although the Commission determined that the Licensed HBEP created a potentially significant impact on this view, given the substantial improvement to this view that the Amended HBEP will bring about, the impact of the Amended HBEP will be less than significant.

KOP-6—View from Pacific Coast Highway near Brookhurst Street. Figure 5.13-7 presents simulations of the view looking north along Pacific Coast Highway toward the project site as it will appear with the Licensed HBEP (Figure 5.13-7a). Figure 5.13-7b is a simulation of the same view as it will appear with the Amended HBEP. Comparing the two views, one of the differences that is readily observable in the simulation of the Amended HBEP is that the Licensed HBEP's Power Block 2 HRSGs, stacks, and air-cooled condenser are no longer visible in the portion of the project site that appears to be the closest to Pacific Coast Highway in this view. Instead, under the Amended HBEP, this portion of the view will be occupied by stacks and other simple-cycle power block components that are lower in height and smaller in scale. In the area on the right site of the project site, in the simulation of the view of the Amended HBEP, the exhaust stacks and HRSGs of Power Block 1 will be located slightly to the left of where the Power Block 1 HRSGs will be in the Licensed HBEP and will appear to be slightly larger than the Licensed HBEP's comparable elements. The Amended HBEP's Power Block 1 air-cooled condenser will be located at essentially the same location as the Licensed HBEP's Power Block 1 HRSGs and will appear slightly larger, but not much taller than the Licensed HBEP's massing of structures. Overall, taking into account the reduced mass of the project facilities seen at the left side of the view and the slightly increased mass of the project facilities on the right side of the view, further from the highway and partially screened by the chain link fence in the foreground, the effect of the Amended HBEP on this view will be generally the same as that of the Licensed HBEP. Like the Licensed HBEP, the effect of the Amended HBEP on this view will be less than significant.

KOP-7—View from the Southern Bluff of the Huntington Beach Mesa. KOP 7 documents views toward the project site from a viewpoint at the entrance to the Huntington Shorecliffs Mobile Home Park, which is located on the southern bluff of the Huntington Beach Mesa, approximately 1 ¼ miles northwest of the project site. Figure 5.13-8a is a simulation of the view with the Licensed HBEP, and Figure 5.13-8b is a simulation of the view of the Amended HBEP. Review of the two simulations reveals that in the view of the Licensed HBEP, a structural mass created by HRSGs, stacks, and an air-cooled condenser extends above the horizon in the center of view where it is partially screened by tall trees lying within the line of sight. In the simulation of the view of the Amended HBEP, the mass of power plant structures visible in center of the view of the Licensed HBEP is gone, leaving the skyline in the center of the view unaffected by the project. Instead, in the area to the left of the center of the view, the tops of the Power Block 1 stacks and air-cooled condenser extend slightly above the horizon line, but they are partially screened from view by intervening trees. The Commission determined that the impact of the Licensed HBEP on this view will be low and less than significant. With the Amended HBEP, the impact will be even lower and will remain less than significant.

5.13.3.3 Impact Significance

A discussion regarding whether the visual effects of the Amended HBEP will be significant pursuant to CEQA is provided below. The assessment of these impacts applies the criteria set forth in Appendix G of the CEQA Guidelines. The CEQA Guidelines define a “significant effect” on the environment to mean a “substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project, including objects of historic or aesthetic significance.” (14 Cal. Code Regs. § 15382.) The criteria are as follows:

- **Will the project have a substantial adverse effect on a scenic vista?**

  No. The Final Decision determined that no views occur in the project vicinity with a level of scenic appeal distinguishing them as a scenic vista. This condition has not changed.

- **Will the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?**

  No. This criterion is not applicable because neither the Licensed HBEP nor the Amended HBEP’s site lies within either the right-of-way or viewshed of an adopted state scenic highway.

- **Will the project substantially degrade the existing visual character or quality of the site and its surroundings?**

  No. As the evaluations of the changes to the views from each of the individual KOPs document, the Amended HBEP will have visual effects that are either generally the same as or less than that of the Licensed HBEP. As a consequence, at six of the seven views, the Amended HBEP, like the Licensed HBEP will not have significant impacts that require mitigation. The Commission found that the Licensed HBEP will have a potentially significant impact on the view from KOP 5 that will require mitigation. As the analysis above demonstrates, the Amended HBEP’s appearance in the view from KOP 5 will be quite different from that of the Licensed HBEP, and, as a consequence, the impact of the Amended HBEP on this view will be much less than that of the Licensed HBEP, eliminating any potential for its effects to be potentially significant. The Commission determined that the Licensed HBEP’s impacts on the view from KOP 4 will be significant but could be reduced to a level that is less than significant through implementation of COCs VIS-1 and VIS-2. Because the impacts of the Amended HBEP on this view will be generally at the same level of those of the Licensed HBEP, this finding will remain the same.

- **Will the project create a new source of substantial light and glare that will adversely affect day or nighttime views in the area?**

  No. The modifications proposed in the Amended HBEP will not increase the amount of night lighting visible within and emanating from the site. In addition, all of the lighting required by the new facilities will conform to the lighting impact mitigation measures specified in existing COCs VIS-2, VIS-3, VIS-4, VIS-5, and VIS-6, which will ensure that project lighting will be the minimal required for operations and safety, will be kept off when not in use, and will make use of fixtures that are hooded and directed downward and toward the area where the light is needed to minimize offsite light trespass and impacts on the night sky. Most significantly, with removal of the existing, massive Huntington Beach Generating Station structures and all of the lighting associated with the Huntington Beach Generating Station that dates from an era when less attention was given to light attenuation than is now the case, there will be a substantial decrease in the amount of light visible on and emanating from the project site.

5.13.4 Cumulative Effects

The Final Decision concluded that the Licensed HBEP will have no potential to cause cumulative visual impacts. Because the visual impacts of the Amended HBEP will be generally similar to or less than those of the Licensed HBEP, this finding remains unchanged.

5.13.5 Consistency with Laws, Ordinances, Regulations and Standards

The Final Decision found the project to be in compliance with all applicable LORS. No applicable visual resources LORS have been modified since the licensing of HBEP. The Amendment will not alter the assumptions or conclusions made in the Final Decision. The Amended HBEP is consistent with all applicable visual resources-related LORS.

5.13.6 Conditions of Certification

No changes to previously identified visual resources impacts will result from the approval of this Petition. Therefore, no additional measures beyond those required in the HBEP Final Decision are necessary.

5.13.7 References

In addition to the reference listed below, the references cited or consulted in the AFC and included in the Final Decision are applicable to the Amended HBEP.

California Energy Commission (CEC). 2014. *Huntington Beach Energy Project Final Decision*. CEC-800-2014-001-CMF. Docket Number 12-AFC-02.

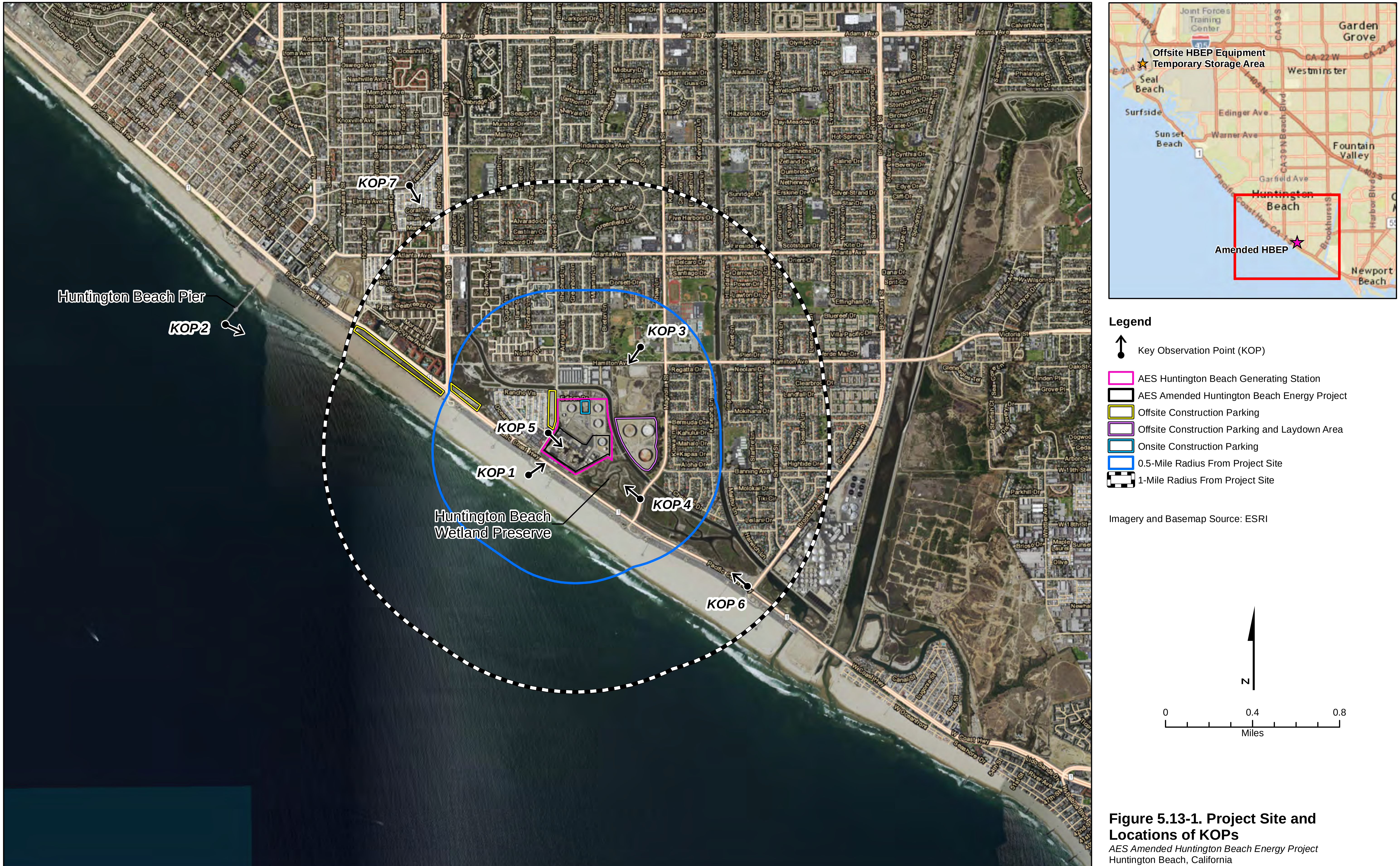

Figure 5.13-1. Project Site and Locations of KOPs
AES Amended Huntington Beach Energy Project
Huntington Beach, California

ch2m.

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A. Simulated view toward project site from Huntington State Beach with the licensed HBEP in place.

B. Simulated view toward project site from Huntington State Beach with the Amended HBEP in place.

Figure 5.13-2. KOP 1 - View Toward HBEP from Huntington State Beach
AES Amended Huntington Beach Energy Project
Huntington Beach, California

ch2m

A. Simulated view toward project site from Huntington Beach Pier with the licensed HBEP in place.

B. Simulated view toward project site from Huntington Beach Pier with the Amended HBEP in place.

Figure 5.13-3. KOP 2 - View Toward HBEP from Huntington Beach Pier
AES Amended Huntington Beach Energy Project
Huntington Beach, California

A. Simulated view toward project site from Edison Park with the licensed HBEP in place.

B. Simulated view toward project site from Edison Park with the Amended HBEP in place.

Figure 5.13-4. KOP 3 - View Toward HBEP from Edison Park
AES Amended Huntington Beach Energy Project
Huntington Beach, California

A. Simulated view toward project site from Magnolia Street with the licensed HBEP in place.

B. Simulated view toward project site from Magnolia Street with the Amended HBEP in place.

Figure 5.13-5. KOP 4 - View Toward HBEP from Magnolia Street
AES Amended Huntington Beach Energy Project
Huntington Beach, California

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A. Simulated view toward project site from Huntington By-The-Sea RV Park with the licensed HBEP in place.

B. Simulated view toward project site from Huntington By-The-Sea RV Park with the Amended HBEP in place.

Figure 5.13-6. KOP 5 - View Toward HBEP from Huntington By-The-Sea RV Park

AES Amended Huntington Beach Energy Project

Huntington Beach, California

A. Simulated view toward project site from Pacific Coast Highway with the licensed HBEP in place.

B. Simulated view toward project site from Pacific Coast Highway with the Amended HBEP in place.

Figure 5.13-7. KOP 6 - View Toward HBEP from Pacific Coast Highway
AES Amended Huntington Beach Energy Project
Huntington Beach, California

A. Simulated view toward project site from Huntington Shorecliffs Mobile Home Park with the licensed HBEP in place.

B. Simulated view toward project site from Huntington Shorecliffs Mobile Home Park with the Amended HBEP in place.

Figure 5.13-8. KOP 7 - View Toward HBEP from Huntington Shorecliffs Mobile Home Park
AES Amended Huntington Beach Energy Project
Huntington Beach, California

5.14 Waste Management

This section presents the Project Owner's evaluation of how the Amended HBEP could impact human health and the environment from nonhazardous and hazardous waste generated, and how the Amended HBEP will comply with applicable waste management LORS and COCs.

The Amended HBEP will not create any new waste management-related impacts that were not previously analyzed during the Licensed HBEP AFC proceedings. The Amended HBEP is consistent with the Licensed HBEP, will meet the approved COCs in the Final Decision, and will comply with all applicable LORS.

5.14.1 Amendment Overview

As discussed in detail in Section 2.0 (Project Description) of this PTA, while similar in nature to the Licensed HBEP, the Amended HBEP differs from the Licensed HBEP in key ways. The Amended HBEP is a natural-gas-fired, combined-cycle and simple-cycle, air-cooled electrical generating facility located on the site of the existing Huntington Beach Generating Station in Huntington Beach, California. The combined-cycle power block will include GE Frame 7FA.05 combined-cycle gas turbines, unfired HRSGs, a steam turbine generator, an air-cooled condenser, a natural-gas-fired auxiliary boiler, and related ancillary equipment. The simple-cycle power block will include two GE LMS-100 simple-cycle units.

The Amended HBEP will be constructed on 30 acres entirely within the site of the existing Huntington Beach Generating Station. As with the Licensed HBEP, the Amended HBEP will reuse existing onsite potable water, natural gas, stormwater, process wastewater, and sanitary pipelines and electrical transmission facilities. No offsite linear developments were required for the Licensed HBEP and no offsite linear developments are required for the Amended HBEP.

Both power blocks will interconnect to the existing onsite SCE 230-kV switchyard.

As with the Licensed HBEP, construction of the Amended HBEP will require the removal of the existing Huntington Beach Generating Station Unit 5 and Units 3 and 4. Demolition of Unit 5, scheduled to occur in 2016, will provide the space for the construction of HBEP Block 1. Construction of Block 1 is expected to take approximately 36 months (including commissioning), with construction scheduled to occur from the first quarter of 2017 through the second quarter of 2020.

As with the Licensed HBEP, demolition of existing Huntington Beach Generating Station Units 3 and 4 is not part of the Amended HBEP project description, but is required in advance of the construction of the Amended HBEP simple-cycle power block.

In addition to the construction of the new generating units, upon the commercial operation of Amended HBEP simple-cycle power block, existing Huntington Beach Generating Station Units 1 and 2 will be decommissioned and demolished to their turbine deck. See Section 2.0 (Project Description) for a description of the decommissioning and demolition of existing Huntington Beach Generating Station Units 1 and 2.

5.14.2 Changes to the Affected Environment

The affected environment remains the same as the Licensed HBEP. A 1.4-acre triangle-shaped paved parking lot between the SCE substation and the boundary of the Licensed HBEP has been acquired by the Project Owner and is included in the analysis of the Amended HBEP. In addition, construction of the Amended HBEP may require the use of an additional 20 acres beyond the 1.9 acres identified in the Final Decision at the former Plains All American Tank Farm site located adjacent to the HBEP site for construction laydown and construction worker parking (see Figure 5.12-4). Thus, the analysis herein includes 22 acres of the former Plains All American Tank Farm site for construction laydown and construction worker parking.

Access to the construction laydown/construction parking area will occur via Pacific Coast Highway to Magnolia Boulevard. Access from the construction laydown area to HBEP for equipment and materials will occur via Magnolia Boulevard to Pacific Coast Highway, right on Pacific Coast Highway to Newland Street,

and right on Newland Street to the HBEP entrance. As included in the Licensed HBEP, large components of the Amended HBEP power blocks that arrive at the Port of Long Beach/Port of Los Angeles may be stored in a construction storage area at AES's Alamitos Generating Station until they can be transported and installed at the Amended HBEP site.

Construction workers parking at the former Plains All American Tank Farm will walk to the HBEP site via an existing bridge over the Huntington Beach Channel and walking path. The bridge and walking path will be fenced with temporary construction fencing for safety and to avoid impacts to the adjacent wetlands. Construction equipment will be moved from the Plains site to the Amended HBEP site via Magnolia Avenue, the Pacific Coast Highway, and Newland Street. Limited construction worker parking also is available on the Amended HBEP site.

5.14.3 Environmental Analysis

The Amended HBEP facility will generate nonhazardous solid waste during construction/demolition and operation that will add to the total waste generated in Orange County and in California. However, as concluded in the Final Decision for the Licensed HBEP, there is adequate recycling and landfill capacity in California to recycle and dispose of the waste generated by the Amended HBEP.

The types and volume of wastes generated during construction and demolition of the Amended HBEP will be similar, if not lower, than those analyzed during the Licensed HBEP. This is due to the fact that the Amended HBEP consists of one combined-cycle power block and one simple-cycle power block, resulting less construction waste generated. In addition, the Licensed HBEP assumed that existing Huntington Beach Generating Station Units 1 and 2 were demolished to their foundations, and the Amended HBEP proposes to demolish the existing Units 1 and 2 to the steam turbine deck, which will result in less demolition waste.

The types and volume of hazardous waste generated during the operation of the Amended HBEP will be similar or less than those analyzed for the Licensed HBEP and will be disposed of consistent with applicable LORS and the existing COCs. See Section 5.5 for additional information related to hazardous materials management.

The Project Owner's compliance with the COCs in the Final Decision and with applicable LOR, will reduce potential adverse impacts of the Amended HBEP to insignificant levels, and ensure that project-related wastes will be handled in an environmentally safe manner. No new significant impacts to waste management will result from the changes as proposed in this PTA.

5.14.4 Cumulative Effects

The Amended HBEP will not cause adverse impacts on waste management and will not cause an exposure of people or property to waste management hazards. As addressed in the Final Decision, there are no minor impacts that could combine cumulatively with those of other projects, including the demolition of existing Huntington Beach Generating Station Units 3 and 4, which is considered a cumulative project. Thus, the Amended HBEP will not result in a cumulatively considerable impact.

Existing laws and regulations address the handling and the management and transportation of waste during construction and operation of Amended HBEP. Existing laws and regulations address the handling of hazardous materials, and the transportation and use of aqueous ammonia, an acutely hazardous material, and will ensure that hazardous materials at the HBEP are safely managed.

5.14.5 Consistency with Laws, Ordinances, Regulations, and Standards

The Final Decision found the project to be in compliance with all applicable LORS. No applicable waste management LORS have been modified since the licensing of HBEP. The Amendment will not alter the assumptions or conclusions made in the Final Decision. The Amended HBEP is consistent with all applicable waste management-related LORS.

5.14.6 Conditions of Certification

No changes to previously identified impacts involving the handling and management of waste will result from the approval of this Petition. Therefore, no additional waste management Conditions of Certification beyond those required in the HBEP Final Decision are necessary.

5.14.7 References

In addition to the reference listed below, the references cited or consulted in the AFC and included in the Final Decision are applicable to the Amended HBEP.

California Energy Commission (CEC). 2014. *Huntington Beach Energy Project Final Decision*. CEC-800-2014-001-CMF. Docket Number 12-AFC-02.

5.15 Worker Health and Safety

This section analyzes the worker health and safety issues that may be encountered during construction and operation of the Amended HBEP.

The Amended HBEP will not create any new worker health and safety-related impacts that were not previously analyzed during the Licensed HBEP AFC proceedings. The Amended HBEP is consistent with the Licensed HBEP, will meet the approved COCs in the Final Decision, and will comply with all applicable LORS.

5.15.1 Amendment Overview

As discussed in detail in Section 2.0 (Project Description) of this PTA, while similar in nature to the Licensed HBEP, the Amended HBEP differs from the Licensed HBEP in key ways. The Amended HBEP is a natural-gas-fired, combined-cycle and simple-cycle, air-cooled electrical generating facility located on the site of the existing Huntington Beach Generating Station in Huntington Beach, California. The combined-cycle power block will include GE Frame 7FA.05 combined-cycle gas turbines, unfired HRSGs, a steam turbine generator, an air-cooled condenser, a natural-gas-fired auxiliary boiler, and related ancillary equipment. The simple-cycle power block will include two GE LMS-100 simple-cycle units.

The Amended HBEP will be constructed on 30 acres entirely within the site of the existing Huntington Beach Generating Station. As with the Licensed HBEP, the Amended HBEP will reuse existing onsite potable water, natural gas, stormwater, process wastewater, and sanitary pipelines and electrical transmission facilities. No offsite linear developments were required for the Licensed HBEP and no offsite linear developments are required for the Amended HBEP.

Both power blocks will interconnect to the existing onsite SCE 230-kV switchyard.

As with the Licensed HBEP, construction of the Amended HBEP will require the removal of the existing Huntington Beach Generating Station Unit 5 and Units 3 and 4. Demolition of Unit 5, scheduled to occur in 2016, will provide the space for the construction of HBEP Block 1. Construction of Block 1 is expected to take approximately 36 months (including commissioning), with construction scheduled to occur from the first quarter of 2017 through the second quarter of 2020.

As with the Licensed HBEP, demolition of existing Huntington Beach Generating Station Units 3 and 4 is not part of the Amended HBEP project description, but is required in advance of the construction of the Amended HBEP simple-cycle power block.

In addition to the construction of the new generating units, upon the commercial operation of Amended HBEP simple-cycle power block, existing Huntington Beach Generating Station Units 1 and 2 will be decommissioned and demolished to their turbine deck. See Section 2.0 (Project Description) for a description of the decommissioning and demolition of existing Huntington Beach Generating Station Units 1 and 2.

5.15.2 Affected Environment

The affected environment remains the same as the Licensed HBEP. A 1.4-acre triangle-shaped paved parking lot between the SCE substation and the boundary of the Licensed HBEP has been acquired by the Project Owner and is included in the analysis of the Amended HBEP. In addition, construction of the Amended HBEP may require the use of an additional 20 acres beyond the 1.9 acres identified in the Final Decision at the former Plains All American Tank Farm site located adjacent to the HBEP site for construction laydown and construction worker parking (see Figure 5.12-4). Thus, the analysis herein includes 22 acres of the former Plains All American Tank Farm site for construction laydown and construction worker parking.

Access to the construction laydown/construction parking area will occur via Pacific Coast Highway to Magnolia Boulevard. Access from the construction laydown area to HBEP for equipment and materials will occur via Magnolia Boulevard to Pacific Coast Highway, right on Pacific Coast Highway to Newland Street, and right on Newland Street to the HBEP entrance. As included in the Licensed HBEP, large components of

the Amended HBEP power blocks that arrive at the Port of Long Beach/Port of Los Angeles may be stored in a construction storage area at AES's Alamitos Generating Station until they can be transported and installed at the Amended HBEP site.

Construction workers parking at the former Plains All American Tank Farm will walk to the HBEP site via an existing bridge over the Huntington Beach Channel and walking path. The bridge and walking path will be fenced with temporary construction fencing for safety and to avoid impacts to the adjacent wetlands. Construction equipment will be moved from the Plains site to the Amended HBEP site via Magnolia Avenue, the Pacific Coast Highway, and Newland Street. Limited construction worker parking also is available on the Amended HBEP site.

5.15.3 Environmental Analysis

Health and safety impacts analyzed in this PTA are evaluated with respect to the CEQA checklist, which does not pose specific questions for worker health and safety. The analysis in this section is consistent with the analysis routinely conducted by CEC staff related to worker health and safety. Related analyses are also included in Section 5.5 (Hazardous Materials Handling), and Section 5.7 (Noise and Vibration).

5.15.3.1 Hazard Analysis

Similar to the Licensed HBEP, workers will be exposed to Amended HBEP construction/demolition and operational safety hazards. The hazard analysis and control measures included in the Licensed HBEP and in the COCs for the Licensed HBEP are applicable to the Amended HBEP. The hazard analysis for HBEP identifies the hazards anticipated during construction/demolition and operation, and indicates which safety programs should be developed and implemented to mitigate and appropriately manage those hazards.

Programs are overall plans that set forth the method or methods that will be followed to achieve particular health and safety objectives. For example, the Fire Protection and Prevention Program will describe what has to be done to protect against and prevent fires. This will include equipment required, such as alarm systems and firefighting equipment, and procedures to follow to protect against fires. The Emergency Action Program/Plan will describe escape procedures, rescue and medical procedures, alarm and communication systems, and response procedures for every hazardous material that can migrate, such as ammonia. The programs or plans are set forth in written documents that are usually kept at specific locations in the facility.

Each program or plan will contain minimum training requirements that are translated into detailed training courses for plant construction/demolition and operating personnel and will adhere to the Property Owner's corporate safety policy and all applicable Occupation Safety and Health Administration and California Occupational Safety and Health Administration regulations. Training will be provided to construction/demolition and operating personnel as needed. For example, all plant operating personnel will receive training in escape procedures under the Emergency Action Program/Plan, but only those working with flammables will receive training under the Fire Protection and Prevention Program.

For the Amended HBEP, no changes are required to Tables 5.16-1 and 5.16-2 from the HBEP AFC, which list construction/demolition and operation activities and associated hazards, and include in the "Control" column the program designed to reduce the occurrence of each hazard.

5.15.3.2 Training and Safety Programs

To protect the safety and health of workers during Amended HBEP construction/demolition and operation, health and safety programs designed to mitigate hazards and comply with applicable regulations will be implemented. Periodic internal audits will be performed by qualified individuals to determine whether proper work practices are being used to mitigate hazardous conditions and to evaluate regulatory compliance. A comprehensive Environmental Health and Safety audit will be conducted on an annual basis during the construction phase and every 3 years during HBEP operation.

Specific training program content for construction/demolition employees will be required of construction/demolition contractors. Construction/demolition workers will be required to attend an Amended HBEP site safety orientation prior to being allowed to work at the site. Workers will also be required to follow all federal, state, and local employee safety rules and regulations and Amended HBEP Safety programs while onsite.

5.15.3.3 Fire Protection

The Huntington Beach Fire Department has eight fire stations. Station 4, located at 21441 Magnolia Street in Huntington Beach, is approximately 0.5 mile northeast of the HBEP site and will be the primary responding fire station to the project site. Approximate response time from Station 4 to the project site is 5 minutes (Smythe, 2012). Mutual aid response would come from the other fire stations in the Project Owner has engaged the Huntington Beach Fire Department in discussions regarding the project’s fire protection needs and the Huntington Beach Fire Department’s ability to respond. The Amended HBEP’s onsite fire suppression system is described in Section 2.0 (Project Description).

5.15.4 Cumulative Effects

The Amended HBEP will not result in any significant cumulative impacts to worker health and safety beyond those addressed in the CEC’s Final Decision.

5.15.5 Consistency with Laws, Ordinances, Regulations, and Standards

The Final Decision found the project to be in compliance with all applicable LORS. No applicable worker health and safety LORS have been modified since the licensing of HBEP. The Amendment will not alter the assumptions or conclusions made in the Final Decision. The Amended HBEP is consistent with all applicable worker health and safety-related LORS.

5.15.6 Conditions of Certification

No changes to previously identified impacts involving worker health and safety will result from the approval of this Petition. Therefore, no additional worker health and safety Conditions of Certification beyond those required in the HBEP Final Decision are necessary.

5.15.7 References

In addition to the references listed below, the references cited or consulted in the AFC and included in the Final Decision are applicable to the Amended HBEP.

California Energy Commission (CEC). 2014. *Huntington Beach Energy Project Final Decision*. CEC-800-2014-001-CMF. Docket Number 12-AFC-02.

Smythe, David/Huntington Beach Fire Department, Hazardous Materials Specialist. 2012. Email communication with Jessica Brandt/CH2M HILL. March 19.

Appendix 2A
Equipment Requirements for Demolition

Appendix 2A HBEP Equipment Requirements - Demo Peaker and Tanks Manpower, Trucks, Equipment

Demolition Peaker and Tanks	Month																							
Equipment	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
Excavators	4	4	4	4	1	1	1																	
Backhoe	2	2	2	2	1	1	1																	
10 Wheel Dump Truck	3	3	3	3	1	1	1																	
Dozer	1	1	1	1	1	1	1																	
Front End Loader	2	2	2	2																				
75 Ton Hydraulic Crane																								
35 Ton Hydraulic Crane	2	2	2	2																				
Fork Lift	3	3	3	3	1	1	1																	
Grader	1	1	1	1	2	2	2																	
Compactor																								
Stake Truck	1	1	1	1																				
Water Truck	2	2	2	2	2	2	2																	

Appendix 2A HBEP Equipment Requirements - Plains Tank Farm Demo Manpower, Trucks, Equipment

	Month																	
Description	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**
Excavators (Equipped with Steel Shears)	6	6	6															
Backhoe	1	1	1	1														
10 Wheel Dump Truck																		
Dozer				6	6													
Front End Loader	1	1	1	1	1													
75 Ton Hydraulic Crane																		
35 Ton Hydraulic Crane																		
Pile Driver																		
Fork Lift	1	1	1	1	1													
Grader			1	1	1													
Compactor				1	1													
Stake Truck	1	1	1	1	1													
Water Truck	2	2	2	2	2													

Appendix 2A HBEP Equipment Requirements - Plains Tank Farm Demo Manpower, Trucks, Equipment

	Month																	
Description	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**
Pick-up Truck	2	2	2	2	2													
Air Compressor	1	1	1	1	1													
Light Towers																		
Heavy Lift Lattice boom Main Crane																		
Heavy Lift Lattice boom Tail Crain																		
Heavy lift Gantry Crane																		

Appendix 2B
Anticipated Number of Truck Deliveries

Appendix 2B Truck Trips Data

	Months																					
Months	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**				
Standard Truck Deliveries																			**Trucks per day per month**	**Days per Month**	**Total Trucks**	**%**
Fill / Gravel	10	17	17	17	17														78	23	1,794	
Mechanical Equipment																			0	23	0	0%
Electrical Equip. and Mtrls																			0	23	0	0%
Piping, Supports, and Insulation Removal			1																1	23	23	1%
Concrete and Rebar Disposal	0.25	0.25	0.25																1	23	17.25	1%
Scrap Steel Disposal	2	2	2																6	23	138	7%
Consumables and Supplies (Fuel)	1	1	1	1	1														5	23	115	5%
Contractor Mobilization	0.25																		0	23	5.75	0%
Contractor Demobilization					0.25														0	23	5.75	0%
Construction Equipment	0.25		0.25		0.5														1	23	23	1%
Total Truck Traffic at Site																						
Trucks/Day/Month	13.8	20.3	21.5	18.0	18.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
Trucks /Month	316.3	465.8	494.5	414.0	431.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
																			Total Truck Trips 2.122			

Appendix 2B Truck Trips Data by Trip Type and Hour – 7FA.05 and LMS

	AM Peak Hour			PM Peak Hour		
Trip Type	**In**	**Out**	**Total**	**In**	**Out**	**Total**
Delivery/Haul Trucks[a] per month			13			
Workers	17	5		5	17	
Total Operation Traffic in PCE						

Note:

[a] Delivery/haul trucks 7FA.05 = 8 per month; delivery/haul trucks LMS = 5 per month.

Appendix 5.1A
Demolition and Construction Emission Estimates

Copies of this appendix have been included in the electronic filing of the Petition to Amend. Electronic copies can be provided upon request.

Appendix 5.1B
Commissioning and Operational Emission Estimates

APPENDIX 5.1B

Commissioning and Operational Emission Estimates

(Criteria and Greenhouse Gas)

Tables presented in this Appendix are as follows:

Amended Huntington Beach Energy Project
Table 5.1B.1
Summary of Commissioning Emission Estimates: Combined-Cycle Turbines
September 2015

			Unabated Emission Rate (lbs/hr)			Total Unabated Emissions (lbs)			Reduction (%)			Abated Emission Rate (lbs/hr)			Abated Emission Rate (g/s)			Total Abated Emissions (lbs)				
Activity	**Duration (hr)**	**CTG Load (%)**	**NO_X**	**CO**	**VOC**	**NO_X**	**CO**	**VOC**	**NO_X (SCR)**	**CO (OxCat)**	**VOC (OxCat)**	**NO_X**	**CO**	**VOC**	**NO_X**	**CO**	**VOC**	**NO_X**	**CO**	**VOC**	**SO_2 [2]**	**$PM_{10/2.5}$ [2]**
CTG Testing (Full Speed No Load, FSNL)	48	10	190	1,900	270	9,120	91,200	12,960	0%	0%	0%	***190***	***1,900***	270	***23.9***	***239***	34.0	9,120	91,200	12,960	233	432
Steam Blows [1]	120	40	68.3	32.4	3.00	8,190	3,888	360	0%	0%	0%	***68.3***	32.4	3.00	***8.60***	4.08	0.38	8,190	3,888	360	583	1,080
Set Unit HRSG & Steam Safety Valves	12	40	68.3	32.4	3.00	819	389	36.0	0%	0%	0%	68.3	32.4	3.00	8.60	4.08	0.38	819	389	36	58.3	108
Steam Blows - Restoration																						
DLN Emissions Tuning	12	50	47.3	23.8	2.00	567	285	24.0	0%	0%	0%	47.3	23.8	2.00	5.95	2.99	0.25	567	285	24	58.3	108
Emissions Tuning	12	60	52.5	24.8	2.00	630	298	24.0	0%	0%	0%	52.5	24.8	2.00	6.62	3.13	0.25	630	298	24	58.3	108
Emissions Tuning	12	80	63.0	29.2	2.50	756	350	30.0	0%	0%	0%	***63.0***	29.2	2.50	***7.94***	3.67	0.32	756	350	30	58.3	108
Restart CTGs and run HRSG in Bypass Mode. STG Bypass Valve Tuning. HRSG Blow Down and Drum Tuning																						
Verify STG on Turning Gear; Establish Vacum in ACC Ext Bypass Blowdown to ACC (combined blows) commence tuning on ACC Controls; Finalize Bypass Valve Tuning. ACC cleaning	168	80	63.0	29.2	2.50	10,584	4,899	420	78%	78%	35%	13.9	6.42	1.63	1.75	0.81	0.20	2,328	1,078	273	816	1,512
CT Base Load Testing/Tuning	24	100	73.5	34.6	3.00	1,764	829	72.0	78%	78%	35%	16.2	7.60	1.95	2.04	0.96	0.25	388	182	47	117	216
Load Test STG / Combine Cycle (2X1) Tuning	48	50	47.3	23.8	2.00	2,268	1,140	96.0	78%	78%	35%	10.4	5.23	1.30	1.31	0.66	0.16	499	251	62	233	432
STG Load Test/Combined Cycle Tuning	96	80	63.0	29.2	2.50	6,048	2,799	240	78%	78%	35%	13.9	6.42	1.63	1.75	0.81	0.20	1,331	616	156	467	864
RATA / Pre-performance Testing/Source Testing	84	80	63.0	29.2	2.50	5,292	2,449	210	78%	78%	35%	13.9	6.42	1.63	1.75	0.81	0.20	1,164	539	137	408	756
Source Testing & Drift Test Day 1	24	50	47.3	23.8	2.00	1,134	570	48.0	78%	78%	35%	10.4	5.23	1.30	1.31	0.66	0.16	249	125	31	117	216
Source Testing & Drift Test Day 2	24	50	47.3	23.8	2.00	1,134	570	48.0	78%	78%	35%	10.4	5.23	1.30	1.31	0.66	0.16	249	125	31	117	216
Source Testing & Drift Test Day 3	24	50	47.3	23.8	2.00	1,134	570	48.0	78%	78%	35%	10.4	5.23	1.30	1.31	0.66	0.16	249	125	31	117	216
Source Testing & Drift Test Day 4	24	50	47.3	23.8	2.00	1,134	570	48.0	78%	78%	35%	10.4	5.23	1.30	1.31	0.66	0.16	249	125	31	117	216
Source Testing & Drift Test Day 5	24	50	47.3	23.8	2.00	1,134	570	48.0	78%	78%	35%	10.4	5.23	1.30	1.31	0.66	0.16	249	125	31	117	216
Source Testing & Drift Test Day 6	24	50	47.3	23.8	2.00	1,134	570	48.0	78%	78%	35%	10.4	5.23	1.30	1.31	0.66	0.16	249	125	31	117	216
Source Testing & Drift Test Day 7	24	50	47.3	23.8	2.00	1,134	570	48.0	78%	78%	35%	10.4	5.23	1.30	1.31	0.66	0.16	249	125	31	117	216
Performance Testing	132	100	73.5	34.6	3.00	9,702	4,562	396	78%	78%	35%	16.2	7.60	1.95	2.04	0.96	0.25	2,134	1,004	257	642	1,188
CALISO Certification & Testing / PPA Testing	60	75	60.9	28.1	2.50	3,654	1,685	150	78%	78%	35%	13.4	6.18	1.63	1.69	0.78	0.20	804	371	98	292	540
Total for One CTG	**996**					**67,332**	**118,766**	**15,354**										**30,477**	**101,328**	**14,682**	**4,841**	**8,964**
Total for Two CTGs (One 2x1 Block)	**1,992**					**134,664**	**237,532**	**30,708**										**60,954**	**202,656**	**29,364**	**9,681**	**17,928**

Notes:

1. Part Load removal efficiencies for NO_X, VOC, and CO require validation from HRSG and catalyst supplier.

2. SO_2 and $PM_{10/2.5}$ emissions during commissioning are expected to be no greater than full load operations. Therefore, emissions were calculated using the maximum hourly emission rates for normal operation, as summarized below.

Maximum Emission Rates	**lbs/hr**
SO_2	4.86
$PM_{10/2.5}$	9.00

Amended Huntington Beach Energy Project
Table 5.1B.2
Summary of Commissioning Emission Estimates: Simple-Cycle Turbines
September 2015

			Unabated Emission Rate (lbs/hr)			Total Unabated Emissions (lbs)			Reduction (%)			Abated Emission Rate (lbs/hr)			Abated Emission Rate (g/s)			Total Abated Emissions (lbs)				
Activity	**Duration (hr)**	**CTG Load (%)**	**NO_x**	**CO**	**VOC**	**NO_x**	**CO**	**VOC**	**NO_x (SCR)**	**CO (OxCat)**	**VOC (OxCat)**	**NO_x**	**CO**	**VOC**	**NO_x**	**CO**	**VOC**	**NO_x**	**CO**	**VOC**	**SO_2 [2]**	**$PM_{10/2.5}$ [2]**
Unit 1 Testing (Full Speed No Load, FSNL)	4	5	40.1	244.0	5.1	160.2	976.0	20.3	0%	0%	0%	***40.1***	***244.0***	5.1	***5.05***	***30.7***	0.64	160.2	976.0	20.3	6.6	25.0
Unit 1 DLN Emissions Tuning [1]	12	100	82.0	360.0	4.6	984.0	4,320.0	54.7	75%	75%	33%	20.5	***90.0***	3.1	2.58	***11.3***	0.38	246.0	1,080.0	36.7	19.7	74.9
Unit 1 Emissions Tuning [1]	12	75	66.0	289.8	4.0	792.0	3,477.6	48.0	75%	75%	33%	16.5	***72.5***	2.7	2.08	***9.13***	0.34	198.0	869.4	32.2	19.7	74.9
Unit 1 Base Load Testing	12	75	66.0	289.8	1.7	792.0	3,477.6	20.5	75%	75%	33%	16.5	72.5	1.1	2.08	9.13	0.14	198.0	869.4	13.7	19.7	74.9
No Operation																						
Install Temporary Emissions Test Equipment																						
Refire Unit 1	12	100	82.0	360.0	4.6	984.0	4,320.0	54.7	75%	75%	33%	20.5	90.0	3.1	2.58	11.3	0.38	246.0	1,080.0	36.7	19.7	74.9
Unit 1 Source Testing & Drift Test Day 1-5; RATA / Pre-performance Testing / Part 60/75 Certification and Source Testing	168	100	82.0	360.0	4.6	13,776.0	60,480.0	766.1	75%	75%	33%	20.5	90.0	3.1	2.58	11.3	0.38	3,444.0	15,120.0	513.3	275.5	1,048.3
Unit 1 Water Wash & Performance Preparation	24	100	82.0	360.0	4.6	1,968.0	8,640.0	109.4	75%	75%	33%	20.5	90.0	3.1	2.58	11.3	0.38	492.0	2,160.0	73.3	39.4	149.8
Unit 1 Performance Testing	24	100	82.0	360.0	4.6	1,968.0	8,640.0	109.4	75%	75%	33%	20.5	90.0	3.1	2.58	11.3	0.38	492.0	2,160.0	73.3	39.4	149.8
Install Temporary Emissions Test Equipment																						
Unit 1 CALISO Certification	12	100	82.0	360.0	4.6	984.0	4,320.0	54.7	75%	75%	33%	20.5	90.0	3.1	2.58	11.3	0.38	246.0	1,080.0	36.7	19.7	74.9
Total for One CTG	**280**					**22,408**	**98,651**	**1,238**										**5,722**	**25,395**	**836**	**459**	**1,747**
Total for Two CTGs	**560**					**44,816**	**197,302**	**2,476**										**11,444**	**50,790**	**1,672**	**918**	**3,494**

Notes:
1. After commissioning, tuning is expected to occur twice a year.
2. SO_2 and $PM_{10/2.5}$ emissions during commissioning are expected to be no greater than full load operations. Therefore, emissions were calculated using the maximum hourly emission rates for normal operation, as summarized below.

Maximum Emission Rates	**lbs/hr**
SO_2	1.64
$PM_{10/2.5}$	6.24

Amended Huntington Beach Energy Project
Table 5.1B.3
Combined Cycle: GE 7FA.05 Performance Data
September 2015

Huntington Beach 2x1 7FA.05 Emissions Data

Case Number	1	2	3	4	5	6	7	8	9	10	11
CTG Model	7FA.05	7FA.05	7FA.05	7FA.05	7FA.05	7FA.05	7FA.05	7FA.05	7FA.05	7FA.05	7FA.05
CTG Fuel Type	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG
CTG Load (as % of emissions compliant load range)	max	average	min	max	max	average	min	max	max	average	min
CTG Inlet Air Cooling	Off	Off	Off	On	Off	Off	Off	On	Off	Off	Off
Fuel Sulfur Content (grains/100 standard cubic feet)	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Ambient Conditions	Low	Low	Low	Average	Average	Average	Average	High	High	High	High
Ambient Temperature, F	32	32	32	65.8	65.8	65.8	65.8	110	110	110	110
Ambient Relative Humidity, %	87%	87%	87%	58%	58%	58%	58%	8%	8%	8%	8%
Atmospheric Pressure, psia	14.68	14.68	14.68	14.68	14.68	14.68	14.68	14.68	14.68	14.68	14.68
Combustion Turbine Performance											
CTG Inlet Air Conditioning Effectiveness, % (ONE CTG)	N/A	N/A	N/A	90%	N/A	N/A	N/A	90%	N/A	N/A	N/A
Inlet Loss, in. H_2O	3.95	3.95	3.95	3.95	3.95	3.95	3.95	3.95	3.95	3.95	3.95
Exhaust Loss, in. H_2O	15.2	9.9	6.6	15.0	15.0	9.3	6.1	14.5	11.8	7.7	6.2
CTG Load Level (percent of Base Load)	BASE	75%	45%	BASE	BASE	75%	44%	BASE	BASE	75%	48%
Gross CTG Output, kW (ONE CTG)	236,140	177,105	105,791	232,073	227,061	170,296	100,815	215,890	190,222	142,667	90,926
Gross CTG Heat Rate, Btu/kWh (LHV) (ONE CTG)	8,683	9,128	11,742	8,789	8,865	9,179	11,662	8,921	9,065	9,710	12,245
Gross CTG Heat Rate, Btu/kWh (HHV) (ONE CTG)	9,628	10,061	12,942	9,687	9,771	10,117	12,854	9,833	9,991	10,702	13,496
Net CTG Output, kW (ONE CTG)	235,402	176,367	105,053	231,335	226,323	169,558	100,077	215,152	189,484	141,929	90,188
Net CTG Heat Rate, Btu/kWh (LHV) (ONE CTG)	8,710	9,166	11,825	8,817	8,894	9,219	11,748	8,952	9,100	9,761	12,345
Net CTG Heat Rate, Btu/kWh (HHV) (ONE CTG)	9,658	10,103	13,033	9,718	9,803	10,161	12,949	9,866	10,030	10,758	13,607
CTG Heat Input, MMBtu/h (LHV) (ONE CTG)	2,050	1,617	1,242	2,040	2,013	1,563	1,176	1,926	1,724	1,385	1,113
CTG Heat Input, MMBtu/h (HHV) (ONE CTG)	2,273	1,782	1,369	2,248	2,219	1,723	1,296	2,123	1,901	1,527	1,227
CTG Exhaust Flow, 10^3 lb/h (ONE CTG)	4,360	3,523	2,803	4,302	4,307	3,381	2,705	4,268	3,797	3,042	2,719
CTG Exhaust Temperature, F (ONE CTG)	1,109	1,117	1,215	1,141	1,141	1,152	1,215	1,112	1,167	1,209	1,215
Gross 2x1 Combined Cycle, kW	693,629	529,542	354,818	693,822	683,688	518,034	342,069	625,183	559,852	428,984	302,758
Net 2x1 Combined Cycle, kW	681,490	520,275	348,609	681,680	671,723	508,968	336,083	614,242	550,055	421,477	297,460
Gross STG Output, kW	221,349	175,332	143,236	229,676	229,566	177,442	140,439	193,403	179,408	143,650	120,906
GT Exaust Composition % Weight (ONE CTG)											
O_2	13.82%	14.04%	14.35%	13.60%	13.77%	13.87%	14.41%	13.97%	14.11%	14.09%	14.99%
CO_2	6.11%	5.96%	5.76%	6.16%	6.07%	6.00%	5.65%	5.86%	5.90%	5.91%	5.32%
H_2O	5.20%	5.09%	4.92%	5.87%	5.62%	5.57%	5.28%	5.97%	5.15%	5.16%	4.68%
N_2	73.51%	73.55%	73.61%	73.02%	73.18%	73.20%	73.31%	72.86%	73.49%	73.48%	73.66%
Ar	1.25%	1.25%	1.25%	1.24%	1.24%	1.24%	1.24%	1.24%	1.25%	1.25%	1.25%
Fuel Sulfur Content (grains/100 standard cubic feet)	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Catalyst Inlet Exhaust Analysis - % Mole Basis - Wet (ONE CTG/HRSG TRAIN)											
Ar	0.89%	0.89%	0.89%	0.88%	0.88%	0.88%	0.88%	0.88%	0.89%	0.89%	0.89%
CO_2	3.95%	3.85%	3.72%	3.96%	3.91%	3.87%	3.64%	3.77%	3.81%	3.82%	3.44%
H_2O	8.21%	8.03%	7.78%	9.23%	8.85%	8.77%	8.33%	9.37%	8.12%	8.14%	7.40%
N_2	74.62%	74.69%	74.80%	73.84%	74.10%	74.13%	74.30%	73.58%	74.59%	74.58%	74.88%
O_2	12.28%	12.48%	12.77%	12.04%	12.21%	12.30%	12.79%	12.35%	12.54%	12.52%	13.34%
Ave Mol Wt (based on % mol)	28.44	28.45	28.46	28.33	28.36	28.37	28.40	28.29	28.43	28.43	28.48
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
SO_2, lb/hr (after SO_2 oxidation)	4.86	3.83	2.94	4.83	4.77	3.70	2.79	4.56	4.09	3.28	2.64
SO_3, lb/hr (after SO_2 oxidation)	4.86	3.83	2.94	4.83	4.77	3.70	2.79	4.56	4.09	3.28	2.64

Case Number	1	2	3	4	5	6	7	8	9	10	11
Stack Exit Temperature, F	216	178	170	213	215	175	170	221	223	198	184
Stack Diameter, ft (estimated)	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Stack Flow, 10^3 lb/h	4,360	3,523	2,803	4,302	4,307	3,381	2,705	4,268	3,797	3,042	2,719
Stack Flow, 10^3 acfm	1261.9	961.9	755.3	1244.4	1248.0	921.4	730.7	1250.8	1110.5	857.1	748.6
Stack Exit Velocity, ft/s	66.95	51.03	40.07	66.02	66.21	48.88	38.76	66.36	58.91	45.47	39.71
NO_X (Catalyst Inlet), ppmvd (dry, 15% O_2)	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
CO (Catalyst Inlet), ppmvd (dry, 15% O_2)	7.07	7.25	7.53	6.96	7.08	7.16	7.65	7.31	7.33	7.31	8.18
VOC (Catalyst Inlet), ppmvd (dry, 15% O_2)	1.10	1.13	1.17	1.08	1.10	1.11	1.19	1.14	1.14	1.14	1.27
Stack NO_X Emissions with the Effects of Selective Catalytic Reduction (SCR) (ONE CTG/HRSG TRAIN)											
NO_X, ppmvd (dry, 15% O2)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
NO_X, ppmvd (dry)	2.91	2.85	2.75	3.00	2.94	2.91	2.74	2.89	2.83	2.83	2.56
NO_X, ppmvw (wet)	2.69	2.63	2.55	2.74	2.70	2.67	2.53	2.64	2.62	2.62	2.38
NO_X, lb/h as NO_2	16.48	12.99	9.98	16.39	16.17	12.56	9.45	15.48	13.86	11.13	8.95
NO_X, lb/MMBtu (LHV) as NO_2	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080
NO_X, lb/MMBtu (HHV) as NO_2	0.0072	0.0073	0.0073	0.0073	0.0073	0.0073	0.0073	0.0073	0.0073	0.0073	0.0073
SCR NH_3 slip, ppmvd (dry, 15% O_2)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
SCR NH_3 slip, lb/h	15.25	12.02	9.24	15.17	14.97	11.62	8.74	14.32	12.82	10.30	8.28
Ammonia Use, lb/h	43.00	33.90	26.05	42.77	42.21	32.78	24.66	40.39	36.16	29.05	23.35
Stack CO Emissions with the Effects of Catalytic Reduction (CO Catalyst) (ONE CTG / HRSG TRAIN)											
CO, ppmvd (dry, 15% O_2)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
CO, ppmvd (dry)	2.91	2.85	2.75	3.00	2.94	2.91	2.74	2.89	2.83	2.83	2.56
CO, ppmvw (wet)	2.69	2.63	2.55	2.74	2.70	2.67	2.53	2.64	2.62	2.62	2.38
CO, lb/h	10.03	7.91	6.08	9.98	9.85	7.65	5.75	9.42	8.44	6.78	5.45
CO, lb/MMBtu (LHV)	0.0049	0.0049	0.0049	0.0049	0.0049	0.0049	0.0049	0.0049	0.0049	0.0049	0.0049
CO, lb/MMBtu (HHV)	0.0044	0.0044	0.0044	0.0044	0.0044	0.0044	0.0044	0.0044	0.0044	0.0044	0.0044
Stack SO_2 Emissions (ONE CTG / HRSG TRAIN)											
Assumed SO_2 oxidation rate in CO Catalyst for SO_3 calculation, vol%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Assumed SO_2 oxidation rate in SCR for SO_3 calculation, vol%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
SO_2, ppmvd (dry, 15% O_2)	0.37	0.37	0.37	0.36	0.37	0.37	0.37	0.36	0.37	0.37	0.37
SO_2, ppmvd (dry)	0.54	0.52	0.51	0.55	0.54	0.54	0.50	0.53	0.52	0.52	0.47
SO_2, ppmvw (wet)	0.49	0.48	0.47	0.49	0.49	0.49	0.46	0.48	0.48	0.48	0.43
SO_2, lb/h	4.86	3.84	2.95	4.81	4.78	3.72	2.79	4.60	4.16	3.33	2.67
SO_2, lb/MMBtu (LHV)	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024
SO_2, lb/MMBtu (HHV)	0.0021	0.0022	0.0022	0.0021	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022
Stack VOC Emissions with the Effects of Catalytic Reduction (CO Catalyst) (ONE CTG / HRSG TRAIN)											
VOC, ppmvd (dry, 15% O_2)	0.5	0.6	0.6	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.6
VOC, ppmvd (dry)	0.80	0.80	0.81	0.81	0.81	0.81	0.82	0.82	0.81	0.81	0.81
VOC, ppmvw (wet)	0.74	0.74	0.75	0.74	0.74	0.75	0.75	0.75	0.75	0.75	0.76
VOC, lb/h as CH_4 (includes VOC correction as applied to CTG)	1.58	1.28	1.02	1.55	1.55	1.22	0.98	1.53	1.38	1.10	0.99
VOC, lb/MMBtu (LHV)	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0009
VOC, lb/MMBtu (HHV)	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007	0.0008	0.0007	0.0007	0.0007	0.0008
PM_{10} from the GT and Duct Burner											
PM_{10} Emissions - Front and Back Half Catch											
PM_{10}, lb/h (from the CTG)	6.70	6.70	6.70	6.70	6.70	6.70	6.70	6.70	6.70	6.70	6.70
PM_{10}, lb/h (from the Burner)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PM_{10}, lb/h (total from CTG and Burner)	6.70	6.70	6.70	6.70	6.70	6.70	6.70	6.70	6.70	6.70	6.70
PM_{10} with the Effects of SO_2 Oxidation [includes $(NH_4)_2$-(SO_4)] (ONE CTG / HRSG TRAIN)											
PM_{10} Emissions - Front and Back Half Catch											
PM_{10}, lb/h (incl. Ammonium Sulfate, assuming 100% conversion from SO_3)	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00
PM_{10}, lb/MMBtu (LHV)	0.0044	0.0056	0.0072	0.0044	0.0045	0.0058	0.0077	0.0047	0.0052	0.0065	0.0081
PM_{10}, lb/MMBtu (HHV)	0.0040	0.0051	0.0066	0.0040	0.0041	0.0052	0.0069	0.0042	0.0047	0.0059	0.0073

Case Number	1	2	3	4	5	6	7	8	9	10	11
$PM_{2.5}$ with the Effects of SO_2 Oxidation [includes $(NH_4)_2$-(SO_4)] (ONE CTG / HRSG TRAIN)											
$PM_{2.5}$ Emissions - Front and Back Half Catch											
$PM_{2.5}$, lb/h	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00
$PM_{2.5}$, lb/MMBtu (LHV)	0.0044	0.0056	0.0072	0.0044	0.0045	0.0058	0.0077	0.0047	0.0052	0.0065	0.0081
$PM_{2.5}$, lb/MMBtu (HHV)	0.0040	0.0051	0.0066	0.0040	0.0041	0.0052	0.0069	0.0042	0.0047	0.0059	0.0073
Total Effects of SO_2 Oxidation (ONE CTG / HRSG TRAIN)											
Total SO_2 to SO_3 conversion rate for SO_3 calculation, %vol	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Total Amount of SO_2 converted to SO_3 for SO_3 calculation, lb/h	4.86	3.83	2.94	4.83	4.77	3.70	2.79	4.56	4.09	3.28	2.64
Maximum Stack Ammonium Sulfate [$(NH_4)_2$-(SO_4)] (assuming 100% conversion from SO_3), lb/h	10.02	7.90	6.07	9.97	9.84	7.64	5.75	9.41	8.43	6.77	5.44
Maximum Stack H_2SO_4 (assuming 100% conversion from SO_3 to H_2SO_4), lb/h	7.44	5.87	4.51	7.40	7.30	5.67	4.27	6.99	6.26	5.03	4.04

Notes:

1. Dry air composition is as follows:
   N_2: 78.1%
   O_2: 21.0%
   Ar: 0.9%
   CO_2: 0.03%
2. Estimated emissions based on GE performance runs provided by AES on 12/23/14, 'AES_EXTERNAL_12_22_2014_Huntington Beach.xlsx'.
3. As the CTG performance and emissions information utilized does not reflect guaranteed values currently offered by GE, it is recommended that additional and suitable margin be applied to the values to account for differences between expected and guaratneed CTG emissions values.
4. Ammonium sulfates created downstream of the SCR are included in front half particulates and front and back half particulates. It is assumed that 100% SO_3 is converted to ammonium sulfates in order to account for "worst case" particulate emissions.
5. CO catalyst VOC destruction rate of 50% is assumed.
6. Sulfur content in fuel gas is assumed to be 0.75 grains/100 SCF.
7. As OEM project specific information is not available, an SO_2 to SO_3 conversion rate of 100% is assumed. Use of a high conversion rate is recommended for purposes of establishing permit limitations and emissions levels to provide additional margin.
8. Ammonia use is calculated with 19% aqueous ammonia and factors in ammonia slip.
9. Information presented is not reflective of emissions control equipment guaranteed performance levels as this information is not presently available. Engineer reserves the ability to adjust information to reflect guaranteed and OEM specific information when available.
10. Information presented is intended to reflect a conservative approach to estimated stack emissions; however, no additional margin has been applied to the emissions rates.
11. Steam turbine and combined cycle performance information presented is preliminary and for information purposes only. Information is subject to change based on equipment supplier feedback and equipment selection.
12. No margin has been included in the information provided. It is recommended that additional margin be added for the purposes of establishing permit limitations.
13. $PM_{10/2.5}$ emission rate of 9.0 lb/hr provided by AES.

Amended Huntington Beach Energy Project
Table 5.1B.4
Combined Cycle: Summary of Start-Up and Shutdown Emission Estimates
September 2015

Expected Startup Emissions per HRSG Stack

Temperature and Pollutant		Hot/Warm Start - Total Event Emissions (lbs/event)	Cold Start - Total Event Emissions (lbs/event)
Event Time (min)		30	60
20°F	NO_X	17	61
	CO	137	325
	VOC	25	36
59°F	NO_X	16	57
	CO	120	287
	VOC	25	36
100°F	NO_X	15	53
	CO	93	220
	VOC	18	25

Notes:
1. Data provided by GE (with a 20% margin).
2. All startup events reflect uninhibited CTG startup to base load.

Expected Shutdown Emissions per HRSG Stack

Temperature and Pollutant		Shutdown - Total Event Emissions (lbs/event)
Event Time (min)		30
20°F	NO_X	10
	CO	133
	VOC	32
59°F	NO_X	9
	CO	119
	VOC	29
100°F	NO_X	8
	CO	97
	VOC	24

Notes:
1. Data provided by GE (with a 20% margin).

Amended Huntington Beach Energy Project
Table 5.1B.5
Combined Cycle: Summary of Operation Emissions – Criteria Pollutants
September 2015

Scenario	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
Ambient Temperature (°F)	32	32	32	65.8	65.8	65.8	65.8	110	110	110	110
Relative Humidity (%)	87%	87%	87%	58%	58%	58%	58%	8%	8%	8%	8%
Load (%)	max	average	min	max	max	average	min	max	max	average	min
Fuel Input (MMBtu/hr HHV)	2,273	1,782	1,369	2,248	2,219	1,723	1,296	2,123	1,901	1,527	1,227
NO_X Emissions											
per turbine (lbs/hr) [a]	16.5	13.0	10.0	16.4	16.2	12.6	9.45	15.5	13.9	11.1	8.95
per turbine (lbs/day) [b]	452	377	313	443	439	361	294	417	382	323	276
per turbine (lbs/month) [c]	12,982	10,608	8,560	12,793	12,647	10,186	8,066	12,041	10,938	9,083	7,595
all turbines (lbs/month) [c]	25,964	21,217	17,119	25,587	25,294	20,372	16,132	24,083	21,876	18,165	15,190
per turbine (lbs/year) [d]	-	-	-	113,461	112,148	90,104	71,116	-	-	-	-
per turbine (tpy) [d]	-	-	-	56.7	56.1	45.1	35.6	-	-	-	-
all turbines (tpy) [d]	-	-	-	113	112	90.1	71.1	-	-	-	-
CO Emissions											
per turbine (lbs/hr) [a]	10.0	7.91	6.08	9.98	9.85	7.65	5.75	9.42	8.44	6.78	5.45
per turbine (lbs/day) [b]	944	898	859	860	857	809	769	710	688	653	624
per turbine (lbs/month) [c]	23,947	22,502	21,255	21,948	21,858	20,360	19,069	18,451	17,779	16,650	15,744
all turbines (lbs/month) [c]	47,895	45,004	42,510	43,895	43,717	40,720	38,139	36,902	35,559	33,299	31,488
per turbine (lbs/year) [d]	-	-	-	184,380	183,581	170,159	158,598	-	-	-	-
per turbine (tpy) [d]	-	-	-	92.2	91.8	85.1	79.3	-	-	-	-
all turbines (tpy) [d]	-	-	-	184	184	170	159	-	-	-	-
VOC Emissions											
per turbine (lbs/hr) [a]	1.58	1.28	1.02	1.55	1.55	1.22	0.98	1.53	1.38	1.10	0.99
per turbine (lbs/day) [b]	159	152	147	152	152	145	140	124	121	115	112
per turbine (lbs/month) [c]	4,631	4,426	4,250	4,423	4,428	4,201	4,037	3,663	3,556	3,369	3,294
all turbines (lbs/month) [c]	9,263	8,852	8,500	8,847	8,856	8,402	8,075	7,326	7,112	6,739	6,589
per turbine (lbs/year) [d]	-	-	-	36,699	36,740	34,709	33,243	-	-	-	-
per turbine (tpy) [d]	-	-	-	18.3	18.4	17.4	16.6	-	-	-	-
all turbines (tpy) [d]	-	-	-	36.7	36.7	34.7	33.2	-	-	-	-
SO_2 Emissions [e]											
per turbine (lbs/hr) [a]	4.86	3.84	2.95	4.81	4.78	3.72	2.79	4.60	4.16	3.33	2.67
per turbine (lbs/day) [b]	117	92.1	70.8	115	115	89.2	67.0	110	100	79.8	64.1
per turbine (lbs/month) [c]	3,615	2,855	2,195	3,577	3,560	2,765	2,078	3,424	3,093	2,474	1,986
all turbines (lbs/month) [c]	7,230	5,709	4,390	7,154	7,120	5,531	4,157	6,849	6,185	4,949	3,971
per turbine (lbs/year) [d]	-	-	-	10,597	10,546	8,192	6,157	-	-	-	-
per turbine (tpy) [d]	-	-	-	5.30	5.27	4.10	3.08	-	-	-	-
all turbines (tpy) [d]	-	-	-	10.6	10.5	8.19	6.16	-	-	-	-
PM Emissions											
per turbine (lbs/hr) [a]	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00
per turbine (lbs/day) [b]	216	216	216	216	216	216	216	216	216	216	216
per turbine (lbs/month) [c]	6,696	6,696	6,696	6,696	6,696	6,696	6,696	6,696	6,696	6,696	6,696
all turbines (lbs/month) [c]	13,392	13,392	13,392	13,392	13,392	13,392	13,392	13,392	13,392	13,392	13,392
per turbine (lbs/year) [d]	-	-	-	59,508	59,508	59,508	59,508	-	-	-	-
per turbine (tpy) [d]	-	-	-	29.8	29.8	29.8	29.8	-	-	-	-
all turbines (tpy) [d]	-	-	-	59.5	59.5	59.5	59.5	-	-	-	-

Notes:
[a] The hourly emission rates are for the turbine in normal operation only (i.e., excludes startup or shutdown emissions).
[b] The daily emission rates include the number of daily starts and stops per the PPA (1 cold start, 1 warm start, and 2 shutdowns per day).
[c] The monthly emission rates assume 31 days and include 2 cold starts, 15 warm starts, 45 hot starts, and 62 shutdowns per month.
[d] The annual emission rate assumes 6,100 hours of operation, 24 cold starts, 100 warm starts, 376 hot starts, and 500 shutdowns per year.
[e] Hourly, daily, and monthly SO_2 emissions assume a peak fuel sulfur content of 0.75 gr/100 cf, while annual SO_2 emissions assume an annual average fuel sulfur content of 0.25 gr/100 cf.

Amended Huntington Beach Energy Project
Table 5.1B.6
Combined Cycle: Summary of Operation Emissions – Air Toxics
September 2015

Assumptions:

Maximum Heat Input Case:	Base load operation	
Total Operations (per turbine - includes startup and shutdown hours):	6,612	hrs/yr
Gas Heat Content:	1,020	MMBtu/MMscf
Maximum Hourly Heat Input (per turbine):	2,273	MMBtu/hr (HHV)
Average Annual Heat Input (per turbine):	2,248	MMBtu/hr (HHV)
Number of Turbines:	2	

Proposed Project	Emission Factors		Emissions (per Turbine)			Emissions (Facility Total)		
Compound	**lb/MMcf [a]**	**lb/MMBtu [a]**	**lbs/hr**	**lbs/yr**	**tpy**	**lbs/hr**	**lbs/yr**	**tpy**
Ammonia [b]	5 ppm	-	15.2	100,290	50.1	30.5	200,580	100
Acetaldehyde	4.08E-02	4.00E-05	0.091	595	0.30	0.18	1,189	0.59
Acrolein	6.53E-03	6.40E-06	0.015	95	0.048	0.029	190	0.10
Benzene	1.22E-02	1.20E-05	0.027	178	0.089	0.055	357	0.18
1,3-Butadiene	4.39E-04	4.30E-07	0.0010	6.39	0.0032	0.0020	12.8	0.0064
Ethylbenzene	3.26E-02	3.20E-05	0.073	476	0.24	0.15	951	0.48
Formaldehyde [c]	3.67E-01	3.60E-04	0.82	5,351	2.68	1.64	10,703	5.35
Hexane	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	1.33E-03	1.30E-06	0.0030	19.3	0.010	0.0059	38.6	0.019
PAHs [d]	2.24E-03	2.20E-06	0.0025	16.4	0.008	0.005	32.7	0.016
Propylene (Propene)	NA	NA	NA	NA	NA	NA	NA	NA
Propylene Oxide	2.96E-02	2.90E-05	0.066	431	0.22	0.13	862	0.43
Toluene	1.33E-01	1.30E-04	0.30	1,932	0.97	0.59	3,865	1.93
Xylene	6.53E-02	6.40E-05	0.15	951	0.48	0.29	1,903	0.95
TOTAL HAPs				**10,052**	**5.03**		**20,104**	**10.1**
TOTAL TACs				**5,536**	**2.77**		**11,072**	**5.54**

Notes:

NA = Not applicable

[a] Obtained from Table 3.1-3 of *AP-42* (EPA, 2000), with the exception of formaldehyde and ammonia. Units of lbs/MMcf calculated by multiplying lbs/MMBtu by the gas heat content.

[b] Based on the operating exhaust NH_3 limit of 5 ppmv @ 15% O_2 and an F-factor of 8,710.

[c] Emission factor was modified to reflect the SCAQMD's formaldehyde emission factor of $3.6x10^{-4}$.

[d] Per Section 3.1.4.3 of *AP-42* (EPA, 2000), PAH emissions were assumed to be controlled up to 50% through the use of an oxidation catalyst.

Amended Huntington Beach Energy Project
Table 5.1B.7
Simple Cycle: LMS 100PB Performance Data
September 2015

Huntington Beach LMS100 PB Emissions Data

Case Number	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
GE Case Number	111	112	113	114	115	116	117	126	127	128	129
CTG Model	LMS100PB	LMS100PB	LMS100PB	LMS100PB	LMS100PB	LMS100PB	LMS100PB	LMS100PB	LMS100PB	LMS100PB	LMS100PB
CTG Fuel Type	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG
CTG Load Level (percent of Base Load)	100	75	50	100	100	75	50	100	100	75	50
CTG Inlet Air Cooling	Off	Off	Off	On	Off	Off	off	On	Off	Off	Off
Ambient Conditions	Low	Low	Low	Average	Average	Average	Average	High	High	High	High
Ambient Temperature, F	32	32	32	65.8	65.8	65.8	65.8	110	110	110	110
Ambient Relative Humidity, %	86.72	86.72	86.72	58.32	58.32	58.32	58.32	7.95	7.95	7.95	7.95
Atmospheric Pressure, psia	14.68	14.68	14.68	14.68	14.68	14.68	14.68	14.68	14.68	14.68	14.68
Combustion Turbine Performance											
Inlet Loss, in. H_2O	5	5	5	5	5	5	5	5	5	5	5
Exhaust Loss, in. H_2O	10	10	10	10	10	10	10	10	10	10	10
Gross CTG Output, kW (ONE CTG)	100,393	75,069	49,715	100,814	98,827	73,908	48,935	77,501	66,189	49,388	32,564
Gross CTG Heat Rate, Btu/kWh (LHV) (ONE CTG)	7,896	8,588	10,026	7,911	7,955	8,627	10,084	8,562	8,950	9,976	11,938
Gross CTG Heat Rate, Btu/kWh (HHV) (ONE CTG)	8,765	9,533	11,129	8,781	8,830	9,576	11,193	9,504	9,935	11,073	13,251
Net CTG Output, kW (ONE CTG)	98,934	73,610	48,256	99,355	97,368	72,448	47,476	76,041	64,730	47,929	31,105
Net CTG Heat Rate, Btu/kWh (LHV) (ONE CTG)	8,012	8,759	10,329	8,027	8,074	8,801	10,394	8,726	9,152	10,279	12,498
Net CTG Heat Rate, Btu/kWh (HHV) (ONE CTG)	8,894	9,722	11,465	8,910	8,962	9,769	11,537	9,686	10,158	11,410	13,873
CTG Heat Input, MMBtu/h (LHV) (ONE CTG)	793	645	498	798	786	638	493	664	592	493	389
CTG Heat Input, MMBtu/h (HHV) (ONE CTG)	880	716	553	885	873	708	548	737	658	547	432
CTG Exhaust Flow, 10^3 lb/h (ONE CTG)	1,754	1,479	1,162	1,746	1,724	1,463	1,151	1,473	1,329	1,128	901
CTG Exhaust Temperature, F (ONE CTG)	789	816	887	794	798	817	887	848	883	925	997
2 LMS100 PB Gross Kw	200,786	150,139	99,430	201,628	197,654	147,815	97,871	155,001	132,378	98,777	65,129
Gross Heat Rate, CTG (LHV)	7,896	8,588	10,026	7,911	7,955	8,627	10,084	8,562	8,950	9,976	11,938
Gross Heat Rate, 2 CTGs (LHV)	7,896	8,588	10,026	7,911	7,955	8,627	10,084	8,562	8,950	9,976	11,938
Aux Load and Transformer Losses	8,036	7,090	6,153	8,063	7,990	7,046	6,122	7,203	6,757	6,122	5,468
Net KW's for 2 LMS100 PB	192,750	143,048	93,277	193,565	189,664	140,770	91,749	147,798	125,621	92,654	59,661
Net Plant Heat Rate (all 2 LMS100 PB) (LHV)	8,225	9,014	10,687	8,241	8,290	9,059	10,757	8,979	9,431	10,635	13,032
Net Plant Heat Rate (all 2 LMS100 PB) (HHV)	9,130	10,006	11,863	9,147	9,202	10,056	11,940	9,967	10,469	11,805	14,466
CTG Exaust Composition % Weight - Wet (ONE CTG)											
O_2	14.23	14.55	14.68	14.00	14.05	14.44	14.58	14.05	14.33	14.50	14.61
CO_2	5.85	5.64	5.55	5.91	5.90	5.64	5.55	5.82	5.77	5.65	5.58
H_2O	4.98	4.82	4.75	5.64	5.47	5.26	5.19	5.90	5.02	4.93	4.87
N_2	73.65	73.71	73.74	73.18	73.30	73.38	73.40	72.95	73.60	73.63	73.65
Ar	1.26	1.26	1.26	1.25	1.25	1.25	1.25	1.24	1.25	1.26	1.26
Catalyst Inlet Exhaust Analysis - % Mole Basis - Wet (ONE CTG/HRSG TRAIN)											
Ar	0.89	0.90	0.90	0.88	0.89	0.89	0.89	0.88	0.89	0.89	0.89
CO_2	3.78	3.65	3.59	3.80	3.80	3.64	3.58	3.74	3.73	3.65	3.61
H_2O	7.87	7.61	7.50	8.87	8.61	8.29	8.17	9.27	7.93	7.78	7.70
N_2	74.77	74.88	74.92	74.01	74.21	74.34	74.39	73.66	74.69	74.75	74.78
O_2	12.65	12.94	13.06	12.39	12.45	12.81	12.94	12.42	12.73	12.89	12.99
Ave Mol Wt (based on % mol)	28.43	28.44	28.45	28.32	28.35	28.37	28.38	28.27	28.42	28.42	28.43
Stack Exit Temperature, F	789	816	887	794	798	817	887	848	883	925	997
Stack Diameter, ft (estimated)	13.50	13.50	13.50	13.50	13.50	13.50	13.50	13.50	13.50	13.50	13.50
Stack Flow, 10^3 lb/h	1754	1479	1162	1746	1724	1463	1151	1473	1329	1128	901
Stack Flow, 10^3 acfm	938.19	807.64	669.81	941.44	930.92	801.79	665.26	829.75	764.69	669.05	562.16
Stack Exit Velocity, ft/s	109.18	94.01	77.96	108.66	108.40	93.34	77.45	96.61	89.04	77.90	65.46
NO_X (Catalyst Inlet), ppmvd (dry, 15% O_2)	25	25	25	25	25	25	25	25	25	25	25
CO (Catalyst Inlet), ppmvd (dry, 15% O_2)	100	100	125	100	100	100	125	100	100	100	125
VOC (Catalyst Inlet), ppmvd (dry, 15% O_2)	4	4	4	4	4	4	4	4	4	4	4
Estimated Maximum Emissions (at CTG Exhaust) x (GE Data, One CTG)											
NO_X, ppmvd (15% O_2)	25	25	25	25	25	25	25	25	25	25	25
NO_X as NO_2, lb/hr	82.37	66.99	51.79	82.88	81.69	66.25	51.27	68.95	61.55	51.19	40.39
CO, ppmvd (15% O_2)	100	100	125	100	100	100	125	100	100	100	125
CO, lb/hr	200.59	163.15	157.66	201.83	198.95	161.35	156.09	167.91	149.91	124.67	122.97
VOC, ppmvd (15% O_2)	4	4	4	4	4	4	4	4	4	4	4

Amended Huntington Beach Energy Project
Table 5.1B.7
Simple Cycle: LMS 100PB Performance Data
September 2015

Huntington Beach LMS100 PB Emissions Data

Case Number	1	2	3	4	5	6	7	8	9	10	11
VOC, lb/hr	4.60	3.74	2.89	4.62	4.56	3.70	2.86	3.85	3.43	2.86	2.25
Fuel Sulfur Content, gr/100 scf	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
PM_{10}, lb/hr	4.33	0.00	0.00	4.33	4.33	0.00	0.00	4.33	4.33	0.00	0.00
SO_2, lb/hr	1.63	1.32	1.02	1.64	1.61	1.31	1.01	1.36	1.22	1.01	0.80
SO_3, lb/hr	0.11	0.09	0.07	0.11	0.11	0.09	0.07	0.09	0.08	0.07	0.05
Estimated Maximum Emissions (at Stack) x (GE Data, One CTG)											
NO_X, ppmvd (15% O_2)	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
NO_X as NO_2, lb/hr	8.24	6.70	5.18	8.29	8.17	6.63	5.13	6.89	6.16	5.12	4.04
CO, ppmvd (15% O_2)	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
CO, lb/hr	8.02	6.53	5.05	8.07	7.96	6.45	4.99	6.72	6.00	4.99	3.93
VOC, ppmvd (15% O_2)	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
VOC, lb/hr	2.30	1.87	1.44	2.31	2.28	1.85	1.43	1.92	1.72	1.43	1.13
NH_3, ppmvd (15% O_2)	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
NH_3, lb/hr	6.10	4.96	3.83	6.14	6.05	4.91	3.80	5.10	4.56	3.79	2.99
PM_{10}, lb/hr	6.24	6.24	6.24	6.24	6.24	6.24	6.24	6.24	6.24	6.24	6.24
Sulfur, Stack Ammonium Sulfate and PM Calculations with 0.75 grain/100 scf Sulfur - PEC Calculation (One CTG)											
Fuel Sulfur Content, gr/100 scf	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Fuel Molecular Weight, lbm/lbmol	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73
Fuel Flow, lb/hr	38,341	31,185	24,109	38,579	38,026	30,842	23,868	32,096	28,655	23,831	18,804
SCFM Fuel (LHV)	14,496	11,790	9,115	14,586	14,377	11,660	9,024	12,135	10,834	9,010	7,109
Elemental Sulfur Molar Weight	32.06	32.06	32.06	32.06	32.06	32.06	32.06	32.06	32.06	32.06	32.06
SO_2 Molar Weight	64.06	64.06	64.06	64.06	64.06	64.06	64.06	64.06	64.06	64.06	64.06
SO_3 Molar Weight	80.06	80.06	80.06	80.06	80.06	80.06	80.06	80.06	80.06	80.06	80.06
Ammonium Sulfate Molar Weight	132.14	132.14	132.14	132.14	132.14	132.14	132.14	132.14	132.14	132.14	132.14
H_2SO_4 Molar Weight	98.08	98.08	98.08	98.08	98.08	98.08	98.08	98.08	98.08	98.08	98.08
Elemental Sulfur in Fuel, lb/hr	0.93	0.76	0.59	0.94	0.92	0.75	0.58	0.78	0.70	0.58	0.46
Moles of Sulfur in Fuel, lbmol/hr	0.03	0.02	0.02	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.01
% Sulfur Oxidized to SO_2, assumed	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
% Sulfur Oxidized to SO_3, assumed	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Conservative SO_2 Calculation at CTG Exhaust, 90% oxidation assumption, lb/hr	1.68	1.36	1.05	1.69	1.66	1.35	1.04	1.40	1.25	1.04	0.82
Conservative SO_3 Calculation at CTG Exhaust, 10% oxidation assumption, lb/hr	0.23	0.19	0.15	0.23	0.23	0.19	0.14	0.19	0.17	0.14	0.11
SO_2 Moles at Calayst Inlet	0.03	0.02	0.02	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.01
Assumed SO_2 oxidation rate in CO Catalyst for SO_3 calculation, vol%	43%	43%	43%	43%	43%	43%	43%	43%	43%	43%	43%
Assumed SO_2 oxidation rate in SCR for SO_3 calculation, vol%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
SO_3, lb/hr created in CO Catalyst	0.905	0.74	0.57	0.91	0.90	0.73	0.56	0.76	0.68	0.56	0.44
SO_3, lb/hr created in SCR Catalyst	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
SO_3, lb/hr from Catalysts	0.92	0.75	0.58	0.92	0.91	0.74	0.57	0.77	0.69	0.57	0.45
Total SO_3, lb/hr (Catalysts plus initial fuel SO_3)	1.149	0.93	0.72	1.16	1.14	0.92	0.72	0.96	0.86	0.71	0.56
Maximum Stack Ammonium Sulfate [$(NH_4)_2$-(SO_4)] (assuming 100% conversion from SO_3), lb/h	1.90	1.54	1.19	1.91	1.88	1.53	1.18	1.59	1.42	1.18	0.93
Maximum Stack H_2SO_4 (assuming 100% conversion from SO_3 to H_2SO_4), lb/h	1.41	1.15	0.89	1.42	1.40	1.13	0.88	1.18	1.05	0.88	0.69
Total PM_{10} at Stack, lb/h per 1 LMS100 PB	6.23	1.54	1.19	6.24	6.21	1.53	1.18	5.92	5.75	1.18	0.93
Catalyst Ammonia Usage - PEC Calculation (One CTG)											
Total Catalyst NO_X Removal, lb/hr	74.13	60.29	46.61	74.59	73.52	59.63	46.15	62.05	55.40	46.07	36.35
NO_X Removal Efficiency, %	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
NO_X Molar Weight	46	46	46	46	46	46	46	46	46	46	46
NH_3 Molar Weight	17	17	17	17	17	17	17	17	17	17	17
NH_3 required for NO_X Removal, lb/hr	27.40	22.28	17.23	27.57	27.17	22.04	17.05	22.93	20.47	17.03	13.44
NH_3 Slip (assumed to be NH_3 in Stack), lb/hr	6.10	4.96	3.83	6.14	6.05	4.91	3.80	5.10	4.56	3.79	2.99
Total Ammonia Usage	33.49	27.24	21.06	33.70	33.22	26.94	20.85	28.04	25.03	20.82	16.43
19% Aqueous Ammonia Solution, lb NH_3/ft^3	11	11	11	11	11	11	11	11	11	11	11
Total Aqueous Ammonia Usage, gph per 1 LMS100 PB	22.78	18.52	14.32	22.92	22.59	18.32	14.18	19.07	17.02	14.16	11.17
19% Aqueous Ammonia Usage, lb/hr per CTG	176.51	143.56	110.99	177.61	175.07	141.98	109.88	147.76	131.91	109.71	86.56
THE BELOW IS FROM GE PERFORMANCE AND EMISSIONS 2.10.15											
Exh Wght % Wet (NOT FOR USE IN ENVIRONMENTAL PERMITS)											
AR	1.26	1.26	1.26	1.25	1.25	1.25	1.25	1.24	1.25	1.26	1.26

Amended Huntington Beach Energy Project
Table 5.1B.7
Simple Cycle: LMS 100PB Performance Data
September 2015

Huntington Beach LMS100 PB Emissions Data

Case Number	1	2	3	4	5	6	7	8	9	10	11
N_2	73.65	73.71	73.74	73.18	73.30	73.38	73.40	72.95	73.60	73.63	73.65
O_2	14.23	14.55	14.68	14.00	14.05	14.44	14.58	14.05	14.33	14.50	14.61
CO_2	5.85	5.64	5.55	5.91	5.90	5.64	5.55	5.82	5.77	5.65	5.58
H_2O	4.98	4.82	4.75	5.64	5.47	5.26	5.19	5.90	5.02	4.93	4.87
SO_2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
HC	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
NO_X	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exh Mole % Dry (NOT FOR USE IN ENVIRONMENTAL PERMITS)											
AR	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
N_2	81.16	81.05	81.00	81.22	81.21	81.06	81.01	81.18	81.12	81.06	81.02
O_2	13.73	14.00	14.12	13.60	13.62	13.97	14.09	13.68	13.83	13.98	14.07
CO_2	4.10	3.95	3.88	4.17	4.16	3.97	3.90	4.13	4.05	3.96	3.91
H_2O	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SO_2	0.00	0.02	0.02	0.00	0.00	0.02	0.02	0.02	0.00	0.02	0.02
CO	0.02	0.01	0.01	0.02	0.02	0.01	0.01	0.01	0.02	0.01	0.01
HC	0.01	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.01	0.00	0.00
NO_X	0.00	0.00	0.00	0.00	0.00	0.00	0.00	----------	0.00	----------	----------
Exh Mole % Wet (NOT FOR USE IN ENVIRONMENTAL PERMITS)											
AR	0.89	0.90	0.90	0.88	0.89	0.89	0.89	0.88	0.89	0.89	0.89
N_2	74.77	74.88	74.92	74.01	74.21	74.34	74.39	73.66	74.69	74.75	74.78
O_2	12.65	12.94	13.06	12.39	12.45	12.81	12.94	12.42	12.73	12.89	12.99
CO_2	3.78	3.65	3.59	3.80	3.80	3.64	3.58	3.74	3.73	3.65	3.61
H_2O	7.87	7.61	7.50	8.87	8.61	8.29	8.17	9.27	7.93	7.78	7.70
SO_2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
HC	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
NO_X	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Amended Huntington Beach Energy Project
Table 5.1B.8
Simple Cycle: Summary of Start-Up and Shutdown Emission Estimates
September 2015

Startup Emissions

Pollutant	Startup	Duration (min)	Catalyst Inlet (lbs/hr)	Inlet Over Duration (lbs)	Design Reduction (%)	Transient Reduction (%)	Net Reduction (%)	Total Outlet (lbs)	Emissions per Event (lbs)
NO_X	T0-T10 [1,2]	10		4.94	90%	0%	0%	04.94	
NO_X	T10-T20 [3]	10	82.0	13.7	90%	50%	45%	07.52	
NO_X	T20-T30 [3]	10	82.0	13.7	90%	100%	90%	01.37	
NO_X	**Total Startup**	**30**						**13.82**	**16.6**
CO	T0-T10 [1,2]	10		31.67	96.0%	83.3%	80%	6.34	
CO	T10-T20 [4]	10	485.0	80.8	96.0%	100.0%	96%	3.25	
CO	T20-T30 [4]	10	485.0	80.8	96.0%	100.0%	96%	3.25	
CO	**Total Startup**	**30**						**12.84**	**15.4**
VOC	T0-T10 [1,2]	10		1	50%	83.3%	42%	0.58	
VOC	T10-T20 [5]	10	10.5	1.75	50%	100%	50%	0.88	
VOC	T20-T30 [5]	10	10.5	1.75	50%	100%	50%	0.88	
VOC	**Total Startup**	**30**						**2.33**	**2.8**

Notes:
1. First fire occurs 4 minutes after initiation of the "10 Minute Start" timeline.
2. For the 10 Minute Start, emissions are per GE LMS 100 PB Estimated GT 10 Minute Startup Emissions at GT Exhasut Flange, dated 02-12-15.
3. For T10 through T30, NO_X emissions (lbs/hr) are based on Case 104 of GE-provided AES Southland (LMS 100 PB Perf & Emissions) New Fuel 02.10.15 Cust Copy R1:
 -No NO_X reduction occurs until catalyst is up to temperature and ammonia is injected, hence no reduction during the T0 to T10 timeframe.
 -It is assumed that the NO_X reduction commences at minute 15 and that design reduction occurs 50% of the time.
 -Emissions per event include a 20% engineers' margin.
4. CO emissions (lbs/hr) are based on a spike factor of 485 lbs/hr for 20 minutes:
 -During the T0 to T10 timeline, the exhaust is >700°F at T5 (1 minute after ignition); therefore, the Transient % of Design is calculated based on 5 minutes out of 6 (hence 83.3%).
 -Emissions per event include a 20% engineers' margin.
5. VOC emissions (lbs/hr) are based on a spike factor of 10.5 lbs/hr for 20 minutes:
 -During the T0 to T10 timeline, the exhaust is >700°F at T5 (1 minute after ignition); therefore, the Transient % of Design is calculated based on 5 minutes out of 6 (hence 83.3%).
 -Emissions per event include a 20% engineers' margin.

Shutdown Emissions

Pollutant	Shutdown	Duration (min)	Inlet (lbs)	Transient (% of Design)	Design Reduction (%)	Transient Reduction (%)	Net Reduction (%)	Emissions per Event (lbs)
NO_X	0-13 minutes*	13.0	5.67	100%	90.0%	50.0%	45.00%	3.12
CO	0-13 minutes*	13.0	54.01	100%	96.0%	50.0%	48.00%	28.09
VOC	0-13 minutes*	13.0	4.08	100%	50%	50.0%	25.00%	3.06

Notes:
Emissions are per GE LMS 100 PB Est Shutdown Emissions GT Exh, dated 01-06-15.
It is conservatively assumed that the catalyst efficiency will be 50% during shutdown.

Amended Huntington Beach Energy Project
Table 5.1B.9
Simple Cycle: Summary of Operation Emissions – Criteria Pollutants
September 2015

Scenario	1	2	3	4	5	6	7	8	9	10	11
Ambient Temperature (°F)	32	32	32	65.8	65.8	65.8	65.8	110	110	110	110
Relative Humidity (%)	86.72	86.72	86.72	58.32	58.32	58.32	58.32	7.95	7.95	7.95	7.95
Load (%)	100	75	50	100	100	75	50	100	100	75	50
Fuel Input (MMBtu/hr HHV)	880	716	553	885	873	708	548	737	658	547	432
NO_X Emissions											
per turbine (lbs/hr) [a]	8.24	6.70	5.18	8.29	8.17	6.63	5.13	6.89	6.16	5.12	4.04
per turbine (lbs/day) [b]	225	191	156	226	224	189	155	195	178	155	131
per turbine (lbs/month) [c]	6,984	5,908	4,845	7,020	6,937	5,857	4,809	6,045	5,528	4,803	4,048
all turbines (lbs/month) [c]	13,968	11,817	9,690	14,039	13,873	11,713	9,617	12,090	11,056	9,606	8,095
per turbine (lbs/year) [d]	-	-	-	16,428	16,292	14,517	12,794	-	-	-	-
per turbine (tpy) [d]	-	-	-	8.2	8.1	7.3	6.4	-	-	-	-
all turbines (tpy) [d]	-	-	-	16.4	16.3	14.5	12.8	-	-	-	-
CO Emissions											
per turbine (lbs/hr) [a]	8.02	6.53	5.05	8.07	7.96	6.45	4.99	6.72	6.00	4.99	3.93
per turbine (lbs/day) [b]	268	234	201	269	267	233	200	239	222	200	176
per turbine (lbs/month) [c]	8,310	7,262	6,226	8,344	8,264	7,212	6,191	7,395	6,891	6,185	5,449
all turbines (lbs/month) [c]	16,619	14,524	12,452	16,689	16,527	14,423	12,381	14,790	13,783	12,370	10,898
per turbine (lbs/year) [d]	-	-	-	24,506	24,374	22,644	20,966	-	-	-	-
per turbine (tpy) [d]	-	-	-	12.3	12.2	11.3	10.5	-	-	-	-
all turbines (tpy) [d]	-	-	-	24.5	24.4	22.6	21.0	-	-	-	-
VOC Emissions											
per turbine (lbs/hr) [a]	2.30	1.87	1.44	2.31	2.28	1.85	1.43	1.92	1.72	1.43	1.13
per turbine (lbs/day) [b]	63.6	53.9	44.3	63.9	63.1	53.4	44.0	55.1	50.5	43.9	37.1
per turbine (lbs/month) [c]	1,971	1,671	1,374	1,981	1,958	1,656	1,364	1,709	1,565	1,362	1,152
all turbines (lbs/month) [c]	3,941	3,341	2,748	3,961	3,915	3,313	2,728	3,418	3,129	2,725	2,303
per turbine (lbs/year) [d]	-	-	-	4,710	4,672	4,176	3,696	-	-	-	-
per turbine (tpy) [d]	-	-	-	2.35	2.34	2.09	1.85	-	-	-	-
all turbines (tpy) [d]	-	-	-	4.7	4.7	4.2	3.7	-	-	-	-
SO_2 Emissions [e]											
per turbine (lbs/hr) [a]	1.63	1.32	1.02	1.64	1.61	1.31	1.01	1.36	1.22	1.01	0.80
per turbine (lbs/day) [b]	39.0	31.7	24.5	39.3	38.7	31.4	24.3	32.7	29.2	24.3	19.1
per turbine (lbs/month) [c]	1,210	984	761	1,218	1,200	973	753	1,013	904	752	593
all turbines (lbs/month) [c]	2,420	1,968	1,522	2,435	2,400	1,947	1,507	2,026	1,809	1,504	1,187
per turbine (lbs/year) [d]	-	-	-	764	753	611	473	-	-	-	-
per turbine (tpy) [d]	-	-	-	0.38	0.38	0.31	0.24	-	-	-	-
all turbines (tpy) [d]	-	-	-	0.76	0.75	0.61	0.47	-	-	-	-
PM Emissions											
per turbine (lbs/hr) [a]	6.24	6.24	6.24	6.24	6.24	6.24	6.24	6.24	6.24	6.24	6.24
per turbine (lbs/day) [b]	150	150	150	150	150	150	150	150	150	150	150
per turbine (lbs/month) [c]	4,644	4,644	4,644	4,644	4,644	4,644	4,644	4,644	4,644	4,644	4,644
all turbines (lbs/month) [c]	9,288	9,288	9,288	9,288	9,288	9,288	9,288	9,288	9,288	9,288	9,288
per turbine (lbs/year) [d]	-	-	-	8,744	8,744	8,744	8,744	-	-	-	-
per turbine (tpy) [d]	-	-	-	4.4	4.4	4.4	4.4	-	-	-	-
all turbines (tpy) [d]	-	-	-	8.7	8.7	8.7	8.7	-	-	-	-

Notes:

[a] The hourly emission rates are for the turbine in normal operation only (i.e., excludes startup or shutdown emissions).

[b] The daily emission rates include the number of daily starts and stops per the PPA (2 starts and 2 shutdowns per day).

[c] The monthly emission rates assume 31 days and include 62 starts and 62 shutdowns per month.

[d] The annual emission rate assumes 1,150 hours of operation, 350 starts, and 350 shutdowns per year.

[e] Hourly, daily, and monthly SO_2 emissions assume a peak fuel sulfur content of 0.75 gr/100 cf, while annual SO_2 emissions assume an annual average fuel sulfur content of 0.25 gr/100 cf.

Amended Huntington Beach Energy Project
Table 5.1B.10
Simple Cycle: Summary of Operation Emissions – Air Toxics
September 2015

Assumptions:

Maximum Heat Input Case:	Base load operation	
Total Operations (per turbine - includes startup and shutdown hours):	1,401	hrs/yr
Gas Heat Content:	1,020	MMBtu/MMscf
Maximum Hourly Heat Input (per turbine):	885	MMBtu/hr (HHV)
Average Annual Heat Input (per turbine):	885	MMBtu/hr (HHV)
Number of Turbines:	2	

Proposed Project	**Emission Factors**		**Emissions (per Turbine)**			**Emissions (Facility Total)**		
Compound	**lb/MMcf** [a]	**lb/MMBtu** [a]	**lbs/hr**	**lbs/yr**	**tpy**	**lbs/hr**	**lbs/yr**	**tpy**
Ammonia [b]	5 ppm	-	6.14	8,595	4.3	12.3	17,190	8.6
Acetaldehyde	4.08E-02	4.00E-05	0.035	50	0.025	0.071	99	0.05
Acrolein	6.53E-03	6.40E-06	0.0057	7.9	0.004	0.011	15.9	0.008
Benzene	1.22E-02	1.20E-05	0.011	14.9	0.007	0.021	29.8	0.015
1,3-Butadiene	4.39E-04	4.30E-07	0.00038	0.53	0.00027	0.00076	1.07	0.0005
Ethylbenzene	3.26E-02	3.20E-05	0.028	40	0.020	0.057	79	0.04
Formaldehyde [c]	3.67E-01	3.60E-04	0.32	446	0.22	0.64	893	0.45
Hexane	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	1.33E-03	1.30E-06	0.0012	1.61	0.0008	0.0023	3.2	0.0016
PAHs [d]	2.24E-03	2.20E-06	0.0010	1.36	0.0007	0.0019	2.7	0.0014
Propylene (Propene)	NA	NA	NA	NA	NA	NA	NA	NA
Propylene Oxide	2.96E-02	2.90E-05	0.026	36	0.018	0.051	72	0.04
Toluene	1.33E-01	1.30E-04	0.12	161	0.08	0.23	322	0.16
Xylene	6.53E-02	6.40E-05	0.057	79	0.04	0.11	159	0.08
TOTAL HAPs				**839**	**0.42**		**1,677**	**0.84**
TOTAL TACs				**462**	**0.23**		**924**	**0.46**

Notes:

NA = Not applicable

[a] Obtained from Table 3.1-3 of *AP-42* (EPA, 2000), with the exception of formaldehyde and ammonia. Units of lbs/MMcf calculated by multiplying lbs/MMBtu by the gas heat content.

[b] Based on the operating exhaust NH_3 limit of 5 ppmv @ 15% O_2 and an F-factor of 8,710.

[c] Emission factor was modified to reflect the SCAQMD's formaldehyde emission factor of $3.6x10^{-4}$.

[d] Per Section 3.1.4.3 of *AP-42* (EPA, 2000), PAH emissions were assumed to be controlled up to 50% through the use of an oxidation catalyst.

Amended Huntington Beach Energy Project
Table 5.1B.11
Auxiliary Boiler: Performance Data
September 2015

Performance Data

Parameter	Units	Estimated/ Expected Value	Note
Gross Steaming Capacity	pph	58,537	
Net Steaming Capacity	pph	50,000	
Design Pressure	psig	540	
Design Steam Conditions		saturated	
Design Max Turndown Capability	%	25	
Design Max Heat Input	MMBtu/hr (HHV)	71	1, 2, and 3
Design Min Heat Input (at max turndown)	MMBtu/hr (HHV)	18	1
Estimated Exhaust Temp at Max Heat Input	°F	318	1
Estimated Exhaust Temp at Min Heat Input	°F	256	1
Estimated Exhaust Gas Flow at Max Heat Input	ACFM	29,473	1
Estimated Exhaust Gas Flow at Min Heat Input	ACFM	6,860	1
Estimated Stack Emissions			
NO_X	ppmvd @ 3% oxygen	5	1
NO_X	lb/MMBtu (HHV)	0.006	1
CO	ppmvd @ 3% oxygen	50	1
CO	lb/MMBtu (HHV)	0.04	1
VOC	lb/MMBtu (HHV)	0.004	1
PM_{10}	lb/MMBtu (HHV)	0.0043	1
SO_2	lb/MMBtu (HHV)	0.00068	4
NH_3	ppmvd @ 3% oxygen	5	1
Estimated Exhaust Gas Analysis (analysis will vary across the operating load range)			
CO_2	% by wt	12.96	2
H_2O	% by wt	10.03	2
N_2	% by wt	72.64	2
O_2	% by wt	4.36	2
Stack Height	ft	80	
Stack Diameter	in	36	

Notes:

1. Reflects representative aux boiler OEM provided information. SPC recommends AES add margin to the stated for the purposes of air modeling and development of air permit application values.

2. Reflects the following gas analysis (%vol): 74.246% methane, 1.473% ethane, 11.909% propane, 0.177% butane, 0.034% pentane, 1.232% hexane, 0.529% CO_2, 9.686% N_2, 0.891% O_2.

3. Auxiliary boiler sizing reflects conservative design assumptions for use in establishing permit limits. Final equipment size and selection (based on major equipmet OEM selection) during detailed design phase will likely reduce aux boiler size to ~50-60 MMBtu/hr.

4. Calculated as follows: 0.25 gr/100 scf x 1,000,000 Btu/MMBtu x 2 lb SO_2/lb S / (7,000 gr/lb x 1,050 Btu/scf x 100 scf).

Amended Huntington Beach Energy Project
Table 5.1B.11
Auxiliary Boiler: Performance Data
September 2015

Auxiliary Boiler Startup Emissions

Startup	NO_X lbs/event	CO lbs/event	VOC lbs/event	NO_X lbs/hr	CO lbs/hr	VOC lbs/hr	Duration min/event	Fuel Consumption MMBtu/hr (HHV)
Cold (Aux Boiler)	4.22	4.34	4.69	Steady State Guarantees			170	41.36
Warm (Aux Boiler)	2.11	2.17	2.34	Steady State Guarantees			85	41.36
Hot (Aux Boiler)	0.62	0.64	0.69	Steady State Guarantees			25	41.36

Notes:
1. Emissions are based on achieving BACT levels at the end of the startup duration.
2. BACT levels are 2 ppmvd @ 15% O_2 for NO_X, CO, and VOC and 5 ppmvd @ 15% O_2 for NH_3.
3. Values presented here are not for for Guarantee. See the Guarantee performance section for further reference.

Auxiliary Boiler Emission Rates

	NO_X	CO	VOC	SO_2	PM_{10}	$PM_{2.5}$	Fuel Use (MMbtu)
Hourly Emissions (lbs/hr)	0.42	2.83	0.28	0.048	0.30	0.30	70.8
Daily Emissions (lbs/day)	5.80	35.0	4.16	0.60	3.77	3.77	878
Monthly Emissions (lbs/month)	174	1,051	125	17.9	113	113	26,327
Annual Emissions (lbs/year)	2,054	12,384	1,473	211	1,333	1,333	310,096
Annual Emissions (tpy)	1.03	6.19	0.74	0.11	0.67	0.67	--

Notes:
1. Hourly emissions are based on the maximum hourly firing rate.
2. Daily emissions are the monthly emissions averaged over 30 days.
3. Monthly and annual emissions assume two cold starts, four warm starts, and four hot starts per month, and operation at the maximum hourly firing rate.

Amended Huntington Beach Energy Project
Table 5.1B.12
Auxiliary Boiler: Summary of Operation Emissions – Criteria Pollutants
September 2015

NO_X Emissions	
(lbs/hr) [a]	0.42
(lbs/day) [b]	5.80
(lbs/month) [c]	174
(lbs/year) [d]	2,054
(tpy) [d]	1.03
CO Emissions	
(lbs/hr) [a]	2.83
(lbs/day) [b]	35.0
(lbs/month) [c]	1051
(lbs/year) [d]	12,384
(tpy) [d]	6.19
VOC Emissions	
(lbs/hr) [a]	0.28
(lbs/day) [b]	4.16
(lbs/month) [c]	124.7
(lbs/year) [d]	1473
(tpy) [d]	0.74
SO_2 Emissions	
(lbs/hr) [a]	0.048
(lbs/day) [b]	0.60
(lbs/month) [c]	17.90
(lbs/year) [d]	211
(tpy) [d]	0.11
PM Emissions	
(lbs/hr) [a]	0.30
(lbs/day) [b]	3.77
(lbs/month) [c]	113.2
(lbs/year) [d]	1333
(tpy) [d]	0.67

Notes:

[a] The hourly emission rates are for the auxiliary boiler in normal operation only (i.e., excludes startup or shutdown emissions).

[b] The daily emission rates are the monthly emission rates averaged over 30 days.

[c] The monthly emission rates assume 31 days of operation at the maximum hourly firing rate, with 2 cold starts, 4 warm starts, and 4 hot starts.

[d] The annual emission rates assume 8,760 hours of operation at the maximum hourly firing rate, with 24 cold starts, 48 warm starts, and 48 hot starts.

Amended Huntington Beach Energy Project
Table 5.1B.13
Auxiliary Boiler: Summary of Operation Emissions – Air Toxics
September 2015

Assumptions:

Total Operations:	8,760	hrs/yr
Gas Heat Content:	1,020	MMBtu/MMscf
Maximum Hourly Heat Input:	70.8	MMBtu/hr (HHV)
Maximum Annual Heat Input [a]:	310,096	MMBtu/yr (HHV)

Proposed Project	Emission Factors		Emissions		
Compound	**lb/MMscf [b]**	**lb/MMBtu [b]**	**lbs/hr**	**lbs/yr**	**tpy**
2-Methylnaphthalene	2.40E-05	2.35E-08	1.67E-06	7.30E-03	3.65E-06
3-Methylchloranthrene	1.80E-06	1.76E-09	1.25E-07	5.47E-04	2.74E-07
7,12-Dimethylbenz(a)anthracene	1.60E-05	1.57E-08	1.11E-06	4.86E-03	2.43E-06
Acenaphthene	1.80E-06	1.76E-09	1.25E-07	5.47E-04	2.74E-07
Acenaphthylene	1.80E-06	1.76E-09	1.25E-07	5.47E-04	2.74E-07
Anthracene	2.40E-06	2.35E-09	1.67E-07	7.30E-04	3.65E-07
Benz(a)anthracene	1.80E-06	1.76E-09	1.25E-07	5.47E-04	2.74E-07
Benzene	2.10E-03	2.06E-06	1.46E-04	6.38E-01	3.19E-04
Benzo(a)pyrene	1.20E-06	1.18E-09	8.33E-08	3.65E-04	1.82E-07
Benzo(b)fluoranthene	1.80E-06	1.76E-09	1.25E-07	5.47E-04	2.74E-07
Benzo(g,h,i)perylene	1.20E-06	1.18E-09	8.33E-08	3.65E-04	1.82E-07
Benzo(k)fluoranthene	1.80E-06	1.76E-09	1.25E-07	5.47E-04	2.74E-07
Butane	2.10E+00	2.06E-03	1.46E-01	6.38E+02	3.19E-01
Chrysene	1.80E-06	1.76E-09	1.25E-07	5.47E-04	2.74E-07
Dibenzo(a,h)anthracene	1.20E-06	1.18E-09	8.33E-08	3.65E-04	1.82E-07
Dichlorobenzene	1.20E-03	1.18E-06	8.33E-05	3.65E-01	1.82E-04
Ethane	3.10E+00	3.04E-03	2.15E-01	9.42E+02	4.71E-01
Fluoranthene	3.00E-06	2.94E-09	2.08E-07	9.12E-04	4.56E-07
Fluorene	2.80E-06	2.75E-09	1.94E-07	8.51E-04	4.26E-07
Formaldehyde	7.50E-02	7.35E-05	5.21E-03	2.28E+01	1.14E-02
Hexane	1.80E+00	1.76E-03	1.25E-01	5.47E+02	2.74E-01
Indeno(1,2,3-cd)pyrene	1.80E-06	1.76E-09	1.25E-07	5.47E-04	2.74E-07
Naphthalene	6.10E-04	5.98E-07	4.23E-05	1.85E-01	9.27E-05
Pentane	2.60E+00	2.55E-03	1.80E-01	7.90E+02	3.95E-01
Phenanathrene	1.70E-05	1.67E-08	1.18E-06	5.17E-03	2.58E-06
Propane	1.60E+00	1.57E-03	1.11E-01	4.86E+02	2.43E-01
Pyrene	5.00E-06	4.90E-09	3.47E-07	1.52E-03	7.60E-07
Toluene	3.40E-03	3.33E-06	2.36E-04	1.03E+00	5.17E-04
Arsenic	2.00E-04	1.96E-07	1.39E-05	6.08E-02	3.04E-05
Barium	4.40E-03	4.31E-06	3.05E-04	1.34E+00	6.69E-04
Beryllium	1.20E-05	1.18E-08	8.33E-07	3.65E-03	1.82E-06
Cadmium	1.10E-03	1.08E-06	7.64E-05	3.34E-01	1.67E-04
Chromium	1.40E-03	1.37E-06	9.72E-05	4.26E-01	2.13E-04
Cobalt	8.40E-05	8.24E-08	5.83E-06	2.55E-02	1.28E-05
Copper	8.50E-04	8.33E-07	5.90E-05	2.58E-01	1.29E-04
Manganese	3.80E-04	3.73E-07	2.64E-05	1.16E-01	5.78E-05
Mercury	2.60E-04	2.55E-07	1.80E-05	7.90E-02	3.95E-05
Molybdenum	1.10E-03	1.08E-06	7.64E-05	3.34E-01	1.67E-04
Nickel	2.10E-03	2.06E-06	1.46E-04	6.38E-01	3.19E-04
Selenium	2.40E-05	2.35E-08	1.67E-06	7.30E-03	3.65E-06
Vanadium	2.30E-03	2.25E-06	1.60E-04	6.99E-01	3.50E-04
Zinc	2.90E-02	2.84E-05	2.01E-03	8.82E+00	4.41E-03
TOTAL HAPs				**1,212**	**0.61**
TOTAL TACs				**575**	**0.29**

Notes:
[a] The auxiliary boiler will operate at the maximum hourly firing rate and will have two cold starts, four warm starts, and four hot starts per month.
[b] Obtained from Tables 1.4-3 and 1.4-4 of *AP-42* (EPA, 1998). Units of lbs/MMBtu calculated by dividing lbs/MMscf by the gas heat content.

Amended Huntington Beach Energy Project
Table 5.1B.14
Facility Wide Natural Gas Fuel Use
September 2015

Hours/Year/Unit

GE 7FA.05	6,612
GE LMS100 PB	1,401
Auxiliary Boiler	8,760

Number of Units

GE 7FA.05	2
GE LMS100 PB	2
Auxiliary Boiler	1

Max Fuel Use	GE 7FA.05 (per unit)	GE LMS100 PB (per unit)	Auxiliary Boiler	Total
Max Fuel Use Per Hour (MMBtu)	2,273	885	70.8	6,388
Max Fuel Use Per Day (MMBtu)	54,563	21,246	878	152,496
Annual Average Fuel Use Per Year (MMBtu)	14,864,741	1,240,114	310,096	32,519,805

Maximum daily fuel use is based on the maximum rated heat capacity multiplied by 24 hours/day

Amended Huntington Beach Energy Project
Table 5.1B.15
Summary of Facility Operation Emissions – Greenhouse Gas Pollutants
September 2015

Facility Heat Input

GE 7FA.05 Natural Gas Use (PTE):	29,729,481	MMBtu/yr
GE LMS100 PB Natural Gas Use (PTE):	2,480,228	MMBtu/yr
Auxiliary Boiler Natural Gas Use (PTE):	310,096	MMBtu/yr
HBEP Total Natural Gas Use (PTE):	32,519,805	MMBtu/yr

GHG Netting

Pollutant	HBEP PTE Emissions (metric tons/year)
CO_2	1,720,623
CH_4	38.0
N_2O	87.4
CO_2 Equivalent (Total) [a]	1,747,611

Notes:

[a] The following global warming potentials were used to estimate CO_2 Equivalents, per Table B.1 of TCR's *2015 Climate Registry Default Emission Factors* (TCR, 2015):

CH_4 =	25
N_2O =	298

GHG Emission Factors

Pollutant	Combined Cycle Emission Factor (kg/MMBtu)	Simple Cycle Emission Factor (kg/MMBtu)	Boiler Emission Factor (kg/MMBtu)
CO_2 [a]	52.91	52.91	52.91
CH_4 [b]	0.00095	0.0038	0.00095
N_2O [b]	0.00285	0.00095	0.00095

Notes:

[a] CO_2 emission factor from Table 12.1 of TCR's *2015 Climate Registry Default Emission Factors* (TCR, 2015).

[b] CH_4 and N_2O emission factors from Table 12.5 of TCR's *2015 Climate Registry Default Emission Factors* (TCR, 2015).

Amended Huntington Beach Energy Project
Table 5.1B.16
Oil-Water Separator Calculations
September 2015

1. Estimated volume throughput of water (an instantaneous gpm):
This value will be driven by the tank rated flow rate. At this stage, we estimate that the most conservative rated flow rate will be 400 gpm.
It is estimated that there will be one 5,000 gallon capacity, 400 gpm rated above ground oil/water separator tank for the Simple Cycle Power Block.
It is estimated that there will be one 5,000 gallon capacity, 300 gpm rated above ground oil/water separator tank for the Combined Cycle Power Block.
2. Total expected annual volume (in gallons):
The estimated annual volume is: 115,000 gallons for the Simple Cycle Power Block and 898,000 gallons for the Combined Cycle Power Block.

Area for LMS100 PB Components at HBEP	**L**	**W**	**Count**	**Total Area**	
	(ft)	(ft)		(ft^2)	
Lube Oil Skids	23	11	2	506	
GSU Transformers	35	22	2	1,540	
Aux Transformers	10	10	2	200	
Fin Fan Cooler Pump Skid	8	15	2	240	
Gas Conditioning	123	40	1	4,920	
GT Fuel Gas Skid	20	12	2	480	
LMS 100 PB Miscellaneous Skids	20	20	1	400	
Ammonia Containment and Unloading	95	75	1	7,125	
Sum of LMS100 PB Area				**15,411**	
Area for 7FA.05 Components at HBEP					
Total Containment Area				121,000	ft^2
Oil-Water Separator Throughput at HBEP					
One 10 Year Storm, 24 Hour Rain Event (LMS100 PB Area)				4,726	ft^3
One 10 Year Storm, 24 Hour Rain Event (7FA.05 Area)				37,107	ft^3
Rain Event (LMS100 PB Area)				35,351	gallons
Rain Event (7FA.05 Area)				277,558	gallons
Amnt. of time it will take LMS100 PB 400 gpm system to process event				88	minutes
Amnt. of time it will take 7FA.05 300 gpm system to process event				925	minutes
Tank Capacity (LMS100 PB Area)				5,000	gallons
Tank Capacity (7FA.05 Area)				5,000	gallons
Expected Annual Volume of Water Processed by LMS100 PB Tank				15,283	ft^3
Expected Annual Volume of Water Processed by 7FA.05 Tank				119,992	ft^3
Expected Annual Volume of Water Processed by All Tanks				135,274	ft^3
				1,011,851	**gallons**

Notes:
Source: 'HB and Alamitos Oil-Water Separator Tank and Sump Estimate for LMS 100.xlsx' and 'HB and Alamitos Oil-Water Separator Tank and Sump Estimate for 2x1FA.xlsx'.
1. It is assumed that the components listed will have their own containment dikes with normally shut drains. Dike contents will be pumped to an above ground separator.
2. Mechanical components located within enclosures are not counted because the oil drains on these enclosures would normally be shut.
3. Huntington Beach 10-year, 24 hour storm event ~ 3.68 inches
Source: Table B.1 in *Orange County Hydrology Manual* (Orange County Environmental Management Agency, 1986)
4. Huntington Beach Yearly Average Precipitation ~ 11.9 inches (30 Year Average)
Source: Weather Base: http://www.weatherbase.com/weather/weatherall.php3?s=519227&cityname=Huntington+Beach%2C+California%2C+United+States+of+America&units=

VOC Emission Calculations

Annual				Monthly Maximum [b]		
Actual Annual Volume (gal/yr)	Rounded Annual Volume (gal/yr)	VOC Emission Factor (lb VOC/gal) [a]	Annual VOC Emissions (lbs/year)	Max Monthly Volume (gal/month)	Monthly VOC Emissions (lbs/month)	Daily VOC Emissions (lbs/day) [c]
1,011,851	1,010,000	0.0002	202.00	252,500	50.50	1.68

Notes:
[a] Derived from Table 5.1-3 of *AP-42* (EPA, 2015). VOC Emission Factor = 0.2 lb/1,000 gallons, which accounts for gasketed covers on the OWS.
[b] Assumption: 25% precipitation falls in a single month.
[c] Daily emissions are based on a 30-day average month.

Amended Huntington Beach Energy Project
Table 5.1B.17
SF_6 Calculations
September 2015

Project Data [a]		Calculation Factors		Annual Emissions		
AEC Electric Breakers [a]	Total SF_6 (lbs)	Annual Leak Rate [b]	SF_6 GWP [c]	Annual SF_6 Emissions (lbs/year)	Annual SF_6 Emissions (metric tons/year)	CO_2e (metric tons/year)
1200A 230 kV	230	0.1%	22,800	0.23	0.00010	2.38
1200A 230 kV	230	0.1%	22,800	0.23	0.00010	2.38
1200A 230 kV	230	0.1%	22,800	0.23	0.00010	2.38
3000A 230 kV	230	0.1%	22,800	0.23	0.00010	2.38
10000A 18 kV	25	0.1%	22,800	0.025	0.000011	0.26
10000A 18 kV	25	0.1%	22,800	0.025	0.000011	0.26
10000A 18 kV	25	0.1%	22,800	0.025	0.000011	0.26
2000A 230 kV	216	0.1%	22,800	0.22	0.000098	2.23
GCB 13.8 kV	24	0.1%	22,800	0.024	0.000011	0.25
GCB 13.8 kV	24	0.1%	22,800	0.024	0.000011	0.25
Total	**1,259**	**0.1%**	**22,800**	**1.259**	**0.000571**	**13.0**

Notes:

[a] Project data provided in 'Alamtios and HB SF6_arb.xlsx' and 'Alamitos and HB SF6 LMS 100.xlsx'. Electrical breakers include three 18-kilovolt transmission breakers, five 230-kilvolt transmission breakers, and two 13.8-kilovolt generator circuit breakers.

[b] Assumed based on *SF_6 Leak Rates from High Voltage Circuit Breakers - U.S. EPA Investigates Potential Greenhouse Gas Emission Sources* , a paper prepared by J. Blackman of the EPA, M. Averyt of ICF Consulting, and Z. Taylor of ICF Consulting.

[c] GWP from Table B.1 of TCR's *2015 Climate Registry Default Emission Factors* (TCR, 2015).

Amended Huntington Beach Energy Project
Table 5.1B.18
Summary of Vehicle Emissions Associated with Project Operation – Criteria Pollutants and GHG
September 2015

Criteria Pollutant Emissions for Operation

Emission Source	Number [a, b]	Miles per Roundtrip [c]	Criteria Pollutant Emissions (lbs/year) [d, e]					
			CO	VOC	SO_2	NO_X	PM_{10}	$PM_{2.5}$
Operation Worker Commute	34	33.2	698.57	11.68	2.44	58.41	42.07	17.43
Material Deliveries	13	13.8	2.38	0.56	0.07	19.05	0.56	0.26
		Total (lbs/year)	**700.95**	**12.24**	**2.51**	**77.45**	**42.62**	**17.68**

Notes:
[a] Number of operational staff (daily) based on engineering estimates from PEC in 'Operating Employees both sites both projects 05.04.15.xlsx'.
[b] Number of material deliveries (monthly) based on engineering estimates from PEC in 'FW HBEP Operational Deliveries.msg'.
[c] Roundtrip miles/day for Operation Worker Commute and Material Deliveries taken as the Urban, South Coast Air Basin C-W and C-NW values, respectively, from Table 4.2 of Appendix D of the *CalEEMod User's Guide* (ENVIRON, 2013).
[d] Calculations assume that workers would be onsite: 365 days/year
[e] Calculations assume that material deliveries would occur: 12 months/year

Greenhouse Gas Emissions for Operation

Emission Source	Number [a, b]	Miles per Roundtrip [c]	GHG Emissions (metric tons/year) [d, e]			CO_2-Equivalent Emissions (metric tons/year) [f]
			CO_2	N_2O	CH_4	
Operation Worker Commute	34	33.2	145.79	0.001483	0.007128	146.41
Material Deliveries	13	13.8	3.80	0.000010	0.000011	3.80
		Total (metric tons/year)	**149.59**	**0.001494**	**0.007139**	**150.21**

Notes:
[a] Number of operational staff (daily) based on engineering estimates from PEC in 'Operating Employees both sites both projects 05.04.15.xlsx'.
[b] Number of material deliveries (monthly) based on engineering estimates from PEC in 'FW HBEP Operational Deliveries.msg'.
[c] Roundtrip miles/day for Operation Worker Commute and Material Deliveries taken as the Urban, South Coast Air Basin C-W and C-NW values, respectively, from Table 4.2 of Appendix D of the *CalEEMod User's Guide* (ENVIRON, 2013).
[d] Calculations assume that workers would be onsite: 365 days/year
[e] Calculations assume that material deliveries would occur: 12 months/year
[f] CO_2-equivalent emissions based on the following global warming potentials from 40 CFR 98, Table A-1:

CH_4: 25
N_2O: 298

Amended Huntington Beach Energy Project
Table 5.1B.19
Equations Used to Calculate Criteria Pollutant and GHG Emissions
September 2015

Emission Source	Pollutant(s)	Equation	Variables
Operation Worker Commute Vehicle Exhaust	CO, VOC, NO_X, SO_X, PM_{10}, and $PM_{2.5}$	E = N x VMT x D x EF / 453.6	E = Emissions (lbs/year) N = Number of vehicles per day VMT = Vehicle miles traveled per roundtrip (miles/trip). Assumes one vehicle trip per day. D = Number of operational days per year EF = EMFAC2014 emission factor (g/mile) 453.6 = Conversion from g to lbs
Material Deliveries Vehicle Exhaust	CO, VOC, NO_X, SO_X, PM_{10}, and $PM_{2.5}$	E = N x VMT x M x EF / 453.6	E = Emissions (lbs/year) N = Number of vehicles per month VMT = Vehicle miles traveled per roundtrip (miles/trip) M = Number of operational months per year EF = EMFAC2014 emission factor (g/mile) 453.6 = Conversion from g to lbs
Operation Worker Commute Vehicle Exhaust	CO_2	E = N x VMT x D / FE x EF x 0.001	E = Emissions (metric tons/year) N = Number of vehicles per day VMT = Vehicle miles traveled per roundtrip (miles/trip). Assumes one vehicle trip per day. D = Number of operational days per year FE = Fuel economy (mpg) EF = Emission factor (kg/gallon) 0.001 = Conversion from kg to metric tons
	CH_4 and N_2O	E = N x VMT x D x EF / 1,000 x 0.001	E = Emissions (metric tons/year) N = Number of vehicles per day VMT = Vehicle miles traveled per roundtrip (miles/trip). Assumes one vehicle trip per day. D = Number of operational days per year EF = Emission factor (g/mile) 1,000 = Conversion from g to kg 0.001 = Conversion from kg to metric tons
Material Deliveries Vehicle Exhaust	CO_2	E = N x VMT x M / FE x EF x 0.001	E = Emissions (metric tons/year) N = Number of vehicles per month VMT = Vehicle miles traveled per roundtrip (miles/trip) M = Number of operational months per year FE = Fuel economy (mpg) EF = Emission factor (kg/gallon) 0.001 = Conversion from kg to metric tons
	CH_4 and N_2O	E = N x VMT x M x EF / 1,000 x 0.001	E = Emissions (metric tons/year) N = Number of vehicles per month VMT = Vehicle miles traveled per roundtrip (miles/trip) M = Number of operational months per year EF = Emission factor (g/mile) 1,000 = Conversion from g to kg 0.001 = Conversion from kg to metric tons

Amended Huntington Beach Energy Project
Table 5.1B.20
Vehicle Emission Factors for Operation - Criteria Pollutants
September 2015

Vehicle Emission Factors for Operation

Vehicle Type	Vehicle Class [a]	Exhaust Emission Factors (g/mile) [b, c]						Fuel Economy
		CO	VOC	SO_2	NO_X	PM_{10} [e]	$PM_{2.5}$ [e]	(mpg) [d]
Operation Worker Commute	Light-duty Auto/Truck	0.769	0.013	0.003	0.064	0.046	0.019	24.806
Material Deliveries	Heavy-duty Diesel	0.502	0.118	0.016	4.014	0.117	0.054	5.781

Notes:

[a] The vehicle classes are represented as follows:

Light-duty Auto/Truck: 50% LDA Gas, 25% LDT1 Gas, and 25% LDT2 Gas values, per Section 4.5 of Appendix A of the *CalEEMod User's Guide* (ENVIRON, 2013).

Heavy-duty Diesel: 100% HHDT DSL values, per Section 4.5 of Appendix A of the *CalEEMod User's Guide* (ENVIRON, 2013).

[b] The Combined Cycle and Simple Cycle Power Blocks are projected to begin commercial operation in May 2020 and January 2024, respectively, based on information provided by AES in 'RE Proposed NTP's or CODs for LMS 100.msg'. Therefore, 2020 emission factors were conservatively used.

[c] Exhaust emission factors from EMFAC2014 for the South Coast Air Basin (Orange County), calendar year 2020. A speed of 40 mph was assumed for offsite vehicles and worker commutes, which is consistent with the CalEEMod defaults. An average temperature of 68°F and humidity of 55% were used per Table B-1 of *CT-EMFAC: A Computer Model to Estimate Transportation Project Emissions* (UC Davis, 2007).

[d] Fuel economy from the EMFAC2014 Web Database (http://www.arb.ca.gov/emfac/2014/) for the South Coast Air Basin, calendar year 2020. Values were estimated by dividing the VMT (miles/day) by the Fuel Consumption (gal/day).

[e] Because of the small number of vehicles, it is assumed that the fugitive dust emissions from paved roads are negligible. As such, paved road emission factors are not included in these values.

Amended Huntington Beach Energy Project
Table 5.1B.21
Vehicle Emission Factors for Operation - GHG
September 2015

Vehicle Emission Factors for Operation

Fuel / Category Type	Emission Factor	Emission Factor Units	Emission Factor Source
CO_2 Emission Factors			
Gasoline	8.78	kg CO_2/gallon	The Climate Registry. 2015. *2015 Climate Registry Default Emission Factors* . Table 13.1. April.
Diesel	10.21	kg CO_2/gallon	The Climate Registry. 2015. *2015 Climate Registry Default Emission Factors* . Table 13.1. April.
N_2O Emission Factors			
Gasoline Passenger Car Model Year 2012 [a]	0.0036	g N_2O/mile	The Climate Registry. 2015. *2015 Climate Registry Default Emission Factors* . Table 13.5. April.
Diesel Heavy-duty Truck Model Year 1960 - 2012 [a]	0.0048	g N_2O/mile	The Climate Registry. 2015. *2015 Climate Registry Default Emission Factors* . Table 13.5. April.
CH_4 Emission Factors			
Gasoline Passenger Car Model Year 2012 [a]	0.0173	g CH_4/mile	The Climate Registry. 2015. *2015 Climate Registry Default Emission Factors* . Table 13.5. April.
Diesel Heavy-duty Truck Model Year 1960 - 2012 [a]	0.0051	g CH_4/mile	The Climate Registry. 2015. *2015 Climate Registry Default Emission Factors* . Table 13.5. April.

Notes:
[a] Model Year 2012 was the most recent year of emission factors available. As a result, it was assumed representative of vehicles used for this project.

Amended Huntington Beach Energy Project
Table 5.1B.22
Simple Cycle: GHG BACT Analysis
September 2015

Performance Data

Data for 1 LMS-100PB	100 Percent Load	75 Percent Load	50 Percent Load
Net Electrical Output (kW)	99,355	72,448	47,476
Net Heat Rate (Btu/kWh-LHV)	8,027	8,801	10,394
Gross Heat Rate (Btu/kWh-LHV)	7,911	8,627	10,084
Gross Electrical Output (kW)	100,814	73,908	48,935

GHG Efficiency Calculations

Parameter	Value	Notes
Average Net Heat Rate (Btu/kWh-LHV)	9,074	
Average Gross Heat Rate (Btu/kWh-LHV)	8,874	
Operating Hours/Year	1,150	
Number of Startups and Shutdowns/Year/CTG	350	
Duration of Startup (to Baseload) (Hours)	0.17	Assumed 10 minutes from first fire to full load operation
Duration of Shutdown (Baseload to No Fuel Combustion) (Hours)	0.22	Assumed 13 minutes from full load operation to no fuel combustion
Startup Hours/Year	58	350 * 0.17
Shutdown Hours/Year	76	350 * 0.22
Startup Net Heat Rate (Btu/kWh-LHV)	25,984	Assumed 2.5 times the 50% load heat rate
Shutdown Net Heat Rate (Btu/kWh-LHV)	15,591	Assumed 1.5 times the 50% load heat rate
Overall Net Heat Rate (Btu/kWh-LHV)	10,227	
Net lb CO_2/MWh	1,075	Based on 52.91 kg CO_2/MMBtu-HHV, converted to LHV using an LHV/HHV factor of 0.9009
Net lb CO_2/MWh (with 8% Degradation)	1,161	

Amended Huntington Beach Energy Project
Table 5.1B.23
Combined Cycle: GHG BACT Analysis
September 2015

1x1 Performance Data

1 on 1 Configuration	Minimum CTG Turndown (Approximately 44% CTG Load)	First Intermediate Point (Approximately 63% CTG Load)	Second Intermediate Point (Approximately 81% CTG Load)	Base Load (100% CTG Load)
Net Plant Electrical Output (kW)	167,083	214,510	267,595	326,268
Net Plant Heat Rate (Btu/kWh-LHV)	7,132	6,413	6,281	6,190
Gross Heat Rate (Btu/kWh-LHV)	6,711	6,056	5,992	5,942
Net Heat Rate (Btu/kWh-HHV)	7,913	7,116	6,970	6,868
Gross Power Output (kW)	177,553	227,169	280,534	339,854
Average Net Electrical Output (kW)	243,864			

2x1 Performance Data

2 on 1 Configuration	Minimum CTG Turndown (Approximately 44% CTG Load)	First Intermediate Point (Approximately 63% CTG Load)	Second Intermediate Point (Approximately 81% CTG Load)	Base Load (100% CTG Load)
Net Plant Electrical Output (kW)	347,857	444,518	547,347	661,631
Net Plant Heat Rate (Btu/kWh-LHV)	6,851	6,190	6,142	6,105
Gross Heat Rate (Btu/kWh-LHV)	6,502	5,928	5,917	5,908
Net Heat Rate (Btu/kWh-HHV)	7,602	6,868	6,815	6,774
Gross Power Output (kW)	366,550	464,168	568,112	683,675
Average Net Electrical Output (kW)	500,338			

GHG Efficiency Calculations

Parameter	Value	Notes
1 on 1 Operating Hours/Year	1,200	Assumed
2 on 1 Operating Hours/Year	4,900	Assumed
Average Net 1 on 1 Heat Rate (Btu/kWh-LHV)	6,504	
Average Net 2 on 1 Heat Rate (Btu/kWh-LHV)	6,322	
Operating Hours/Year	6,100	
Number of Hot/Warm Startups/Year	476	For two turbines
Number of Cold Startups/Year	24	For two turbines
Number of Shutdowns/Year	500	For two turbines
Duration of Hot/Warm Startup (to Baseload) (Hours)	0.25	First fire to base load reached in 15 minutes
Duration of Cold Startup (to Baseload) (Hours)	0.33	First fire to base load reached in 20 minutes
Duration of Shutdown (Baseload to No Fuel Combustion) (Hours)	0.50	Baseload to no fuel combustion
Startup Hours/Year	127	476 * 0.25 + 24 * 0.33
Shutdown Hours/Year	250	500 * 0.50
Startup Net Heat Rate (Btu/kWh-LHV)	17,829	Assumed 2.5 times the 44% load heat rate
Shutdown Net Heat Rate (Btu/kWh-LHV)	10,698	Assumed 1.5 times the 44% load heat rate
Overall Net Heat Rate (Btu/kWh-LHV)	6,750	
Net lb CO_2/MWh	709	Based on 52.91 kg CO_2/MMBtu-HHV, converted to LHV using an LHV/HHV factor of 0.9009.
Net lb CO_2/MWh (with 8% Degradation)	766	709 Net lb CO_2/MWh * 1.08
Capacity Factor (%)	47.35	

Appendix 5.1C
Dispersion Modeling and Climate Information

APPENDIX 5.1C

Dispersion Modeling and Climate Information

Tables presented in this Appendix are as follows:

Figures presented in this Appendix are as follows:

Amended Huntington Beach Energy Project

Table 5.1C.1

Demolition and Construction Stack Parameters

September 2015

Area Poly Sources

Source ID	Base Elevation (m)	Release Height (m)	Number of Vertices	Vertical Dimension (m)	Easting (X1) (m)	Northing (Y1) (m)	Easting (X2) (m)	Northing (Y2) (m)	Easting (X3) (m)	Northing (Y3) (m)	Easting (X4) (m)	Northing (Y4) (m)	Easting (X5) (m)	Northing (Y5) (m)	Easting (X6) (m)	Northing (Y6) (m)	Easting (X7) (m)	Northing (Y7) (m)
FUG	3.66	0.00	7	1.00	409550	3723300	409550	3723175	409515	3723175	409450	3723130	409350	3723200	409425	3723275	409475	3723300

Point Sources

Source ID	Stack Release Type (Beta)	Easting (X) (m)	Northing (Y) (m)	Base Elevation (m)	Stack Height (m)	Temperature (K)	Exit Velocity (m/s)	Stack Diameter (m)
EAST01	Horizontal	409425	3723150	3.66	4.60	533	18.0	0.127
EAST02	Horizontal	409450	3723150	3.66	4.60	533	18.0	0.127
EAST03	Horizontal	409400	3723175	3.66	4.60	533	18.0	0.127
EAST04	Horizontal	409425	3723175	3.66	4.60	533	18.0	0.127
EAST05	Horizontal	409450	3723175	3.66	4.60	533	18.0	0.127
EAST06	Horizontal	409475	3723175	3.66	4.60	533	18.0	0.127
EAST07	Horizontal	409500	3723175	3.66	4.60	533	18.0	0.127
EAST08	Horizontal	409525	3723175	3.66	4.60	533	18.0	0.127
EAST09	Horizontal	409550	3723175	3.66	4.60	533	18.0	0.127
EAST10	Horizontal	409375	3723200	3.66	4.60	533	18.0	0.127
EAST11	Horizontal	409400	3723200	3.66	4.60	533	18.0	0.127
EAST12	Horizontal	409425	3723200	3.66	4.60	533	18.0	0.127
EAST13	Horizontal	409450	3723200	3.66	4.60	533	18.0	0.127
EAST14	Horizontal	409475	3723200	3.66	4.60	533	18.0	0.127
EAST15	Horizontal	409500	3723200	3.66	4.60	533	18.0	0.127
EAST16	Horizontal	409525	3723200	3.66	4.60	533	18.0	0.127
EAST17	Horizontal	409550	3723200	3.66	4.60	533	18.0	0.127
EAST18	Horizontal	409400	3723225	3.66	4.60	533	18.0	0.127
EAST19	Horizontal	409425	3723225	3.66	4.60	533	18.0	0.127
EAST20	Horizontal	409450	3723225	3.66	4.60	533	18.0	0.127
EAST21	Horizontal	409475	3723225	3.66	4.60	533	18.0	0.127
EAST22	Horizontal	409500	3723225	3.66	4.60	533	18.0	0.127
EAST23	Horizontal	409525	3723225	3.66	4.60	533	18.0	0.127
EAST24	Horizontal	409550	3723225	3.66	4.60	533	18.0	0.127
EAST25	Horizontal	409400	3723250	3.66	4.60	533	18.0	0.127
EAST26	Horizontal	409425	3723250	3.66	4.60	533	18.0	0.127
EAST27	Horizontal	409450	3723250	3.66	4.60	533	18.0	0.127
EAST28	Horizontal	409475	3723250	3.66	4.60	533	18.0	0.127
EAST29	Horizontal	409500	3723250	3.66	4.60	533	18.0	0.127
EAST30	Horizontal	409525	3723250	3.66	4.60	533	18.0	0.127
EAST31	Horizontal	409550	3723250	3.66	4.60	533	18.0	0.127
EAST32	Horizontal	409425	3723275	3.66	4.60	533	18.0	0.127
EAST33	Horizontal	409450	3723275	3.66	4.60	533	18.0	0.127
EAST34	Horizontal	409475	3723275	3.66	4.60	533	18.0	0.127
EAST35	Horizontal	409500	3723275	3.66	4.60	533	18.0	0.127
EAST36	Horizontal	409525	3723275	3.66	4.60	533	18.0	0.127
EAST37	Horizontal	409550	3723275	3.66	4.60	533	18.0	0.127
EAST38	Horizontal	409475	3723300	3.66	4.60	533	18.0	0.127
EAST39	Horizontal	409500	3723300	3.66	4.60	533	18.0	0.127
EAST40	Horizontal	409525	3723300	3.66	4.60	533	18.0	0.127
EAST41	Horizontal	409550	3723300	3.66	4.60	533	18.0	0.127

Amended Huntington Beach Energy Project
Table 5.1C.2
Demolition and Construction Emission Rates
September 2015

Emission Rates for 1-hour, 3-hour, 8-hour, and 24-hour Modeling

	1-hour NO_2		1-hour CO		8-hour CO		1-hour SO_2		3-hour SO_2		24-hour SO_2		24-hour PM_{10}		24-hour $PM_{2.5}$	
Source ID	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)
FUG	-	-	-	-	-	-	-	-	-	-	-	-	0.020	0.16	0.0077	0.061
EXH	0.21	1.63	1.08	8.55	1.08	8.55	0.0018	0.014	0.0018	0.014	0.0008	0.0060	0.0005	0.0043	0.0005	0.0043
Maximum Month	39		27		27		27		27		27		16		16	

Emission Rates for Annual Modeling

	Annual NO_2		Annual PM_{10}		Annual $PM_{2.5}$	
Source ID	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)
FUG	-	-	0.012	0.097	0.0034	0.027
EXH	0.063	0.50	0.0008	0.0060	0.0008	0.0060
Maximum Months	36-47		27-38		27-38	

Emission rates for exhaust sources are the total for all sources

Amended Huntington Beach Energy Project
Table 5.1C.3
Demolition and Construction Results
September 2015

		NO_2 (µg/m^3) [a]			CO (µg/m^3)		SO_2 (µg/m^3)				PM_{10} (µg/m^3)		$PM_{2.5}$ (µg/m^3)	
Source	Year	1-hour	1-hour (federal) [b]	Annual	1-hour	8-hour	1-hour	1-hour (federal	3-hour	24-hour	24-hour	Annual	24-hour	Annual
ALL		26.6	122	2.00	175	136	0.29	0.29	0.27	0.058	10.6	2.94	3.38	0.83
EXH	2010	26.6	26.0	2.00	175	136	0.29	0.29	0.27	0.058	0.041	0.032	0.038	0.032
FUG		-	-	-	-	-	-	-	-	-	10.6	2.91	3.34	0.80
ALL		26.5	121	2.00	174	140	0.29	0.29	0.27	0.056	9.89	2.91	3.24	0.82
EXH	2011	26.5	26.2	2.00	174	140	0.29	0.29	0.27	0.056	0.040	0.032	0.037	0.032
FUG		-	-	-	-	-	-	-	-	-	9.86	2.88	3.20	0.79
ALL		26.8	120	2.05	176	131	0.29	0.29	0.27	0.059	10.7	3.01	3.43	0.85
EXH	2012	26.8	26.4	2.05	176	131	0.29	0.29	0.27	0.059	0.042	0.033	0.037	0.033
FUG		-	-	-	-	-	-	-	-	-	10.7	2.98	3.40	0.82
ALL		26.9	121	2.00	177	139	0.30	0.29	0.28	0.058	10.8	3.01	3.51	0.85
EXH	2013	26.9	26.4	2.00	177	139	0.30	0.29	0.28	0.058	0.041	0.032	0.037	0.032
FUG		-	-	-	-	-	-	-	-	-	10.8	2.98	3.48	0.82
ALL		27.0	121	1.92	177	134	0.30	0.29	0.28	0.056	11.1	2.84	3.54	0.80
EXH	2014	27.0	26.5	1.92	177	134	0.30	0.29	0.28	0.056	0.040	0.031	0.036	0.031
FUG		-	-	-	-	-	-	-	-	-	11.1	2.81	3.51	0.77

[a] The maximum 1-hour and annual NO_2 concentrations include ambient NO_2 ratios of 0.80 (EPA, 2011) and 0.75 (EPA, 2005), respectively.

[b] The total predicted concentration for the federal 1-hour NO_2 standard is the high-8th-high modeled concentration paired with 98th percentile seasonal hour-of-day background concentrations for 2010 through 2012.

Amended Huntington Beach Energy Project
Table 5.1C.4
Commissioning Stack Parameters
September 2015

Point Sources

Scenario	Source ID	Easting (X) (m)	Northing (Y) (m)	Base Elevation (m)	Stack Height (m)	Temperature (K)	Exit Velocity (m/s)	Stack Diameter (m)
GE 7FA.05, 10% Load	7FA01	409449	3723146	3.66	45.7	361	9.33	6.10
	7FA02	409474	3723182	3.66	45.7	361	9.33	6.10
	Aux Boiler	409438	3723236	3.66	24.4	432	21.2	0.91
GE 7FA.05, 40% Load	7FA01	409449	3723146	3.66	45.7	359	11.9	6.10
	7FA02	409474	3723182	3.66	45.7	359	11.9	6.10
	Aux Boiler	409438	3723236	3.66	24.4	432	21.2	0.91
GE 7FA.05, 80% Load	7FA01	409449	3723146	3.66	45.7	366	16.1	6.10
	7FA02	409474	3723182	3.66	45.7	366	16.1	6.10
	Aux Boiler	409438	3723236	3.66	24.4	432	21.2	0.91
GE LMS 100PB, 5% Load	7FA01	409449	3723146	3.66	45.7	350	12.2	6.10
	7FA02	409474	3723182	3.66	45.7	350	12.2	6.10
	LMS01	409149	3723193	3.66	24.4	728	10.0	4.11
	LMS02	409185	3723168	3.66	24.4	728	10.0	4.11
	Aux Boiler	409438	3723236	3.66	24.4	432	21.2	0.91
GE LMS 100PB, 75% Load	7FA01	409449	3723146	3.66	45.7	350	12.2	6.10
	7FA02	409474	3723182	3.66	45.7	350	12.2	6.10
	LMS01	409149	3723193	3.66	24.4	694	33.3	4.11
	LMS02	409185	3723168	3.66	24.4	694	33.3	4.11
	Aux Boiler	409438	3723236	3.66	24.4	432	21.2	0.91
GE LMS 100PB, Full Load	7FA01	409449	3723146	3.66	45.7	350	12.2	6.10
	7FA02	409474	3723182	3.66	45.7	350	12.2	6.10
	LMS01	409149	3723193	3.66	24.4	748	23.8	4.11
	LMS02	409185	3723168	3.66	24.4	748	23.8	4.11
	Aux Boiler	409438	3723236	3.66	24.4	432	21.2	0.91

Amended Huntington Beach Energy Project
Table 5.1C.5
Commissioning Emission Rates
September 2015

Short-Term Pollutant Commissioning Emissions

		1-hour NO_2		1-hour CO		8-hour CO	
Scenario	Source ID	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)
GE 7FA.05, 10% Load	7FA01	23.9	190	239	1,900	239	1,900
	7FA02	23.9	190	239	1,900	239	1,900
	Aux Boiler	0.027	0.21	0.18	1.42	0.14	1.09
GE 7FA.05, 40% Load	7FA01	8.60	68.3	-	-	-	-
	7FA02	8.60	68.3	-	-	-	-
	Aux Boiler	0.027	0.21	-	-	-	-
GE 7FA.05, 80% Load	7FA01	7.94	63.0	-	-	-	-
	7FA02	7.94	63.0	-	-	-	-
	Aux Boiler	0.027	0.21	-	-	-	-
GE LMS 100PB, 5% Load	7FA01	7.69	61.0	41.0	325	12.0	95.2
	7FA02	7.69	61.0	41.0	325	12.0	95.2
	LMS01	5.05	40.1	30.7	244	30.7	244
	LMS02	5.05	40.1	30.7	244	30.7	244
	Aux Boiler	0.027	0.21	0.18	1.42	0.14	1.09
GE LMS 100PB, 75% Load	7FA01	-	-	41.0	325	12.0	95.2
	7FA02	-	-	41.0	325	12.0	95.2
	LMS01	-	-	9.13	72.5	9.13	72.5
	LMS02	-	-	9.13	72.5	9.13	72.5
	Aux Boiler	-	-	0.18	1.42	0.14	1.09
GE LMS 100PB, Full Load	7FA01	-	-	41.0	325	12.0	95.2
	7FA02	-	-	41.0	325	12.0	95.2
	LMS01	-	-	11.3	90.0	11.3	90.0
	LMS02	-	-	11.3	90.0	11.3	90.0
	Aux Boiler	-	-	0.18	1.42	0.14	1.09

Annual Pollutant Commissioning Emissions

		Annual NO_2		Annual PM_{10}		Annual $PM_{2.5}$	
Scenario	Source ID	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)
GE 7FA.05 [a]	7FA01	1.46	11.6	0.98	7.82	0.98	7.82
	7FA02	1.46	11.6	0.98	7.82	0.98	7.82
	Aux Boiler	0.017	0.14	0.010	0.082	0.010	0.082
GE LMS 100PB [b]	7FA01	1.02	8.12	0.86	6.79	0.86	6.79
	7FA02	1.02	8.12	0.86	6.79	0.86	6.79
	LMS01	0.32	2.53	0.15	1.20	0.15	1.20
	LMS02	0.32	2.53	0.15	1.20	0.15	1.20
	Aux Boiler	0.017	0.14	0.010	0.082	0.010	0.082

[a] GE 7FA.05 annual emissions include emissions from commissioning as well as annual operation.
[b] GE LMS 100PB annual emissions include emissions from commissioning as well as annual operation.

Amended Huntington Beach Energy Project

Table 5.1C.6

Commissioning Building Parameters

September 2015

GE 7FA.05 Commissioning

Building Name	Number of Tiers	Tier Number	Base Elevation (m)	Tier Height (m)	Number of Corners	Corner 1 East (X) (m)	Corner 1 North (Y) (m)	Corner 2 East (X) (m)	Corner 2 North (Y) (m)	Corner 3 East (X) (m)	Corner 3 North (Y) (m)	Corner 4 East (X) (m)	Corner 4 North (Y) (m)	Corner 5 East (X) (m)	Corner 5 North (Y) (m)	Corner 6 East (X) (m)	Corner 6 North (Y) (m)	Corner 7 East (X) (m)	Corner 7 North (Y) (m)	Corner 8 East (X) (m)	Corner 8 North (Y) (m)	Corner 9 East (X) (m)	Corner 9 North (Y) (m)
'AIRIN3'	1	-	3.66	21.6	9	409385	3723198	409377	3723187	409384	3723182	409387	3723182	409395	3723177	409401	3723185	409393	3723191	409391	3723194	409385	3723198
'AIRIN4'	1	-	3.66	21.6	9	409426	3723221	409421	3723213	409412	3723218	409409	3723219	409402	3723223	409410	3723234	409416	3723230	409418	3723227	409426	3723221
'HRSG1'	1	-	3.66	25.6	5	409424	3723169	409447	3723152	409443	3723145	409418	3723162	409424	3723169								
'HRSG2'	1	-	3.66	25.6	5	409449	3723205	409473	3723188	409468	3723182	409444	3723198	409449	3723205								
'ACC'	1	-	3.66	33.5	5	409549	3723302	409551	3723173	409512	3723173	409510	3723301	409549	3723302								
'STG'	1	-	3.66	17.9	5	409482	3723251	409490	3723251	409490	3723235	409482	3723235	409482	3723251								
'WALL1'	1	-	3.66	15.2	9	409566	3723274	409567	3723158	409519	3723157	409437	3723109	409436	3723110	409519	3723158	409566	3723159	409565	3723274	409566	3723274
'WALL2'	1	-	3.66	6.10	7	409447	3723302	409427	3723301	409402	3723266	409402	3723265	409427	3723301	409447	3723301	409447	3723301				
'UNIT1L1'	2	1	3.66	23.2	4	409293	3723102	409312	3723128	409335	3723112	409317	3723086										
'UNIT1L2'	-	2	3.66	37.6	4	409301	3723114	409312	3723128	409335	3723112	409326	3723098										
'UNIT2L1'	2	1	3.66	23.2	4	409252	3723127	409272	3723153	409295	3723137	409277	3723111										
'UNIT2L2'	-	2	3.66	37.6	4	409261	3723139	409272	3723153	409295	3723137	409285	3723123										
'UNIT3L1'	2	1	3.66	23.2	4	409187	3723175	409206	3723202	409229	3723186	409211	3723159										
'UNIT3L2'	-	2	3.66	37.6	4	409195	3723187	409206	3723202	409229	3723186	409220	3723172										
'UNIT4L1'	2	1	3.66	23.2	4	409146	3723201	409165	3723228	409188	3723212	409170	3723185										
'UNIT4L2'	-	2	3.66	37.6	4	409154	3723213	409165	3723228	409188	3723212	409179	3723198										

Cylindical Building Name	Base Elevation (m)	Center East (X) (m)	Center North (Y) (m)	Tank Height (m)	Tank Diameter (m)
Stack12	3.66	409274	3723095	61.0	6.27
Stack34	3.66	409165	3723168	61.0	6.27

Amended Huntington Beach Energy Project
Table 5.1C.6
Commissioning Building Parameters
September 2015

GE LMS 100PB Commissioning

Building Name	Number of Tiers	Tier Number	Base Elevation (m)	Tier Height (m)	Number of Corners	Corner 1 East (X) (m)	Corner 1 North (Y) (m)	Corner 2 East (X) (m)	Corner 2 North (Y) (m)	Corner 3 East (X) (m)	Corner 3 North (Y) (m)	Corner 4 East (X) (m)	Corner 4 North (Y) (m)	Corner 5 East (X) (m)	Corner 5 North (Y) (m)	Corner 6 East (X) (m)	Corner 6 North (Y) (m)	Corner 7 East (X) (m)	Corner 7 North (Y) (m)	Corner 8 East (X) (m)	Corner 8 North (Y) (m)	Corner 9 East (X) (m)	Corner 9 North (Y) (m)
'AIRIN3'	1	-	3.66	21.6	9	409385	3723198	409377	3723187	409384	3723182	409387	3723182	409395	3723177	409401	3723185	409393	3723191	409391	3723194	409385	3723198
'AIRIN4'	1	-	3.66	21.6	9	409426	3723221	409421	3723213	409412	3723218	409409	3723219	409402	3723223	409410	3723234	409416	3723230	409418	3723227	409426	3723221
'HRSG1'	1	-	3.66	25.6	5	409424	3723169	409447	3723152	409443	3723145	409418	3723162	409424	3723169								
'HRSG2'	1	-	3.66	25.6	5	409449	3723205	409473	3723188	409468	3723182	409444	3723198	409449	3723205								
'ACC'	1	-	3.66	33.5	5	409549	3723302	409551	3723173	409512	3723173	409510	3723301	409549	3723302								
'STG'	1	-	3.66	17.9	5	409482	3723251	409490	3723251	409490	3723235	409482	3723235	409482	3723251								
'WALL1'	1	-	3.66	15.2	9	409566	3723274	409567	3723158	409519	3723157	409437	3723109	409436	3723110	409519	3723158	409566	3723159	409565	3723274	409566	3723274
'WALL2'	1	-	3.66	6.10	7	409447	3723302	409427	3723301	409402	3723266	409402	3723265	409427	3723301	409447	3723301	409447	3723301				
'UNIT1L1'	2	1	3.66	23.2	4	409293	3723102	409312	3723128	409335	3723112	409317	3723086										
'UNIT1L2'	-	2	3.66	37.6	4	409301	3723114	409312	3723128	409335	3723112	409326	3723098										
'UNIT2L1'	2	1	3.66	23.2	4	409252	3723127	409272	3723153	409295	3723137	409277	3723111										
'UNIT2L2'	-	2	3.66	37.6	4	409261	3723139	409272	3723153	409295	3723137	409285	3723123										
'AIRIN1'	1	-	3.66	15.6	5	409161	3723216	409148	3723225	409142	3723217	409155	3723207	409161	3723216								
'AIRIN2'	1	-	3.66	15.6	5	409196	3723179	409202	3723187	409216	3723178	409210	3723169	409196	3723179								
'CTG1'	1	-	3.66	9.45	7	409160	3723207	409158	3723209	409151	3723201	409147	3723197	409153	3723193	409156	3723198	409160	3723207				
'CTG2'	1	-	3.66	9.45	7	409194	3723184	409197	3723182	409192	3723172	409190	3723168	409184	3723172	409187	3723176	409194	3723184				

Cylindical Building Name	Base Elevation (m)	Center East (X) (m)	Center North (Y) (m)	Tank Height (m)	Tank Diameter (m)
Stack12	3.66	409274	3723095	61.0	6.27

Amended Huntington Beach Energy Project
Table 5.1C.7
Commissioning Results
September 2015

Scenario	Year	NO_2 (µg/m^3) [a] 1-hour	CO (µg/m^3) 1-hour	CO (µg/m^3) 8-hour
GE 7FA.05, 10% Load [b]	2010	136	2,498	1,784
	2011	166	3,097	1,654
	2012	158	2,878	1,737
	2013	179	3,377	1,793
	2014	143	2,654	1,576
GE 7FA.05, 40% Load	2010	62.7	-	-
	2011	59.5	-	-
	2012	61.4	-	-
	2013	62.0	-	-
	2014	66.5	-	-
GE 7FA.05, 80% Load	2010	40.6	-	-
	2011	33.6	-	-
	2012	42.8	-	-
	2013	29.1	-	-
	2014	42.3	-	-
GE LMS 100PB, 5% Load	2010	75.6	504	117
	2011	75.9	506	117
	2012	79.0	527	115
	2013	77.3	515	125
	2014	79.1	527	125
GE LMS 100PB, 75% Load	2010	-	503	95.3
	2011	-	506	91.0
	2012	-	526	98.8
	2013	-	514	96.2
	2014	-	526	89.5
GE LMS 100PB, Full Load	2010	-	503	95.9
	2011	-	506	91.1
	2012	-	526	99.4
	2013	-	514	96.3
	2014	-	526	90.3

[a] The maximum 1-hour NO_2 concentrations include an ambient NO_2 ratio of 0.80 (EPA, 2011), unless otherwise noted.

[b] Commissioning impacts for the GE 7FA.05 10% load scenario are for a single turbine only. 1-hour NO_2 impacts were modeled using the Plume Volume Molar Ratio Method.

Scenario	Year	NO_2 (µg/m^3) [c] Annual	PM_{10} (µg/m^3) Annual	$PM_{2.5}$ (µg/m^3) Annual
GE 7FA.05 [d]	2010	0.59	0.52	0.52
	2011	0.60	0.54	0.54
	2012	0.66	0.59	0.59
	2013	0.66	0.59	0.59
	2014	0.66	0.58	0.58
GE LMS 100PB [e]	2010	0.43	0.47	0.47
	2011	0.44	0.48	0.48
	2012	0.48	0.53	0.53
	2013	0.49	0.53	0.53
	2014	0.48	0.53	0.53

[c] The maximum annual NO_2 concentrations include an ambient NO_2 ratio of 0.75 (EPA, 2005).

[d] Annual commissioning impacts are based on total emissions from commissioning and annual operation of 2 GE 7FA.05 turbines and the auxiliary boiler.

[e] Annual commissioning impacts are based on total emissions from commissioning and annual operation of 2 GE 7FA.05 turbines, 2 GE LMS 100PB turbines, and the auxiliary boiler.

Amended Huntington Beach Energy Project
Table 5.1C.8
Operational Stack Parameters
September 2015

Point Sources

Scenario	Source ID	Easting (X) (m)	Northing (Y) (m)	Base Elevation (m)	Stack Height (m)	Temperature (K)	Exit Velocity (m/s)	Stack Diameter (m)
1	GE 7FA.05-01	409449	3723146	3.66	45.7	375	20.4	6.10
	GE 7FA.05-02	409474	3723182	3.66	45.7	375	20.4	6.10
	GE LMS 100PB-01	409149	3723193	3.66	24.4	694	33.3	4.11
	GE LMS 100PB-02	409185	3723168	3.66	24.4	694	33.3	4.11
2	GE 7FA.05-01	409449	3723146	3.66	45.7	354	15.6	6.10
	GE 7FA.05-02	409474	3723182	3.66	45.7	354	15.6	6.10
	GE LMS 100PB-01	409149	3723193	3.66	24.4	709	28.7	4.11
	GE LMS 100PB-02	409185	3723168	3.66	24.4	709	28.7	4.11
3	GE 7FA.05-01	409449	3723146	3.66	45.7	350	12.2	6.10
	GE 7FA.05-02	409474	3723182	3.66	45.7	350	12.2	6.10
	GE LMS 100PB-01	409149	3723193	3.66	24.4	748	23.8	4.11
	GE LMS 100PB-02	409185	3723168	3.66	24.4	748	23.8	4.11
4	GE 7FA.05-01	409449	3723146	3.66	45.7	374	20.1	6.10
	GE 7FA.05-02	409474	3723182	3.66	45.7	374	20.1	6.10
	GE LMS 100PB-01	409149	3723193	3.66	24.4	697	33.1	4.11
	GE LMS 100PB-02	409185	3723168	3.66	24.4	697	33.1	4.11
5	GE 7FA.05-01	409449	3723146	3.66	45.7	375	20.2	6.10
	GE 7FA.05-02	409474	3723182	3.66	45.7	375	20.2	6.10
	GE LMS 100PB-01	409149	3723193	3.66	24.4	699	33.0	4.11
	GE LMS 100PB-02	409185	3723168	3.66	24.4	699	33.0	4.11
6	GE 7FA.05-01	409449	3723146	3.66	45.7	353	14.9	6.10
	GE 7FA.05-02	409474	3723182	3.66	45.7	353	14.9	6.10
	GE LMS 100PB-01	409149	3723193	3.66	24.4	709	28.4	4.11
	GE LMS 100PB-02	409185	3723168	3.66	24.4	709	28.4	4.11
7	GE 7FA.05-01	409449	3723146	3.66	45.7	350	11.8	6.10
	GE 7FA.05-02	409474	3723182	3.66	45.7	350	11.8	6.10
	GE LMS 100PB-01	409149	3723193	3.66	24.4	748	23.6	4.11
	GE LMS 100PB-02	409185	3723168	3.66	24.4	748	23.6	4.11
8	GE 7FA.05-01	409449	3723146	3.66	45.7	378	20.2	6.10
	GE 7FA.05-02	409474	3723182	3.66	45.7	378	20.2	6.10
	GE LMS 100PB-01	409149	3723193	3.66	24.4	726	29.4	4.11
	GE LMS 100PB-02	409185	3723168	3.66	24.4	726	29.4	4.11
9	GE 7FA.05-01	409449	3723146	3.66	45.7	379	18.0	6.10
	GE 7FA.05-02	409474	3723182	3.66	45.7	379	18.0	6.10
	GE LMS 100PB-01	409149	3723193	3.66	24.4	746	27.1	4.11
	GE LMS 100PB-02	409185	3723168	3.66	24.4	746	27.1	4.11
10	GE 7FA.05-01	409449	3723146	3.66	45.7	365	13.9	6.10
	GE 7FA.05-02	409474	3723182	3.66	45.7	365	13.9	6.10
	GE LMS 100PB-01	409149	3723193	3.66	24.4	769	23.7	4.11
	GE LMS 100PB-02	409185	3723168	3.66	24.4	769	23.7	4.11
11	GE 7FA.05-01	409449	3723146	3.66	45.7	358	12.1	6.10
	GE 7FA.05-02	409474	3723182	3.66	45.7	358	12.1	6.10
	GE LMS 100PB-01	409149	3723193	3.66	24.4	809	20.0	4.11
	GE LMS 100PB-02	409185	3723168	3.66	24.4	809	20.0	4.11
N/A	Auxiliary Boiler	409438	3723236	3.66	24.4	432	21.2	0.91

Amended Huntington Beach Energy Project
Table 5.1C.9
Operational Emission Rates
September 2015

GE 7FA.05 Per Turbine Emission Rates

Exhaust	1-hour NO_2		1-hour CO		8-hour CO		1-hour SO_2		3-hour SO_2		24-hour SO_2		24-hour PM_{10}		24-hour $PM_{2.5}$		Annual NO_2		Annual PM_{10}		Annual $PM_{2.5}$	
Scenario	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)
Scenario 1	7.69	61.0	41.0	325	12.3	97.9	0.61	4.86	0.61	4.86	0.61	4.86	1.13	9.00	1.13	9.00	-	-	-	-	-	-
Scenario 2	7.69	61.0	41.0	325	12.2	96.4	0.48	3.84	0.48	3.84	0.48	3.84	1.13	9.00	1.13	9.00	-	-	-	-	-	-
Scenario 3	7.69	61.0	41.0	325	12.0	95.2	0.37	2.95	0.37	2.95	0.37	2.95	1.13	9.00	1.13	9.00	-	-	-	-	-	-
Scenario 4	7.18	57.0	36.2	287	11.0	87.5	0.61	4.81	0.61	4.81	0.61	4.81	1.13	9.00	1.13	9.00	1.63	13.0	0.86	6.79	0.86	6.79
Scenario 5	7.18	57.0	36.2	287	11.0	87.4	0.60	4.78	0.60	4.78	0.60	4.78	1.13	9.00	1.13	9.00	1.61	12.8	0.86	6.79	0.86	6.79
Scenario 6	7.18	57.0	36.2	287	10.8	85.9	0.47	3.72	0.47	3.72	0.47	3.72	1.13	9.00	1.13	9.00	1.30	10.3	0.86	6.79	0.86	6.79
Scenario 7	7.18	57.0	36.2	287	10.7	84.6	0.35	2.79	0.35	2.79	0.35	2.79	1.13	9.00	1.13	9.00	1.02	8.12	0.86	6.79	0.86	6.79
Scenario 8	6.68	53.0	27.7	220	8.80	69.9	0.58	4.60	0.58	4.60	0.58	4.60	1.13	9.00	1.13	9.00	-	-	-	-	-	-
Scenario 9	6.68	53.0	27.7	220	8.72	69.2	0.52	4.16	0.52	4.16	0.52	4.16	1.13	9.00	1.13	9.00	-	-	-	-	-	-
Scenario 10	6.68	53.0	27.7	220	8.57	68.0	0.42	3.33	0.42	3.33	0.42	3.33	1.13	9.00	1.13	9.00	-	-	-	-	-	-
Scenario 11	6.68	53.0	27.7	220	8.46	67.1	0.34	2.67	0.34	2.67	0.34	2.67	1.13	9.00	1.13	9.00	-	-	-	-	-	-

GE LMS 100PB Per Turbine Emission Rates

Exhaust	1-hour NO_2		1-hour CO		8-hour CO		1-hour SO_2		3-hour SO_2		24-hour SO_2		24-hour PM_{10}		24-hour $PM_{2.5}$		Annual NO_2		Annual PM_{10}		Annual $PM_{2.5}$	
Scenario	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)
Scenario 1	2.78	22.0	5.77	45.8	2.20	17.5	0.20	1.63	0.20	1.63	0.20	1.63	0.79	6.24	0.79	6.24	-	-	-	-	-	-
Scenario 2	2.72	21.6	5.71	45.3	2.04	16.2	0.17	1.32	0.17	1.32	0.17	1.32	0.79	6.24	0.79	6.24	-	-	-	-	-	-
Scenario 3	2.67	21.2	5.66	44.9	1.89	15.0	0.13	1.02	0.13	1.02	0.13	1.02	0.79	6.24	0.79	6.24	-	-	-	-	-	-
Scenario 4	2.78	22.1	5.77	45.8	2.20	17.5	0.21	1.64	0.21	1.64	0.21	1.64	0.79	6.24	0.79	6.24	0.24	1.88	0.13	1.00	0.13	1.00
Scenario 5	2.77	22.0	5.76	45.7	2.19	17.4	0.20	1.61	0.20	1.61	0.20	1.61	0.79	6.24	0.79	6.24	0.23	1.86	0.13	1.00	0.13	1.00
Scenario 6	2.72	21.6	5.71	45.3	2.04	16.2	0.16	1.31	0.16	1.31	0.16	1.31	0.79	6.24	0.79	6.24	0.21	1.66	0.13	1.00	0.13	1.00
Scenario 7	2.67	21.2	5.66	44.9	1.89	15.0	0.13	1.01	0.13	1.01	0.13	1.01	0.79	6.24	0.79	6.24	0.18	1.46	0.13	1.00	0.13	1.00
Scenario 8	2.73	21.7	5.72	45.4	2.06	16.4	0.17	1.36	0.17	1.36	0.17	1.36	0.79	6.24	0.79	6.24	-	-	-	-	-	-
Scenario 9	2.70	21.5	5.69	45.2	1.99	15.8	0.15	1.22	0.15	1.22	0.15	1.22	0.79	6.24	0.79	6.24	-	-	-	-	-	-
Scenario 10	2.67	21.2	5.66	44.9	1.89	15.0	0.13	1.01	0.13	1.01	0.13	1.01	0.79	6.24	0.79	6.24	-	-	-	-	-	-
Scenario 11	2.63	20.9	5.62	44.6	1.78	14.1	0.10	0.80	0.10	0.80	0.10	0.80	0.79	6.24	0.79	6.24	-	-	-	-	-	-

Auxiliary Boiler Emission Rates

Exhaust	1-hour NO_2		1-hour CO		8-hour CO		1-hour SO_2		3-hour SO_2		24-hour SO_2		24-hour PM_{10}		24-hour $PM_{2.5}$		Annual NO_2		Annual PM_{10}		Annual $PM_{2.5}$	
Scenario	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)
N/A	0.027	0.21	0.18	1.42	0.14	1.09	0.0030	0.024	0.0030	0.024	0.0018	0.014	0.012	0.091	0.012	0.091	0.017	0.14	0.010	0.082	0.010	0.082

Amended Huntington Beach Energy Project
Table 5.1C.10
Operational Building Parameters
September 2015

Building Name	Number of Tiers	Tier Number	Base Elevation (m)	Tier Height (m)	Number of Corners	Corner 1 East (X) (m)	Corner 1 North (Y) (m)	Corner 2 East (X) (m)	Corner 2 North (Y) (m)	Corner 3 East (X) (m)	Corner 3 North (Y) (m)	Corner 4 East (X) (m)	Corner 4 North (Y) (m)	Corner 5 East (X) (m)	Corner 5 North (Y) (m)	Corner 6 East (X) (m)	Corner 6 North (Y) (m)	Corner 7 East (X) (m)	Corner 7 North (Y) (m)	Corner 8 East (X) (m)	Corner 8 North (Y) (m)	Corner 9 East (X) (m)	Corner 9 North (Y) (m)
'AIRIN3'	1	-	3.66	21.6	9	409385	3723198	409377	3723187	409384	3723182	409387	3723182	409395	3723177	409401	3723185	409393	3723191	409391	3723194	409385	3723198
'AIRIN4'	1	-	3.66	21.6	9	409426	3723221	409421	3723213	409412	3723218	409409	3723219	409402	3723223	409410	3723234	409416	3723230	409418	3723227	409426	3723221
'HRSG1'	1	-	3.66	25.6	5	409424	3723169	409447	3723152	409443	3723145	409418	3723162	409424	3723169								
'HRSG2'	1	-	3.66	25.6	5	409449	3723205	409473	3723188	409468	3723182	409444	3723198	409449	3723205								
'ACC'	1	-	3.66	33.5	5	409549	3723302	409551	3723173	409512	3723173	409510	3723301	409549	3723302								
'STG'	1	-	3.66	17.9	5	409482	3723251	409490	3723251	409490	3723235	409482	3723235	409482	3723251								
'WALL1'	1	-	3.66	15.2	9	409566	3723274	409567	3723158	409519	3723157	409437	3723109	409436	3723110	409519	3723158	409566	3723159	409565	3723274	409566	3723274
'WALL2'	1	-	3.66	6.1	7	409447	3723302	409427	3723301	409402	3723266	409402	3723265	409427	3723301	409447	3723301	409447	3723301				
'AIRIN1'	1	-	3.66	15.6	5	409161	3723216	409148	3723225	409142	3723217	409155	3723207	409161	3723216								
'AIRIN2'	1	-	3.66	15.6	5	409196	3723179	409202	3723187	409216	3723178	409210	3723169	409196	3723179								
'CTG1'	1	-	3.66	9.4	7	409160	3723207	409158	3723209	409151	3723201	409147	3723197	409153	3723193	409156	3723198	409160	3723207				
'CTG2'	1	-	3.66	9.4	7	409194	3723184	409197	3723182	409192	3723172	409190	3723168	409184	3723172	409187	3723176	409194	3723184				

Amended Huntington Beach Energy Project
Table 5.1C.11a
Operational Results – Load Analysis
September 2015

32°F Ambient Temperature Scenarios

		NO_2 (µg/m^3) [b]		CO (µg/m^3)		SO_2 (µg/m^3)				PM_{10} (µg/m^3)	$PM_{2.5}$ (µg/m^3)
Scenario [a]	Year	1-hour	1-hour (federal) [c]	1-hour	8-hour	1-hour	1-hour (federal)	3-hour	24-hour	24-hour	24-hour
GE 7FA.05 Max. Load/ GE LMS 100PB Max. Load	2010	43.2	102	288	25.8	4.28	2.08	2.92	0.53	1.07	0.71
	2011	22.2	105	148	24.0	2.20	1.79	1.57	0.42	0.86	0.70
	2012	43.0	102	287	25.5	4.26	1.73	1.68	0.63	1.23	0.73
	2013	21.5	102	143	25.5	2.13	1.77	1.59	0.47	0.97	0.73
	2014	41.5	103	276	26.2	4.11	2.13	2.21	0.53	1.06	0.77
GE 7FA.05 Max. Load/ GE LMS 100PB Ave. Load	2010	43.2	102	288	25.8	4.28	2.08	2.92	0.53	1.07	0.72
	2011	22.2	105	148	24.0	2.20	1.79	1.57	0.42	0.88	0.73
	2012	43.0	103	287	25.5	4.26	1.73	1.68	0.63	1.25	0.74
	2013	21.5	103	143	25.5	2.13	1.77	1.59	0.47	0.98	0.75
	2014	41.5	103	276	26.2	4.11	2.13	2.21	0.53	1.08	0.79
GE 7FA.05 Max. Load/ GE LMS 100PB Min. Load	2010	43.2	102	288	25.8	4.28	2.08	2.92	0.53	1.08	0.73
	2011	22.2	105	148	24.1	2.20	1.79	1.57	0.42	0.90	0.75
	2012	43.0	103	287	25.5	4.26	1.73	1.67	0.62	1.26	0.76
	2013	21.6	103	143	25.5	2.13	1.77	1.58	0.47	0.99	0.78
	2014	41.5	103	276	26.2	4.11	2.12	2.21	0.53	1.10	0.82
GE 7FA.05 Ave. Load/ GE LMS 100PB Max. Load	2010	64.0	118	427	59.1	5.02	4.31	4.13	1.19	2.88	1.31
	2011	58.0	108	386	51.4	4.52	3.76	3.40	0.69	1.70	1.31
	2012	68.9	108	459	62.4	5.37	3.67	3.54	1.04	2.51	1.53
	2013	57.8	105	385	64.5	4.51	3.75	3.80	0.88	2.16	1.32
	2014	67.8	106	452	56.6	5.28	4.24	4.02	0.99	2.46	1.39
GE 7FA.05 Ave. Load/ GE LMS 100PB Ave. Load	2010	64.0	118	427	59.1	5.02	4.31	4.13	1.19	2.88	1.32
	2011	58.0	108	387	51.4	4.52	3.76	3.40	0.69	1.71	1.32
	2012	68.9	108	459	62.5	5.37	3.67	3.54	1.04	2.52	1.53
	2013	57.8	105	385	64.5	4.51	3.75	3.80	0.88	2.16	1.33
	2014	67.8	106	452	56.6	5.28	4.24	4.02	0.99	2.47	1.40
GE 7FA.05 Ave. Load/ GE LMS 100PB Min. Load	2010	64.0	118	427	59.1	5.01	4.31	4.13	1.19	2.88	1.32
	2011	58.0	109	387	51.5	4.52	3.76	3.40	0.69	1.72	1.33
	2012	68.9	108	459	62.5	5.37	3.67	3.54	1.04	2.53	1.54
	2013	57.8	105	385	64.5	4.51	3.75	3.80	0.88	2.16	1.33
	2014	67.8	106	452	56.6	5.28	4.24	4.02	0.99	2.48	1.40
GE 7FA.05 Min. Load/ GE LMS 100PB Max. Load	2010	88.6	140	591	111	5.36	4.75	4.31	1.51	4.68	2.65
	2011	84.8	121	565	104	5.13	4.60	4.52	1.19	3.71	2.68
	2012	89.3	128	595	118	5.41	4.78	4.94	1.51	4.63	2.85
	2013	87.9	117	586	104	5.33	4.86	4.77	1.34	4.14	2.99
	2014	94.0	123	626	105	5.69	5.01	4.64	1.51	4.70	3.21
GE 7FA.05 Min. Load/ GE LMS 100PB Ave. Load	2010	88.6	140	591	111	5.36	4.75	4.31	1.51	4.68	2.65
	2011	84.8	121	565	104	5.13	4.60	4.52	1.19	3.71	2.68
	2012	89.3	128	595	118	5.41	4.78	4.94	1.51	4.63	2.85
	2013	88.0	117	586	104	5.33	4.86	4.77	1.34	4.15	2.99
	2014	94.0	123	626	105	5.69	5.01	4.64	1.51	4.71	3.21
GE 7FA.05 Min. Load/ GE LMS 100PB Min. Load	2010	88.6	140	591	111	5.36	4.75	4.31	1.51	4.68	2.65
	2011	84.8	121	565	104	5.13	4.60	4.52	1.19	3.71	2.69
	2012	89.3	128	595	118	5.41	4.78	4.94	1.51	4.64	2.86
	2013	88.0	117	586	104	5.32	4.86	4.77	1.34	4.15	3.00
	2014	94.0	123	627	105	5.69	5.01	4.64	1.51	4.72	3.22

Amended Huntington Beach Energy Project
Table 5.1C.11a
Operational Results – Load Analysis
September 2015

65.8°F Ambient Temperature Scenarios

		NO_2 (µg/m^3) [b]			CO (µg/m^3)		SO_2 (µg/m^3)				PM_{10} (µg/m^3)		$PM_{2.5}$ (µg/m^3)	
Scenario [a]	Year	1-hour	1-hour (federal) [c]	Annual	1-hour	8-hour	1-hour	1-hour (federal)	3-hour	24-hour	24-hour	Annual	24-hour	Annual
GE 7FA.05 Max. Load with Evap./ GE LMS 100PB Max. Load with Evap.	2010	41.0	102	0.25	258	24.4	4.35	2.27	3.02	0.57	1.14	0.18	0.72	0.18
	2011	22.2	105	0.28	140	21.9	2.36	1.85	1.52	0.43	0.89	0.20	0.72	0.20
	2012	41.7	102	0.29	263	24.7	4.43	1.69	1.77	0.67	1.31	0.21	0.74	0.21
	2013	20.9	102	0.32	131	23.4	2.22	1.84	1.69	0.48	0.99	0.23	0.74	0.23
	2014	40.1	103	0.32	253	23.9	4.26	2.21	2.32	0.54	1.09	0.23	0.78	0.23
GE 7FA.05 Max. Load with Evap./ GE LMS 100PB Max. Load	2010	41.0	102	0.25	258	24.4	4.35	2.27	3.02	0.57	1.14	0.18	0.72	0.18
	2011	22.2	105	0.28	140	21.9	2.36	1.85	1.52	0.43	0.89	0.20	0.72	0.20
	2012	41.7	102	0.29	263	24.7	4.43	1.69	1.77	0.67	1.32	0.21	0.74	0.21
	2013	20.9	102	0.32	131	23.4	2.22	1.84	1.69	0.48	0.99	0.23	0.74	0.23
	2014	40.1	103	0.32	253	23.9	4.26	2.21	2.32	0.54	1.09	0.23	0.78	0.23
GE 7FA.05 Max. Load with Evap./ GE LMS 100PB Ave. Load	2010	41.0	102	0.25	258	24.4	4.35	2.27	3.02	0.57	1.14	0.18	0.74	0.18
	2011	22.2	105	0.28	140	22.0	2.36	1.85	1.52	0.43	0.91	0.20	0.74	0.20
	2012	41.7	102	0.29	263	24.7	4.43	1.69	1.77	0.67	1.33	0.21	0.76	0.21
	2013	20.9	102	0.32	132	23.4	2.22	1.84	1.69	0.48	1.00	0.23	0.76	0.23
	2014	40.1	103	0.32	253	23.9	4.26	2.21	2.32	0.54	1.10	0.23	0.81	0.23
GE 7FA.05 Max. Load with Evap./ GE LMS 100PB Min. Load	2010	41.0	102	0.25	258	24.4	4.35	2.27	3.02	0.57	1.14	0.18	0.77	0.18
	2011	22.2	105	0.28	140	22.0	2.36	1.85	1.52	0.43	0.93	0.20	0.76	0.20
	2012	41.7	102	0.29	263	24.7	4.43	1.69	1.77	0.67	1.34	0.21	0.78	0.21
	2013	21.0	102	0.32	132	23.4	2.22	1.84	1.69	0.48	1.01	0.23	0.79	0.23
	2014	40.1	103	0.32	253	24.0	4.26	2.21	2.32	0.54	1.12	0.23	0.84	0.23
GE 7FA.05 Max. Load/ GE LMS 100PB Max. Load with Evap.	2010	40.8	102	0.24	257	24.0	4.26	2.16	2.95	0.55	1.11	0.17	0.71	0.17
	2011	21.4	105	0.27	135	21.6	2.24	1.88	1.52	0.42	0.87	0.20	0.71	0.20
	2012	41.1	102	0.29	259	24.5	4.30	1.64	1.70	0.66	1.30	0.21	0.73	0.21
	2013	20.6	102	0.31	130	23.2	2.15	1.80	1.62	0.47	0.98	0.23	0.74	0.23
	2014	39.6	103	0.32	250	23.7	4.14	2.12	2.24	0.53	1.08	0.23	0.77	0.23
GE 7FA.05 Max. Load/ GE LMS 100PB Max. Load	2010	40.8	102	0.24	257	24.0	4.26	2.16	2.95	0.55	1.11	0.17	0.71	0.17
	2011	21.4	105	0.27	135	21.6	2.24	1.88	1.51	0.42	0.87	0.20	0.71	0.20
	2012	41.1	102	0.28	259	24.5	4.30	1.64	1.70	0.66	1.30	0.21	0.73	0.21
	2013	20.6	102	0.31	130	23.2	2.15	1.80	1.62	0.47	0.98	0.23	0.74	0.23
	2014	39.6	103	0.31	250	23.7	4.14	2.12	2.23	0.53	1.08	0.23	0.77	0.23
GE 7FA.05 Max. Load/ GE LMS 100PB Ave. Load	2010	40.8	102	0.24	257	24.0	4.26	2.16	2.95	0.55	1.11	0.17	0.73	0.17
	2011	21.4	105	0.27	135	21.7	2.24	1.88	1.51	0.42	0.88	0.20	0.73	0.20
	2012	41.1	102	0.29	259	24.5	4.30	1.64	1.70	0.65	1.32	0.21	0.75	0.21
	2013	20.6	102	0.31	130	23.2	2.15	1.79	1.62	0.47	0.99	0.23	0.76	0.23
	2014	39.6	103	0.31	250	23.7	4.14	2.12	2.23	0.53	1.10	0.23	0.80	0.23
GE 7FA.05 Max. Load/ GE LMS 100PB Min. Load	2010	40.8	102	0.24	257	24.0	4.26	2.16	2.95	0.55	1.11	0.18	0.76	0.18
	2011	21.4	105	0.27	135	21.7	2.24	1.88	1.51	0.41	0.90	0.20	0.75	0.20
	2012	41.1	102	0.29	259	24.5	4.30	1.64	1.70	0.65	1.33	0.21	0.77	0.21
	2013	20.7	102	0.31	130	23.2	2.15	1.79	1.62	0.47	1.00	0.23	0.78	0.23
	2014	39.6	103	0.31	250	23.8	4.14	2.12	2.23	0.53	1.12	0.23	0.83	0.23

Amended Huntington Beach Energy Project
Table 5.1C.11a
Operational Results – Load Analysis
September 2015

	2010	64.7	121	0.36	409	62.2	5.32	4.60	4.30	1.31	3.22	0.31	1.51	0.31
GE 7FA.05 Ave. Load/	2011	58.6	108	0.39	370	53.7	4.80	4.12	3.79	0.80	2.00	0.34	1.43	0.34
GE LMS 100PB Max.	2012	67.5	108	0.41	426	69.0	5.52	4.07	3.93	1.10	2.73	0.36	1.63	0.36
Load with Evap.	2013	55.7	105	0.44	351	66.0	4.56	4.15	4.22	0.99	2.47	0.38	1.53	0.38
	2014	67.1	107	0.43	423	64.6	5.49	4.59	4.29	1.24	3.10	0.38	1.51	0.38
	2010	64.7	121	0.36	409	62.2	5.32	4.60	4.30	1.31	3.22	0.31	1.51	0.31
GE 7FA.05 Ave. Load/	2011	58.6	108	0.39	370	53.7	4.80	4.12	3.79	0.80	2.00	0.34	1.43	0.34
GE LMS 100PB Max.	2012	67.5	108	0.41	426	69.0	5.52	4.07	3.93	1.10	2.73	0.36	1.63	0.36
Load	2013	55.7	105	0.43	351	66.0	4.56	4.15	4.22	0.99	2.47	0.38	1.53	0.38
	2014	67.1	107	0.43	423	64.6	5.49	4.59	4.29	1.24	3.10	0.38	1.51	0.38
	2010	64.7	121	0.36	409	62.2	5.32	4.59	4.30	1.31	3.22	0.31	1.52	0.31
GE 7FA.05 Ave. Load/	2011	58.7	108	0.39	370	53.7	4.80	4.12	3.79	0.80	2.00	0.34	1.44	0.34
GE LMS 100PB Ave.	2012	67.5	108	0.42	426	69.0	5.52	4.07	3.93	1.10	2.74	0.36	1.64	0.36
Load	2013	55.7	105	0.44	351	66.0	4.56	4.15	4.22	0.99	2.47	0.38	1.53	0.38
	2014	67.1	107	0.43	423	64.6	5.49	4.59	4.29	1.24	3.11	0.38	1.52	0.38
	2010	64.7	121	0.36	409	62.3	5.32	4.59	4.30	1.31	3.22	0.32	1.53	0.32
GE 7FA.05 Ave. Load/	2011	58.7	108	0.39	370	53.7	4.80	4.12	3.79	0.80	2.01	0.34	1.45	0.34
GE LMS 100PB Min.	2012	67.5	108	0.41	426	69.0	5.52	4.07	3.93	1.10	2.75	0.36	1.64	0.36
Load	2013	55.7	105	0.43	351	66.0	4.56	4.15	4.22	0.99	2.47	0.38	1.54	0.38
	2014	67.1	107	0.43	423	64.6	5.49	4.59	4.29	1.24	3.12	0.38	1.53	0.38
	2010	85.3	137	0.48	538	111	5.22	4.73	4.32	1.50	4.91	0.50	2.87	0.50
GE 7FA.05 Min. Load/	2011	81.6	124	0.48	515	98.6	5.01	4.58	4.48	1.21	3.97	0.51	2.82	0.51
GE LMS 100PB Max.	2012	87.3	130	0.53	551	111	5.36	4.72	4.94	1.66	5.37	0.55	3.04	0.55
Load with Evap.	2013	86.2	117	0.54	544	98.4	5.29	4.80	4.71	1.27	4.15	0.57	3.43	0.57
	2014	91.6	123	0.56	578	104	5.62	4.87	4.62	1.54	5.06	0.58	3.48	0.58
	2010	85.3	137	0.48	538	111	5.22	4.73	4.32	1.50	4.91	0.50	2.87	0.50
GE 7FA.05 Min. Load/	2011	81.6	124	0.48	515	98.6	5.00	4.58	4.48	1.21	3.97	0.51	2.82	0.51
GE LMS 100PB Max.	2012	87.3	130	0.53	551	111	5.36	4.72	4.94	1.66	5.37	0.55	3.04	0.55
Load	2013	86.2	117	0.54	544	98.4	5.29	4.80	4.70	1.27	4.15	0.57	3.43	0.57
	2014	91.6	123	0.56	578	104	5.62	4.87	4.62	1.54	5.06	0.58	3.48	0.58
	2010	85.3	137	0.48	538	111	5.22	4.73	4.32	1.50	4.91	0.50	2.87	0.50
GE 7FA.05 Min. Load/	2011	81.6	124	0.48	515	98.6	5.00	4.58	4.48	1.21	3.97	0.51	2.82	0.51
GE LMS 100PB Ave.	2012	87.3	130	0.53	551	111	5.36	4.72	4.94	1.66	5.38	0.55	3.04	0.55
Load	2013	86.2	117	0.54	544	98.4	5.29	4.80	4.70	1.27	4.15	0.57	3.43	0.57
	2014	91.6	123	0.56	578	104	5.62	4.87	4.62	1.54	5.07	0.58	3.48	0.58
	2010	85.3	137	0.48	538	111	5.22	4.73	4.32	1.50	4.91	0.50	2.87	0.50
GE 7FA.05 Min. Load/	2011	81.6	124	0.48	515	98.6	5.00	4.58	4.48	1.21	3.97	0.51	2.82	0.51
GE LMS 100PB Min.	2012	87.4	130	0.53	551	111	5.36	4.72	4.94	1.66	5.38	0.56	3.05	0.56
Load	2013	86.2	117	0.54	544	98.4	5.29	4.80	4.70	1.27	4.15	0.57	3.44	0.57
	2014	91.7	123	0.56	578	104	5.62	4.87	4.62	1.54	5.07	0.59	3.48	0.59

Amended Huntington Beach Energy Project
Table 5.1C.11a
Operational Results – Load Analysis
September 2015

110°F Ambient Temperature Scenarios

		NO_2 (µg/m^3) [b]		CO (µg/m^3)		SO_2 (µg/m^3)				PM_{10} (µg/m^3)	$PM_{2.5}$ (µg/m^3)
Scenario [a]	Year	1-hour	1-hour (federal) [c]	1-hour	8-hour	1-hour	1-hour (federal)	3-hour	24-hour	24-hour	24-hour
GE 7FA.05 Max. Load with Evap./ GE LMS 100PB Max. Load with Evap.	2010	37.8	102	196	19.3	4.11	2.01	2.80	0.51	1.08	0.71
	2011	19.3	104	100	17.5	2.09	1.73	1.43	0.40	0.87	0.71
	2012	37.4	102	194	18.6	4.06	1.64	1.59	0.60	1.24	0.73
	2013	18.7	102	96.4	18.5	2.02	1.63	1.50	0.45	0.97	0.74
	2014	36.3	102	188	19.1	3.94	2.01	2.11	0.50	1.06	0.78
GE 7FA.05 Max. Load with Evap./ GE LMS 100PB Max. Load	2010	37.8	102	196	19.3	4.11	2.01	2.80	0.51	1.08	0.73
	2011	19.3	104	100	17.6	2.09	1.73	1.43	0.40	0.87	0.72
	2012	37.4	102	194	18.6	4.06	1.64	1.59	0.60	1.25	0.74
	2013	18.7	102	96.4	18.5	2.01	1.63	1.50	0.44	0.98	0.75
	2014	36.3	102	188	19.2	3.94	2.01	2.11	0.49	1.07	0.79
GE 7FA.05 Max. Load with Evap./ GE LMS 100PB Ave. Load	2010	37.8	102	196	19.3	4.11	2.01	2.80	0.51	1.08	0.74
	2011	19.3	104	100	17.6	2.09	1.73	1.43	0.40	0.89	0.74
	2012	37.4	102	194	18.6	4.06	1.64	1.59	0.60	1.26	0.76
	2013	18.7	102	96.5	18.5	2.01	1.63	1.50	0.44	0.99	0.77
	2014	36.3	102	188	19.2	3.94	2.01	2.11	0.49	1.08	0.81
GE 7FA.05 Max. Load with Evap./ GE LMS 100PB Min. Load	2010	37.8	102	196	19.3	4.11	2.01	2.80	0.51	1.08	0.75
	2011	19.3	105	100	17.6	2.09	1.73	1.43	0.40	0.90	0.77
	2012	37.4	102	194	18.6	4.06	1.64	1.59	0.59	1.28	0.78
	2013	18.7	102	96.5	18.5	2.01	1.63	1.49	0.44	1.00	0.79
	2014	36.3	102	188	19.2	3.94	2.01	2.11	0.49	1.10	0.84
GE 7FA.05 Max. Load/ GE LMS 100PB Max. Load with Evap.	2010	44.5	102	231	25.9	4.33	2.67	3.20	0.69	1.57	0.82
	2011	29.0	105	150	19.7	2.82	1.95	1.51	0.41	0.99	0.81
	2012	45.7	102	237	22.8	4.44	2.05	1.96	0.66	1.50	0.90
	2013	23.6	102	122	25.3	2.30	1.95	1.96	0.54	1.26	0.81
	2014	44.3	103	230	24.1	4.31	2.50	2.68	0.58	1.33	0.85
GE 7FA.05 Max. Load/ GE LMS 100PB Max. Load	2010	44.5	102	231	25.9	4.33	2.67	3.20	0.69	1.57	0.82
	2011	29.0	105	150	19.7	2.82	1.95	1.51	0.41	0.99	0.82
	2012	45.7	102	237	22.8	4.44	2.05	1.96	0.66	1.50	0.91
	2013	23.6	102	122	25.3	2.30	1.95	1.96	0.54	1.27	0.82
	2014	44.3	103	230	24.1	4.31	2.50	2.68	0.57	1.34	0.86
GE 7FA.05 Max. Load/ GE LMS 100PB Ave. Load	2010	44.5	102	231	25.9	4.33	2.67	3.20	0.69	1.57	0.84
	2011	29.0	105	150	19.7	2.82	1.95	1.51	0.41	1.00	0.83
	2012	45.7	102	237	22.8	4.44	2.05	1.96	0.66	1.51	0.91
	2013	23.6	102	122	25.3	2.30	1.95	1.96	0.54	1.27	0.83
	2014	44.3	103	230	24.1	4.31	2.50	2.68	0.57	1.35	0.88
GE 7FA.05 Max. Load/ GE LMS 100PB Min. Load	2010	44.5	102	231	25.9	4.33	2.67	3.20	0.69	1.57	0.86
	2011	29.0	105	150	19.8	2.82	1.95	1.51	0.41	1.02	0.84
	2012	45.7	102	237	22.9	4.44	2.05	1.96	0.66	1.52	0.92
	2013	23.6	102	122	25.3	2.30	1.94	1.96	0.54	1.28	0.85
	2014	44.3	103	230	24.2	4.31	2.50	2.68	0.57	1.36	0.90

Amended Huntington Beach Energy Project

Table 5.1C.11a

Operational Results – Load Analysis

September 2015

GE 7FA.05 Ave. Load/ GE LMS 100PB Max. Load with Evap.	2010	61.8	121	321	49.5	4.87	4.25	3.98	1.22	3.35	1.48
	2011	56.7	107	294	43.7	4.45	3.84	3.46	0.73	2.03	1.42
	2012	64.6	107	335	55.1	5.07	3.68	3.59	0.98	2.73	1.59
	2013	51.9	104	269	53.2	4.08	3.81	3.81	0.90	2.50	1.52
	2014	63.8	106	331	52.8	5.01	4.17	3.92	1.13	3.16	1.46
GE 7FA.05 Ave. Load/ GE LMS 100PB Max. Load	2010	61.8	121	321	49.5	4.87	4.25	3.98	1.22	3.35	1.48
	2011	56.7	107	294	43.7	4.45	3.84	3.46	0.73	2.03	1.42
	2012	64.6	107	335	55.1	5.07	3.68	3.59	0.98	2.73	1.60
	2013	51.9	104	269	53.2	4.08	3.81	3.81	0.90	2.50	1.52
	2014	63.8	106	331	52.8	5.01	4.17	3.92	1.13	3.16	1.46
GE 7FA.05 Ave. Load/ GE LMS 100PB Ave. Load	2010	61.8	121	321	49.6	4.87	4.25	3.98	1.22	3.35	1.49
	2011	56.7	107	294	43.8	4.45	3.84	3.46	0.73	2.04	1.43
	2012	64.6	107	335	55.1	5.07	3.67	3.59	0.98	2.73	1.61
	2013	51.9	104	269	53.2	4.08	3.81	3.81	0.90	2.50	1.52
	2014	63.8	106	331	52.9	5.01	4.17	3.92	1.13	3.17	1.46
GE 7FA.05 Ave. Load/ GE LMS 100PB Min. Load	2010	61.8	121	321	49.6	4.87	4.25	3.98	1.22	3.35	1.50
	2011	56.7	107	294	43.8	4.45	3.84	3.46	0.73	2.05	1.44
	2012	64.6	107	335	55.1	5.07	3.67	3.59	0.98	2.74	1.62
	2013	51.9	104	269	53.2	4.08	3.81	3.81	0.90	2.50	1.53
	2014	63.8	106	331	52.9	5.01	4.17	3.92	1.13	3.18	1.46
GE 7FA.05 Min. Load/ GE LMS 100PB Max. Load with Evap.	2010	74.5	127	387	75.1	4.76	4.20	3.79	1.33	4.47	2.38
	2011	70.2	117	365	64.0	4.50	3.99	3.93	0.95	3.20	2.43
	2012	72.7	116	377	77.6	4.65	4.11	4.20	1.23	4.09	2.53
	2013	71.5	109	372	69.2	4.58	4.12	4.18	1.12	3.76	2.67
	2014	77.5	111	403	70.2	4.97	4.31	3.98	1.25	4.21	2.78
GE 7FA.05 Min. Load/ GE LMS 100PB Max. Load	2010	74.5	127	387	75.1	4.76	4.20	3.79	1.33	4.47	2.38
	2011	70.2	117	365	64.1	4.50	3.99	3.93	0.94	3.20	2.43
	2012	72.7	116	377	77.6	4.65	4.11	4.20	1.23	4.10	2.53
	2013	71.5	109	372	69.2	4.58	4.12	4.18	1.12	3.76	2.68
	2014	77.5	111	403	70.2	4.96	4.31	3.98	1.25	4.21	2.78
GE 7FA.05 Min. Load/ GE LMS 100PB Ave. Load	2010	74.5	127	387	75.1	4.76	4.20	3.79	1.33	4.47	2.39
	2011	70.2	117	365	64.1	4.50	3.99	3.93	0.94	3.21	2.43
	2012	72.7	116	377	77.6	4.64	4.11	4.20	1.23	4.10	2.53
	2013	71.5	109	372	69.2	4.58	4.12	4.18	1.12	3.76	2.68
	2014	77.5	111	403	70.2	4.96	4.31	3.98	1.25	4.22	2.78
GE 7FA.05 Min. Load/ GE LMS 100PB Min. Load	2010	74.5	127	387	75.1	4.76	4.20	3.79	1.33	4.47	2.39
	2011	70.2	117	365	64.1	4.50	3.99	3.93	0.94	3.22	2.43
	2012	72.7	116	377	77.7	4.64	4.11	4.20	1.23	4.10	2.54
	2013	71.5	109	372	69.2	4.58	4.12	4.18	1.12	3.76	2.68
	2014	77.6	111	403	70.2	4.96	4.31	3.98	1.25	4.22	2.79

[a] All modeled scenarios include two GE 7FA.05 turbines, two GE LMS 100PB turbines, and the auxiliary boiler.

[b] The maximum 1-hour and annual NO_2 concentrations include ambient NO_2 ratios of 0.80 (EPA, 2011) and 0.75 (EPA, 2005), respectively.

[c] The total predicted concentration for the federal 1-hour NO_2 standard is the high-8th-high modeled concentration paired with 98th percentile seasonal hour-of-day background concentrations for 2010 through 2012.

Amended Huntington Beach Energy Project
Table 5.1C.11b
Operational Results – SCAQMD Rule 2005
September 2015

GE 7FA.05 Unit 1

Year	1-hour Concentration (µg/m³)	1-hour Federal Concentration (µg/m³)	Annual Concentration (µg/m³)
2010	38.9	40.0	0.17
2011	34.5	35.5	0.17
2012	38.9	41.0	0.19
2013	42.2	43.8	0.19
2014	43.1	39.4	0.19

GE 7FA.05 Unit 2

Year	1-hour Concentration (µg/m³)	1-hour Federal Concentration (µg/m³)	Annual Concentration (µg/m³)
2010	60.3	52.0	0.23
2011	53.3	49.1	0.24
2012	52.7	51.2	0.27
2013	58.5	62.0	0.26
2014	55.0	53.6	0.27

GE LMS 100PB Unit 1

Year	1-hour Concentration (µg/m³)	1-hour Federal Concentration (µg/m³)	Annual Concentration (µg/m³)
2010	2.94	2.96	0.011
2011	3.03	3.05	0.013
2012	3.09	3.11	0.013
2013	3.12	3.14	0.015
2014	2.60	2.61	0.015

GE LMS 100PB Unit 2

Year	1-hour Concentration (µg/m³)	1-hour Federal Concentration (µg/m³)	Annual Concentration (µg/m³)
2010	2.95	2.97	0.011
2011	3.01	3.03	0.013
2012	3.12	3.14	0.013
2013	3.07	3.10	0.015
2014	2.88	2.91	0.015

Auxiliary Boiler

Year	1-hour Concentration (µg/m³)	1-hour Federal Concentration (µg/m³)	Annual Concentration (µg/m³)
2010	1.36	1.36	0.13
2011	1.27	1.27	0.13
2012	1.33	1.33	0.14
2013	1.16	1.16	0.13
2014	1.19	1.19	0.13

The maximum 1-hour and annual NO_2 concentrations include ambient NO_2 ratios of 0.80 (EPA, 2011) and 0.75 (EPA, 2005), respectively.

Amended Huntington Beach Energy Project
Table 5.1C.11c
Operational Results – Class II SIL and Increment
September 2015

	NO_2 (µg/m^3) [a]		CO (µg/m^3)		PM_{10} (µg/m^3)	
Year	1-hour	Annual	1-hour	8-hour	24-hour [b]	Annual
2010	88.6	0.48	591	111	4.65	0.50
2011	84.8	0.48	565	104	3.62	0.51
2012	89.3	0.53	595	118	4.93	0.56
2013	88.0	0.54	586	104	3.81	0.57
2014	94.0	0.56	627	105	4.76	0.59

[a] The maximum 1-hour and annual NO_2 concentrations include ambient NO_2 ratios of 0.80 (EPA, 2011) and 0.75 (EPA, 2005), respectively.
[b] The 24-hour PM_{10} concentration is based on both GE 7FA.05 turbines operating 20 hours per day at minimum load and 4 hours per day at average load.

Amended Huntington Beach Energy Project
Table 5.1C.11d
Operational Results – Class I SIL and Increment
September 2015

Annual NO_2 Concentrations ($\mu g/m^3$) at 50 km Receptor Ring [a]

Year	2010	2011	2012	2013	2014
All	0.0062	0.0061	0.0062	0.0058	0.0054
GE 7FA.05 Unit 1	0.0026	0.0026	0.0026	0.0025	0.0023
GE 7FA.05 Unit 2	0.0026	0.0026	0.0026	0.0025	0.0023
GE LMS 100PB Unit 1	0.0004	0.0004	0.0004	0.0004	0.0004
GE LMS 100PB Unit 2	0.0004	0.0004	0.0004	0.0004	0.0004
Auxiliary Boiler	0.0001	0.0001	0.0001	0.0001	0.0001

24-hour PM_{10} Concentrations ($\mu g/m^3$) at 50 km Receptor Ring

Year	2010	2011	2012	2013	2014
All	0.055	0.054	0.055	0.053	0.046
GE 7FA.05 Unit 1	0.019	0.020	0.019	0.018	0.016
GE 7FA.05 Unit 2	0.019	0.020	0.019	0.018	0.016
GE LMS 100PB Unit 1	0.0098	0.0096	0.011	0.0088	0.0089
GE LMS 100PB Unit 2	0.0097	0.0096	0.010	0.0088	0.0089
Auxiliary Boiler	0.0003	0.0004	0.0003	0.0004	0.0003

Annual PM_{10} Concentrations ($\mu g/m^3$) at 50 km Receptor Ring

Year	2010	2011	2012	2013	2014
All	0.0067	0.0066	0.0067	0.0063	0.0059
GE 7FA.05 Unit 1	0.0030	0.0029	0.0029	0.0028	0.0026
GE 7FA.05 Unit 2	0.0030	0.0029	0.0029	0.0028	0.0026
GE LMS 100PB Unit 1	0.0004	0.0004	0.0004	0.0004	0.0003
GE LMS 100PB Unit 2	0.0004	0.0004	0.0004	0.0004	0.0003
Auxiliary Boiler	5.0E-05	5.0E-05	5.0E-05	5.0E-05	4.0E-05

[a] The maximum annual NO_2 concentrations include an ambient NO_2 ratio of 0.75 (EPA, 2005).

Amended Huntington Beach Energy Project
Table 5.1C.12
Competing Source Stack Parameters
September 2015

Point Sources

Facility	Source ID	Easting (X) (m)	Northing (Y) (m)	Base Elevation (m)	Stack Height (m)	Temperature (K)	Exit Velocity (m/s)	Stack Diameter (m)
HBEP	7FA01	409449	3723146	3.66	45.7	350	11.8	6.10
	7FA02	409474	3723182	3.66	45.7	350	11.8	6.10
	LMS01	409149	3723193	3.66	24.4	748	23.6	4.11
	LMS02	409185	3723168	3.66	24.4	748	23.6	4.11
	AUXBOILER	409438	3723236	3.66	24.4	432	21.2	0.91
Huntington Beach Generating Station (HBGS)	BOILER12	409274	3723095	3.66	61.0	367	7.90	6.27
Orange County Sanitation - Fountain Valley (OCSFV)	1730101	412962	3728359	8.00	7.41	1,089	1.37	2.23
	1730102	412914	3728328	7.70	7.62	475	7.03	0.55
	1730103	412935	3728401	8.00	18.9	533	17.9	0.76
	1730104	412942	3728391	8.00	18.9	533	17.9	0.76
	1730105	412939	3728396	8.00	18.9	533	17.9	0.76
Orange County Sanitation - Huntington Beach (OCSHB)	2911001	411071	3722313	1.60	7.62	475	7.44	0.53
	2911002	411096	3722214	1.60	7.41	1089	1.37	0.68
	2911003	411240	3722455	1.60	18.0	589	22.9	0.76
	2911004	411248	3722455	1.60	18.0	589	22.9	0.76
	2911005	411255	3722455	1.60	18.0	589	22.9	0.76
	2911006	411263	3722455	1.60	18.0	589	22.9	0.76
	2911007	411270	3722455	1.60	18.0	589	22.9	0.76
Beta Offshore (Beta)	16607301	395222	3716431	0	18.3	661	31.1	0.30
	16607302	395222	3716431	0	18.3	641	30.0	0.30
	16607303	395222	3716431	0	18.3	585	24.2	0.30
	16607304	394082	3717932	0	18.3	663	28.7	0.30
	16607305	394082	3717932	0	18.3	684	34.7	0.30
	16607306	394082	3717932	0	18.3	583	21.1	0.30
	16607307	395265	3716554	0	18.3	671	39.4	0.61
	16607308	395265	3716554	0	18.3	671	38.1	0.61
	16607309	395265	3716554	0	18.3	677	37.5	0.61
	16607310	395265	3716554	0	18.3	671	81.2	0.76
	16607311	395265	3716554	0	18.3	669	81.1	0.76
	16607312	395265	3716554	0	18.3	668	81.4	0.76
	16607313	395265	3716554	0	22.9	464	8.35	0.51

Volume Sources

Facility	Source ID	Base Elevation (m)	Release Height (m)	Initial Horizontal Dimension (m)	Initial Vertical Dimension (m)
Shipping Lanes (525 sources)	734601-774425	0	0.0	186	23.3

Competing source data provided by SCAQMD.

Amended Huntington Beach Energy Project
Table 5.1C.13
Competing Source Emission Rates
September 2015

Emission Rates for PSD 1-hour NO_2 Competing Source Modeling

Facility	Source ID	1-hour NO_2 (g/s)	1-hour NO_2 (lb/hr)
HBEP	7FA01	7.18	57.0
	7FA02	7.18	57.0
	LMS01	2.67	21.2
	LMS02	2.67	21.2
	AUXBOILER	0.03	0.21
HBGS	BOILER12	4.32	34.3
OCSFV	1730101	0.65	5.17
	1730102	0.01	0.08
	1730103	0.98	7.78
	1730104	0.98	7.78
	1730105	0.98	7.78
OCSHB	2911001	0.08	0.60
	2911002	0.11	0.87
	2911003	0.87	6.90
	2911004	0.87	6.90
	2911005	0.87	6.90
	2911006	0.87	6.90
	2911007	0.87	6.90
Beta	16607301	1.90	15.1
	16607302	1.90	15.1
	16607303	1.90	15.1
	16607304	1.90	15.1
	16607305	1.90	15.1
	16607306	1.90	15.1
	16607307	0.37	2.94
	16607308	0.31	2.46
	16607309	0.35	2.78
	16607310	2.52	20.0
	16607311	2.48	19.7
	16607312	2.48	19.7
	16607313	10.3	81.6
Shipping Lanes (Total for 525 sources)	734601-774425	25.5	202

Competing source data provided by SCAQMD.

Amended Huntington Beach Energy Project
Table 5.1C.14
Competing Source Results
September 2015

1-hour NO_2 Concentrations ($\mu g/m^3$) [a]

Year	2010	2011	2012	2013	2014
All	140	148	150	146	146
HBEP	75.2	70.6	72.9	74.1	76.0
HBGS	5.15	5.08	5.32	5.12	4.73
OCSFV	8.99	8.98	9.02	8.92	9.06
OCSHB	56.2	54.0	54.1	54.1	53.7
BETA	67.6	68.6	67.0	67.1	66.1
SHIPS	24.3	25.4	25.4	22.8	25.4

[a] The total predicted concentration for the federal 1-hour NO_2 standard is the high-8th-high modeled concentration paired with 98th percentile seasonal hour-of-day background concentrations for 2010 through 2012.

Amended Huntington Beach Energy Project

Table 5.1C.15

Combined Cycle Power Block Operation with Simple Cycle Power Block Construction Stack Parameters

September 2015

Construction Area Poly Sources

Source ID	Base Elevation (m)	Release Height (m)	Number of Vertices	Vertical Dimension (m)	Easting (X1) (m)	Northing (Y1) (m)	Easting (X2) (m)	Northing (Y2) (m)	Easting (X3) (m)	Northing (Y3) (m)	Easting (X4) (m)	Northing (Y4) (m)
FUG	3.66	0.00	4	1.00	409175	3723285	409277	3723213	409206	3723111	409103	3723183

Construction Point Sources

Source ID	Stack Release Type (Beta)	Easting (X) (m)	Northing (Y) (m)	Base Elevation (m)	Stack Height (m)	Temperature (K)	Exit Velocity (m/s)	Stack Diameter (m)
WEST01	Horizontal	409175	3723285	3.66	4.60	533	18.0	0.127
WEST02	Horizontal	409195	3723271	3.66	4.60	533	18.0	0.127
WEST03	Horizontal	409216	3723256	3.66	4.60	533	18.0	0.127
WEST04	Horizontal	409236	3723242	3.66	4.60	533	18.0	0.127
WEST05	Horizontal	409257	3723228	3.66	4.60	533	18.0	0.127
WEST06	Horizontal	409277	3723213	3.66	4.60	533	18.0	0.127
WEST07	Horizontal	409161	3723265	3.66	4.60	533	18.0	0.127
WEST08	Horizontal	409181	3723250	3.66	4.60	533	18.0	0.127
WEST09	Horizontal	409202	3723236	3.66	4.60	533	18.0	0.127
WEST10	Horizontal	409222	3723222	3.66	4.60	533	18.0	0.127
WEST11	Horizontal	409243	3723207	3.66	4.60	533	18.0	0.127
WEST12	Horizontal	409263	3723193	3.66	4.60	533	18.0	0.127
WEST13	Horizontal	409146	3723244	3.66	4.60	533	18.0	0.127
WEST14	Horizontal	409167	3723230	3.66	4.60	533	18.0	0.127
WEST15	Horizontal	409187	3723215	3.66	4.60	533	18.0	0.127
WEST16	Horizontal	409208	3723201	3.66	4.60	533	18.0	0.127
WEST17	Horizontal	409228	3723187	3.66	4.60	533	18.0	0.127
WEST18	Horizontal	409249	3723172	3.66	4.60	533	18.0	0.127
WEST19	Horizontal	409132	3723224	3.66	4.60	533	18.0	0.127
WEST20	Horizontal	409152	3723209	3.66	4.60	533	18.0	0.127
WEST21	Horizontal	409173	3723195	3.66	4.60	533	18.0	0.127
WEST22	Horizontal	409193	3723181	3.66	4.60	533	18.0	0.127
WEST23	Horizontal	409214	3723166	3.66	4.60	533	18.0	0.127
WEST24	Horizontal	409234	3723152	3.66	4.60	533	18.0	0.127
WEST25	Horizontal	409118	3723203	3.66	4.60	533	18.0	0.127
WEST26	Horizontal	409138	3723189	3.66	4.60	533	18.0	0.127
WEST27	Horizontal	409159	3723174	3.66	4.60	533	18.0	0.127
WEST28	Horizontal	409179	3723160	3.66	4.60	533	18.0	0.127
WEST29	Horizontal	409200	3723146	3.66	4.60	533	18.0	0.127
WEST30	Horizontal	409220	3723131	3.66	4.60	533	18.0	0.127
WEST31	Horizontal	409103	3723183	3.66	4.60	533	18.0	0.127
WEST32	Horizontal	409124	3723168	3.66	4.60	533	18.0	0.127
WEST33	Horizontal	409144	3723154	3.66	4.60	533	18.0	0.127
WEST34	Horizontal	409165	3723140	3.66	4.60	533	18.0	0.127
WEST35	Horizontal	409185	3723125	3.66	4.60	533	18.0	0.127
WEST36	Horizontal	409206	3723111	3.66	4.60	533	18.0	0.127

Amended Huntington Beach Energy Project
Table 5.1C.15
Combined Cycle Power Block Operation with Simple Cycle Power Block Construction Stack Parameters
September 2015

Operational Point Sources

Pollutant Scenario	Source ID	Easting (X) (m)	Northing (Y) (m)	Base Elevation (m)	Stack Height (m)	Temperature (K)	Exit Velocity (m/s)	Stack Diameter (m)
CO, 1-hour NO_2, 1-hour SO_2	GE 7FA.05-01 Scenario 3	409449	3723146	3.66	45.7	350	12.2	6.10
	GE 7FA.05-02 Scenario 3	409474	3723182	3.66	45.7	350	12.2	6.10
1-hour NO_2 (federal), Annual NO_2, 3-hour SO_2, 24-hour SO_2, PM_{10}, $PM_{2.5}$	GE 7FA.05-01 Scenario 7	409449	3723146	3.66	45.7	350	11.8	6.10
	GE 7FA.05-02 Scenario 7	409474	3723182	3.66	45.7	350	11.8	6.10
All Pollutants	Auxiliary Boiler	409438	3723236	3.66	24.4	432	21.2	0.91

Amended Huntington Beach Energy Project
Table 5.1C.16
Combined Cycle Power Block Operation with Simple Cycle Power Block Construction Emission Rates
September 2015

Emission Rates for 1-hour, 3-hour, 8-hour, and 24-hour Modeling

	1-hour NO_2		1-hour NO_2 (federal)		1-hour CO		8-hour CO		1-hour SO_2		3-hour SO_2		24-hour SO_2		24-hour PM_{10}		24-hour $PM_{2.5}$	
Source ID	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)
FUG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.018	0.14	0.0075	0.060
EXH	0.057	0.45	0.057	0.45	0.58	4.57	0.58	4.57	0.0011	0.0086	0.0011	0.0086	4.5E-04	0.0036	7.2E-04	0.0058	7.2E-04	0.0057
GE 7FA.05-01	7.69	61.0	7.18	57.0	41.0	325	12.0	95.2	0.37	2.95	0.35	2.79	0.35	2.79	1.13	9.00	1.13	9.00
GE 7FA.05-02	7.69	61.0	7.18	57.0	41.0	325	12.0	95.2	0.37	2.95	0.35	2.79	0.35	2.79	1.13	9.00	1.13	9.00
Auxiliary Boiler	0.027	0.21	0.027	0.21	0.18	1.42	0.14	1.09	0.0030	0.024	0.0030	0.024	0.0018	0.014	0.012	0.091	0.012	0.091
Maximum Month	79		79		79		79		79		79		79		79		79	

Emission Rates for Annual Modeling

	Annual NO_2		Annual PM_{10}		Annual $PM_{2.5}$	
Source ID	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)
FUG	-	-	0.0065	0.052	0.0017	0.014
EXH	0.011	0.091	3.5E-04	0.0027	3.4E-04	0.0027
GE 7FA.05-01	1.02	8.12	0.86	6.79	0.86	6.79
GE 7FA.05-02	1.02	8.12	0.86	6.79	0.86	6.79
Auxiliary Boiler	0.017	0.14	0.010	0.082	0.010	0.082
Maximum Months	78-89		78-89		78-89	

Emission rates for exhaust sources are the total for all sources.

Amended Huntington Beach Energy Project
Table 5.1C.17
Combined Cycle Power Block Operation with Simple Cycle Power Block Construction Building Parameters
September 2015

Building Name	Number of Tiers	Tier Number	Base Elevation (m)	Tier Height (m)	Number of Corners	Corner 1 East (X) (m)	Corner 1 North (Y) (m)	Corner 2 East (X) (m)	Corner 2 North (Y) (m)	Corner 3 East (X) (m)	Corner 3 North (Y) (m)	Corner 4 East (X) (m)	Corner 4 North (Y) (m)	Corner 5 East (X) (m)	Corner 5 North (Y) (m)	Corner 6 East (X) (m)	Corner 6 North (Y) (m)	Corner 7 East (X) (m)	Corner 7 North (Y) (m)	Corner 8 East (X) (m)	Corner 8 North (Y) (m)	Corner 9 East (X) (m)	Corner 9 North (Y) (m)
'AIRIN3'	1	-	3.66	21.6	9	409385	3723198	409377	3723187	409384	3723182	409387	3723182	409395	3723177	409401	3723185	409393	3723191	409391	3723194	409385	3723198
'AIRIN4'	1	-	3.66	21.6	9	409426	3723221	409421	3723213	409412	3723218	409409	3723219	409402	3723223	409410	3723234	409416	3723230	409418	3723227	409426	3723221
'HRSG1'	1	-	3.66	25.6	5	409424	3723169	409447	3723152	409443	3723145	409418	3723162	409424	3723169								
'HRSG2'	1	-	3.66	25.6	5	409449	3723205	409473	3723188	409468	3723182	409444	3723198	409449	3723205								
'ACC'	1	-	3.66	33.5	5	409549	3723302	409551	3723173	409512	3723173	409510	3723301	409549	3723302								
'STG'	1	-	3.66	17.9	5	409482	3723251	409490	3723251	409490	3723235	409482	3723235	409482	3723251								
'WALL1'	1	-	3.66	15.2	9	409566	3723274	409567	3723158	409519	3723157	409437	3723109	409436	3723110	409519	3723158	409566	3723159	409565	3723274	409566	3723274
'WALL2'	1	-	3.66	6.10	7	409447	3723302	409427	3723301	409402	3723266	409402	3723265	409427	3723301	409447	3723301	409447	3723301				
'UNIT1L1'	2	1	3.66	23.2	4	409293	3723102	409312	3723128	409335	3723112	409317	3723086										
'UNIT1L2'	-	2	3.66	37.6	4	409301	3723114	409312	3723128	409335	3723112	409326	3723098										
'UNIT2L1'	2	1	3.66	23.2	4	409252	3723127	409272	3723153	409295	3723137	409277	3723111										
'UNIT2L2'	-	2	3.66	37.6	4	409261	3723139	409272	3723153	409295	3723137	409285	3723123										

Cylindical Building Name	Base Elevatio (m)	Center East (X) (m)	Center North (Y) (m)	Tank Height (m)	Tank Diameter (m)
Stack12	3.66	409274	3723095	61.0	6.27

Amended Huntington Beach Energy Project
Table 5.1C.18
Combined Cycle Power Block Operation with Simple Cycle Power Block Construction Results
September 2015

		NO_2 (µg/m^3)			CO (µg/m^3)		SO_2 (µg/m^3)				PM_{10} (µg/m^3)		$PM_{2.5}$ (µg/m^3)	
Source	Year	1-hour [a]	1-hour (federal) [b]	Annual [a]	1-hour	8-hour	1-hour	1-hour (federal)	3-hour	24-hour	24-hour	Annual	24-hour	Annual
ALL	2010	88.6	137	0.55	591	111	5.36	4.75	4.32	1.50	7.79	0.83	2.92	0.51
Exhaust		7.66	7.52	0.36	95.8	81.2	0.18	0.18	0.17	0.036	0.058	0.014	0.051	0.014
Fugitive		-	-	-	-	-	-	-	-	-	7.72	0.79	2.52	0.21
Operation		88.6	75.2	0.47	591	111	5.36	4.75	4.32	1.50	4.91	0.49	2.87	0.49
ALL	2011	84.7	124	0.55	566	104	5.13	4.60	4.49	1.21	9.11	0.85	3.02	0.52
Exhaust		7.68	7.54	0.36	96.0	80.1	0.18	0.18	0.17	0.035	0.056	0.014	0.050	0.014
Fugitive		-	-	-	-	-	-	-	-	-	9.04	0.80	2.97	0.21
Operation		84.7	70.6	0.47	565	104	5.13	4.60	4.48	1.21	3.96	0.49	2.81	0.49
ALL	2012	89.2	130	0.60	595	118	5.40	4.78	4.94	1.66	9.33	0.88	3.18	0.57
Exhaust		7.76	7.56	0.37	97.0	75.6	0.18	0.18	0.17	0.035	0.057	0.015	0.051	0.015
Fugitive		-	-	-	-	-	-	-	-	-	9.29	0.83	2.86	0.22
Operation		89.1	72.9	0.52	595	117	5.40	4.78	4.94	1.66	5.36	0.54	3.02	0.54
ALL	2013	87.8	117	0.60	587	104	5.32	4.86	4.71	1.27	8.60	0.87	3.55	0.58
Exhaust		7.76	7.53	0.36	97.0	79.0	0.18	0.18	0.17	0.035	0.057	0.014	0.050	0.014
Fugitive		-	-	-	-	-	-	-	-	-	8.25	0.82	2.67	0.22
Operation		87.8	74.1	0.53	586	104	5.32	4.86	4.71	1.27	4.15	0.56	3.40	0.56
ALL	2014	93.8	123	0.62	627	106	5.68	5.01	4.62	1.53	8.53	0.84	3.51	0.59
Exhaust		7.74	7.63	0.34	96.8	77.9	0.18	0.18	0.17	0.035	0.057	0.014	0.049	0.014
Fugitive		-	-	-	-	-	-	-	-	-	8.43	0.77	2.81	0.20
Operation		93.8	76.0	0.54	626	105	5.68	5.01	4.62	1.53	5.02	0.57	3.46	0.57

[a] The maximum 1-hour and annual NO_2 concentrations include ambient NO_2 ratios of 0.80 (EPA, 2011) and 0.75 (EPA, 2005), respectively.
[b] The total predicted concentration for the federal 1-hour NO_2 standard is the high-8th-high modeled concentration paired with 98th percentile seasonal hour-of-day background concentrations for 2010 through 2012.

Amended Huntington Beach Energy Project

Table 5.1C.19

Amended HBEP Operation with Units 1 and 2 Demolition Stack Parameters

September 2015

Construction Area Poly Sources

Source ID	Base Elevation (m)	Release Height (m)	Number of Vertices	Vertical Dimension (m)	Easting (X1) (m)	Northing (Y1) (m)	Easting (X2) (m)	Northing (Y2) (m)	Easting (X3) (m)	Northing (Y3) (m)	Easting (X4) (m)	Northing (Y4) (m)
FUG	3.66	0.00	4	1.00	409294	3723203	409376	3723146	409304	3723043	409222	3723101

Construction Point Sources

Source ID	Stack Release Type (Beta)	Easting (X) (m)	Northing (Y) (m)	Base Elevation (m)	Stack Height (m)	Temperature (K)	Exit Velocity (m/s)	Stack Diameter (m)
SOUTH01	Horizontal	409294	3723203	3.66	4.60	533	18.0	0.127
SOUTH02	Horizontal	409314	3723189	3.66	4.60	533	18.0	0.127
SOUTH03	Horizontal	409335	3723174	3.66	4.60	533	18.0	0.127
SOUTH04	Horizontal	409355	3723160	3.66	4.60	533	18.0	0.127
SOUTH05	Horizontal	409376	3723146	3.66	4.60	533	18.0	0.127
SOUTH06	Horizontal	409280	3723183	3.66	4.60	533	18.0	0.127
SOUTH07	Horizontal	409300	3723168	3.66	4.60	533	18.0	0.127
SOUTH08	Horizontal	409321	3723154	3.66	4.60	533	18.0	0.127
SOUTH09	Horizontal	409341	3723140	3.66	4.60	533	18.0	0.127
SOUTH10	Horizontal	409362	3723125	3.66	4.60	533	18.0	0.127
SOUTH11	Horizontal	409265	3723162	3.66	4.60	533	18.0	0.127
SOUTH12	Horizontal	409286	3723148	3.66	4.60	533	18.0	0.127
SOUTH13	Horizontal	409306	3723133	3.66	4.60	533	18.0	0.127
SOUTH14	Horizontal	409327	3723119	3.66	4.60	533	18.0	0.127
SOUTH15	Horizontal	409347	3723105	3.66	4.60	533	18.0	0.127
SOUTH16	Horizontal	409251	3723142	3.66	4.60	533	18.0	0.127
SOUTH17	Horizontal	409271	3723127	3.66	4.60	533	18.0	0.127
SOUTH18	Horizontal	409292	3723113	3.66	4.60	533	18.0	0.127
SOUTH19	Horizontal	409312	3723099	3.66	4.60	533	18.0	0.127
SOUTH20	Horizontal	409333	3723084	3.66	4.60	533	18.0	0.127
SOUTH21	Horizontal	409237	3723121	3.66	4.60	533	18.0	0.127
SOUTH22	Horizontal	409257	3723107	3.66	4.60	533	18.0	0.127
SOUTH23	Horizontal	409278	3723092	3.66	4.60	533	18.0	0.127
SOUTH24	Horizontal	409298	3723078	3.66	4.60	533	18.0	0.127
SOUTH25	Horizontal	409319	3723064	3.66	4.60	533	18.0	0.127
SOUTH26	Horizontal	409222	3723101	3.66	4.60	533	18.0	0.127
SOUTH27	Horizontal	409243	3723086	3.66	4.60	533	18.0	0.127
SOUTH28	Horizontal	409263	3723072	3.66	4.60	533	18.0	0.127
SOUTH29	Horizontal	409284	3723058	3.66	4.60	533	18.0	0.127
SOUTH30	Horizontal	409304	3723043	3.66	4.60	533	18.0	0.127

Amended Huntington Beach Energy Project
Table 5.1C.19
Amended HBEP Operation with Units 1 and 2 Demolition Stack Parameters
September 2015

Operational Point Sources

Pollutant Scenario	Source ID	Easting (X) (m)	Northing (Y) (m)	Base Elevation (m)	Stack Height (m)	Temperature (K)	Exit Velocity (m/s)	Stack Diameter (m)
CO, 1-hour NO_2, 1-hour SO_2	GE 7FA.05-01 Scenario 3	409449	3723146	3.66	45.7	350	12.2	6.10
	GE 7FA.05-02 Scenario 3	409474	3723182	3.66	45.7	350	12.2	6.10
1-hour NO_2 (federal), Annual NO_2, 3-hour SO_2, 24-hour SO_2, PM_{10}, $PM_{2.5}$	GE 7FA.05-01 Scenario 7	409449	3723146	3.66	45.7	350	11.8	6.10
	GE 7FA.05-02 Scenario 7	409474	3723182	3.66	45.7	350	11.8	6.10
1-hour SO_2	GE LMS 100PB-01 Scenario 1	409149	3723193	3.66	24.4	694	33.3	4.11
	GE LMS 100PB-02 Scenario 1	409185	3723168	3.66	24.4	694	33.3	4.11
CO, 1-hour NO_2	GE LMS 100PB-01 Scenario 3	409149	3723193	3.66	24.4	748	23.8	4.11
	GE LMS 100PB-02 Scenario 3	409185	3723168	3.66	24.4	748	23.8	4.11
3-hour SO_2, 24-hour SO_2	GE LMS 100PB-01 Scenario 4	409149	3723193	3.66	24.4	697	33.1	4.11
	GE LMS 100PB-02 Scenario 4	409185	3723168	3.66	24.4	697	33.1	4.11
Annual NO_2	GE LMS 100PB-01 Scenario 6	409149	3723193	3.66	24.4	709	28.4	4.11
	GE LMS 100PB-02 Scenario 6	409185	3723168	3.66	24.4	709	28.4	4.11
1-hour NO_2 (federal), PM_{10}, $PM_{2.5}$	GE LMS 100PB-01 Scenario 7	409149	3723193	3.66	24.4	748	23.6	4.11
	GE LMS 100PB-02 Scenario 7	409185	3723168	3.66	24.4	748	23.6	4.11
All Pollutants	Auxiliary Boiler	409438	3723236	3.66	24.4	432	21.2	0.91

Amended Huntington Beach Energy Project
Table 5.1C.20
Amended HBEP Operation with Units 1 and 2 Demolition Emission Rates
September 2015

Emission Rates for 1-hour, 3-hour, 8-hour, and 24-hour Modeling

	1-hour NO_2		1-hour NO_2 (federal)		1-hour CO		8-hour CO		1-hour SO_2		3-hour SO_2		24-hour SO_2		24-hour PM_{10}		24-hour $PM_{2.5}$	
Source ID	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)
FUG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.010	0.082	0.0012	0.0094
EXH	0.043	0.34	0.043	0.34	0.48	3.80	0.48	3.80	0.0008	0.0064	0.0008	0.0064	0.0003	0.0027	0.0005	0.0043	0.0005	0.0043
GE 7FA.05-01	7.69	61.0	7.18	57.0	41.0	325	12.0	95.2	0.37	2.95	0.35	2.79	0.35	2.79	1.13	9.00	1.13	9.00
GE 7FA.05-02	7.69	61.0	7.18	57.0	41.0	325	12.0	95.2	0.37	2.95	0.35	2.79	0.35	2.79	1.13	9.00	1.13	9.00
GE LMS 100PB-01	2.67	21.2	2.67	21.2	5.66	44.9	1.89	15.0	0.20	1.63	0.21	1.64	0.21	1.64	0.79	6.24	0.79	6.24
GE LMS 100PB-02	2.67	21.2	2.67	21.2	5.66	44.9	1.89	15.0	0.20	1.63	0.21	1.64	0.21	1.64	0.79	6.24	0.79	6.24
Auxiliary Boiler	0.027	0.21	0.027	0.21	0.18	1.42	0.14	1.09	0.0030	0.024	0.0030	0.024	0.0018	0.014	0.012	0.091	0.012	0.091
Maximum Month	113		113		113		113		113		113		113		113		113	

Emission Rates for Annual Modeling

	Annual NO_2		Annual PM_{10}		Annual $PM_{2.5}$	
Source ID	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)
FUG	-	-	0.0078	0.062	0.0009	0.0071
EXH	0.013	0.10	0.0004	0.0031	0.0004	0.0031
GE 7FA.05-01	1.02	8.12	0.86	6.79	0.86	6.79
GE 7FA.05-02	1.02	8.12	0.86	6.79	0.86	6.79
GE LMS 100PB-01	0.21	1.66	0.13	1.00	0.13	1.00
GE LMS 100PB-02	0.21	1.66	0.13	1.00	0.13	1.00
Auxiliary Boiler	0.017	0.14	0.010	0.082	0.010	0.082
Maximum Months	109-120		109-120		109-120	

Emission rates for exhaust sources are the total for all sources.

Amended Huntington Beach Energy Project

Table 5.1C.21

Amended HBEP Operation with Units 1 and 2 Demolition Building Parameters

September 2015

Building Name	Number of Tiers	Tier Number	Base Elevation (m)	Tier Height (m)	Number of Corners	Corner 1 East (X) (m)	Corner 1 North (Y) (m)	Corner 2 East (X) (m)	Corner 2 North (Y) (m)	Corner 3 East (X) (m)	Corner 3 North (Y) (m)	Corner 4 East (X) (m)	Corner 4 North (Y) (m)	Corner 5 East (X) (m)	Corner 5 North (Y) (m)	Corner 6 East (X) (m)	Corner 6 North (Y) (m)	Corner 7 East (X) (m)	Corner 7 North (Y) (m)	Corner 8 East (X) (m)	Corner 8 North (Y) (m)	Corner 9 East (X) (m)	Corner 9 North (Y) (m)
'AIRIN3'	1	-	3.66	21.6	9	409385	3723198	409377	3723187	409384	3723182	409387	3723182	409395	3723177	409401	3723185	409393	3723191	409391	3723194	409385	3723198
'AIRIN4'	1	-	3.66	21.6	9	409426	3723221	409421	3723213	409412	3723218	409409	3723219	409402	3723223	409410	3723234	409416	3723230	409418	3723227	409426	3723221
'HRSG1'	1	-	3.66	25.6	5	409424	3723169	409447	3723152	409443	3723145	409418	3723162	409424	3723169								
'HRSG2'	1	-	3.66	25.6	5	409449	3723205	409473	3723188	409468	3723182	409444	3723198	409449	3723205								
'ACC'	1	-	3.66	33.5	5	409549	3723302	409551	3723173	409512	3723173	409510	3723301	409549	3723302								
'STG'	1	-	3.66	17.9	5	409482	3723251	409490	3723251	409490	3723235	409482	3723235	409482	3723251								
'WALL1'	1	-	3.66	15.2	9	409566	3723274	409567	3723158	409519	3723157	409437	3723109	409436	3723110	409519	3723158	409566	3723159	409565	3723274	409566	3723274
'WALL2'	1	-	3.66	6.10	7	409447	3723302	409427	3723301	409402	3723266	409402	3723265	409427	3723301	409447	3723301	409447	3723301				
'AIRIN1'	1	-	3.66	15.6	5	409161	3723216	409148	3723225	409142	3723217	409155	3723207	409161	3723216								
'AIRIN2'	1	-	3.66	15.6	5	409196	3723179	409202	3723187	409216	3723178	409210	3723169	409196	3723179								
'CTG1'	1	-	3.66	9.45	7	409160	3723207	409158	3723209	409151	3723201	409147	3723197	409153	3723193	409156	3723198	409160	3723207				
'CTG2'	1	-	3.66	9.45	7	409194	3723184	409197	3723182	409192	3723172	409190	3723168	409184	3723172	409187	3723176	409194	3723184				

Amended Huntington Beach Energy Project
Table 5.1C.22
Amended HBEP Operation with Units 1 and 2 Demolition Results
September 2015

		NO_2 (µg/m^3)			CO (µg/m^3)		SO_2 (µg/m^3)				PM_{10} (µg/m^3)		$PM_{2.5}$ (µg/m^3)	
Source	Year	1-hour [a]	1-hour (federal) [b]	Annual [a]	1-hour	8-hour	1-hour	1-hour (federal)	3-hour	24-hour	24-hour	Annual	24-hour	Annual
ALL	2010	88.8	137	0.64	594	114	5.36	4.76	4.33	1.51	5.04	0.93	2.92	0.52
Exhaust		6.20	6.03	0.40	88.6	72.4	0.15	0.15	0.14	0.029	0.046	0.016	0.041	0.016
Fugitive		-	-	-	-	-	-	-	-	-	4.84	0.89	0.41	0.10
Operation		88.6	75.2	0.48	591	111	5.36	4.75	4.32	1.50	4.91	0.50	2.87	0.50
ALL	2011	85.1	124	0.64	570	107	5.14	4.60	4.49	1.21	5.81	0.94	2.83	0.53
Exhaust		6.15	6.02	0.40	87.8	73.2	0.15	0.15	0.14	0.026	0.042	0.016	0.039	0.016
Fugitive		-	-	-	-	-	-	-	-	-	5.67	0.90	0.45	0.10
Operation		84.8	70.6	0.48	565	104	5.14	4.60	4.49	1.21	3.97	0.51	2.82	0.51
ALL	2012	89.6	130	0.69	599	121	5.42	4.79	4.95	1.66	5.60	0.99	3.09	0.58
Exhaust		6.13	6.01	0.42	87.6	68.5	0.15	0.15	0.14	0.029	0.047	0.017	0.038	0.017
Fugitive		-	-	-	-	-	-	-	-	-	5.55	0.95	0.46	0.11
Operation		89.3	72.9	0.53	595	118	5.42	4.78	4.95	1.66	5.38	0.56	3.05	0.56
ALL	2013	88.3	117	0.69	590	107	5.34	4.87	4.71	1.28	5.35	1.00	3.51	0.60
Exhaust		6.22	6.08	0.41	88.9	76.2	0.15	0.15	0.14	0.027	0.043	0.016	0.039	0.016
Fugitive		-	-	-	-	-	-	-	-	-	5.16	0.95	0.45	0.11
Operation		88.0	74.1	0.54	586	104	5.33	4.87	4.71	1.27	4.15	0.57	3.44	0.57
ALL	2014	94.3	123	0.70	630	109	5.70	5.02	4.63	1.54	5.25	0.93	3.54	0.61
Exhaust		6.23	6.08	0.38	89.0	71.5	0.15	0.15	0.14	0.028	0.045	0.015	0.038	0.015
Fugitive		-	-	-	-	-	-	-	-	-	4.97	0.87	0.46	0.10
Operation		94.0	76.0	0.56	627	105	5.70	5.01	4.62	1.54	5.07	0.59	3.48	0.59

[a] The maximum 1-hour and annual NO_2 concentrations include ambient NO_2 ratios of 0.80 (EPA, 2011) and 0.75 (EPA, 2005), respectively.
[b] The total predicted concentration for the federal 1-hour NO_2 standard is the high-8th-high modeled concentration paired with 98th percentile seasonal hour-of-day background concentrations for 2010 through 2012.

Amended Huntington Beach Energy Project
Table 5.1C.23
Joint Frequency Distribution for Crystal Cove State Park
September 2015

Stability Class	Wind Speed (m/s)	Transport Time (hours)	σ_y (meters)	σ_z (meters)	u (m/s)	Sigma Y * Sigma Z * u (m^3/s)	Count	Frequency	Cumulative Frequency
F	1	3.47	330	51	0.5	8,406	120	0.3	0.3
E	1	3.47	496	88	0.5	21,776	67	0.2	0.4
F	2	1.74	330	51	1.5	25,219	54	0.1	0.5
F	3	1.16	330	51	2.5	42,032	5	0.0	0.6
D	1	3.47	663	153	0.5	50,726	45	0.1	0.7
E	2	1.74	496	88	1.5	65,327	41	0.1	0.8
E	3	1.16	496	88	2.5	108,878	21	0.0	0.8
D	2	1.74	663	153	1.5	152,178	59	0.1	0.9
E	4	0.87	496	88	3.5	152,429	0	0.0	0.9
D	3	1.16	663	153	2.5	253,630	12	0.0	1.0
D	4	0.87	663	153	3.5	355,082	19	0.0	1.0
D	5	0.69	663	153	4.5	456,534	8	0.0	1.0
D	6	0.58	663	153	5.5	557,986	1	0.0	1.0
D	7	0.50	663	153	6.5	659,438	0	0.0	1.0

Table Notes

m/s – meter(s) per second

m^3/s – cubic meters per second

σ_y – Pasquill-Gifford horizontal diffusion coefficient

σ_z – Pasquill-Gifford vertical diffusion coefficient

U – wind speed

Amended Huntington Beach Energy Project
Table 5.1C.24
Joint Frequency Distribution for Huntington Beach State Park
September 2015

Stability Class	Wind Speed (m/s)	Transport Time (hours)	σ_y (meters)	σ_z (meters)	u (m/s)	Sigma Y * Sigma Z * u (m^3/s)	Count	Frequency*	Cumulative Frequency*
F	1	0.02	2.6	1.6	0.5	2	1,702	3.9	3.9
E	1	0.02	4.0	2.4	0.5	5	675	1.5	5.4
F	2	0.01	2.6	1.6	1.5	6	955	2.2	7.6
D	1	0.02	5.3	3.1	0.5	8	370	0.8	8.4
F	3	0.01	2.6	1.6	2.5	11	195	0.4	8.9
E	2	0.01	4.0	2.4	1.5	14	635	1.4	10.3
E	3	0.01	4.0	2.4	2.5	24	158	0.4	10.7
D	2	0.01	5.3	3.1	1.5	25	527	1.2	11.9
E	4	0.00	4.0	2.4	3.5	33	63	0.1	12.0
D	3	0.01	5.3	3.1	2.5	41	264	0.6	12.7
D	4	0.00	5.3	3.1	3.5	58	66	0.2	12.8
D	5	0.00	5.3	3.1	4.5	74	53	0.1	12.9
D	6	0.00	5.3	3.1	5.5	91	96	0.2	13.1
D	7	0.00	5.3	3.1	6.5	107	64	0.1	13.3

* Frequency and cumulative frequency based on all hours of the day.

Amended Huntington Beach Energy Project
Table 5.1C.25
Shoreline Fumigation Analysis
September 2015

SCREEN3 Shoreline Fumigation Impact Analysis Results

Pollutant	Averaging Period	Fumigation Impacts [a] ($\mu g/m^3$)	Background ($\mu g/m^3$)	Total ($\mu g/m^3$)	CAAQS ($\mu g/m^3$)	Above CAAQS?	NAAQS ($\mu g/m^3$)	Above NAAQS?
PM_{10}	24-hour	15.5	51.0	66.5	N/A	no	150	no
NO_2 [b]	1-hour	172	142	314	339	no	N/A	no
SO_2	1-hour	10.5	20.2	30.7	655	no	N/A	no
	3-hour	9.45	20.2	29.7	N/A	no	1,300	no
	24-hour	4.20	5.20	9.40	105	no	N/A	no
CO	1-hour	980	3,321	4,301	23,000	no	40,000	no
	8-hour	204	2,519	2,723	10,000	no	10,000	no

Notes:

[a] Fumigation impacts were calculated by multiplying the 1 g/s unit emission SCREEN3 impacts by source emissions. The sum of all emission sources are displayed.

[b] 1-hour NO_2 impact assumes an 80 percent ambient ratio method.

SCREEN3 Inputs for Shoreline Fumigation Impact Analysis for Unit Emissions

Emission Source	Emission Rate (g/s)	Stack Height (m)	Stack Inside Diameter (m)	Stack Exit Velocity (m/s)	Stack Gas Exit Temperature (K)	Building Height (m)	Horizontal Building Dimension (m)	Horizontal Building Dimension (m)	Distance to Shore (m)
GE LMS 100PB Simple Cycle 1	1	24.4	4.11	23.6	748	9.4	6.9	15.7	490
GE LMS 100PB Simple Cycle 2	1	24.4	4.11	23.6	748	9.4	6.9	15.7	535
GE 7FA.05 Combined Cycle 1	1	45.7	6.10	11.8	350	25.6	8.4	29	350
GE 7FA.05 Combined Cycle 2	1	45.7	6.10	11.8	350	25.6	8.4	29	350
Auxiliary Boiler	1	24.4	0.91	21.2	432	21.6	9.8	21	560

Notes:
SCREEN3 was run with a Rural option and default ambient air temperature of 293 K.

Amended Huntington Beach Energy Project
Table 5.1C.25
Shoreline Fumigation Analysis
September 2015

SCREEN3 Outputs for Shoreline Fumigation Impact Analysis for Unit Emissions

Emission Source	Fumigation Impacts [a] ($\mu g/m^3$)			
	1-hour	3-hour	8-hour	24-hour
GE LMS 100PB Simple Cycle 1	6.57	5.91	4.60	2.63
GE LMS 100PB Simple Cycle 2	6.66	5.99	4.66	2.66
GE 7FA.05 Combined Cycle 1	12.52	11.27	8.76	5.01
GE 7FA.05 Combined Cycle 2	12.52	11.27	8.76	5.01
Auxiliary Boiler	N/A	N/A	N/A	N/A

Notes:
[a] 3-hour, 8-hour, and 24-hour averaging periods were calculated by multiplying the 1-hour SCREEN3 impact with the following factors:

Averaging Period	Adjustment Factor
3 hours	0.9
8 hours	0.7
24 hours	0.4

Criteria Pollutant Emissions

Pollutant	Averaging Period	GE LMS 100PB Simple Cycle 1	GE LMS 100PB Simple Cycle 2	GE 7FA.05 Combined Cycle 1	GE 7FA.05 Combined Cycle 2	Auxiliary Boiler
PM_{10}	24-hour	0.79	0.79	1.13	1.13	0.012
NO_X	1-hour	2.67	2.67	7.18	7.18	0.027
SO_2	1-hour	0.13	0.13	0.35	0.35	0.003
	3-hour	0.13	0.13	0.35	0.35	0.003
	24-hour	0.13	0.13	0.35	0.35	0.002
CO	1-hour	5.66	5.66	36.16	36.16	0.178
	8-hour	1.89	1.89	10.66	10.66	0.137

Amended Huntington Beach Energy Project
Table 5.1C.26
Effects of Street Sweeping Roadways During Construction
September 2015

Modeling Scenario	Pollutant	Maximum Fugitive Dust Emissions (tpy)	Emissions Reduction Needed (tpy) [a]	Daily Vehicle Volume [b]	Annual Vehicle Volume	Fugitive Dust Emission Factor (g/mile) [c]	Street Sweeping Once per Month [d]	Reduction from Street Sweeping Every 14 Days [d]	Miles for Sweeping Once per Month [e]	Miles for Sweeping Every 14 Days [e]
Amended HBEP Demolition/Construction	PM_{10}	0.43	0.33	37,384	13,645,160	0.300	9%	26%	0.81	0.28
Combined Cycle Power Block Operation and Simple Cycle Power Block Construction	PM_{10}	0.23	0.05	37,384	13,645,160	0.300	9%	26%	0.12	0.04
Amended HBEP Operation and Demolition of Units 1 and 2	PM_{10}	0.27	0.08	37,384	13,645,160	0.300	9%	26%	0.20	0.07

Notes:

[a] Emissions Reduction Needed for PM_{10} was based on the estimated maximum annual emission rate resulting in an annual modeled impact that, when combined with a background concentration of 19.3 µg/m³, would be less than the CAAQS.

[b] Annual Average Daily Vehicle Volumes were obtained from Figure 2-6 of the *Draft Existing Circulation Conditions Technical Report Traffic Study* (Stantec, 2014). The additional annual average daily vehicle traffic resulting from the Amended HBEP construction activities is also provided, as derived from Section 5.12.3.2 of the PTA assuming the same reduction for all roadways as for Newland Street. Note that only Pacific Coast Highway volumes were considered since this is the roadway that would be most affected by the Amended HBEP construction activities.

Street Name	Annual Average Daily Volume	Annual Average Daily Construction Volume
Newland Street	14,000	638
Pacific Coast Highway	37,000	384
Magnolia Street	23,000	191
Brookhurst Street	34,000	223
Beach Boulevard	29,000	256
Hamilton Avenue	19,000	191
Atlanta Avenue	17,000	128
Adams Avenue	33,000	64

[c] Fugitive Dust Emission Factor was calculated using CalEEMod methodology for paved roads, as described below.

[d] Control efficiencies were taken from Table XI-C of the *SCAQMD CEQA Handbook* for Street Sweeping Local, Arterial, and Collector Streets (SCAQMD, 2007).

[e] Miles for Sweeping were calculated using the following equation:

Miles for Sweeping (miles) = Emissions Reduction Needed (tons/year) x 2,000 (lb/ton) x 453.6 (g/lb) / [Fugitive Dust Emission Factor (g/mile) x Reduction from Street Sweeping x Annual Vehicle Volume]

Derivation of Paved Road Emission Factors

Vehicles on Paved Roads

Parameter	PM_{10}
Average Weight [a]	2.4
k [b]	1.0
sL [a]	0.1
Emission Factor (g/mile) [c]	0.300

Notes:

[a] Average Weight and sL taken as the CalEEMod defaults for the Huntington Beach climate region of the South Coast Air Basin.

[b] k taken from Table 13.2.1-1 of Section 13.2.1 of *AP-42* (EPA, 2011).

[c] Emission factor calculated using Equation 1 from Section 13.2.1 of *AP-42* (EPA, 2011):

Emission Factor (g/mile) = k (g/mile) x $[sL\ (g/m^2)]^{0.91}$ x $[\text{Average Weight (tons)}]^{1.02}$

Amended Huntington Beach Energy Project
Table 5.1C.27
First Quarter Wind Table
September 2015

Frequency Distribution (Hours)
Date Range: January 1 - March 31 (2010-2014)

Wind Speed (m/s) Wind Direction (from)	0.25 - 0.5	0.5 - 2.1	2.1 - 3.6	3.6 - 5.7	5.7 - 8.8	8.8 - 11.1	>= 11.1	Total
N	0	261	191	3	0	0	0	455
NNE	0	188	410	8	7	0	0	613
NE	0	98	339	39	64	11	0	551
ENE	0	84	274	50	37	0	0	445
E	0	59	308	13	0	0	0	380
ESE	0	51	485	18	0	0	0	554
SE	0	60	378	35	6	0	0	479
SSE	0	50	248	27	16	9	1	351
S	0	73	303	86	38	6	0	506
SSW	0	95	740	442	54	1	0	1,332
SW	0	150	1,122	495	21	0	0	1,788
WSW	0	182	903	262	10	0	0	1,357
W	0	132	377	93	11	0	0	613
WNW	0	120	163	15	0	0	0	298
NW	0	109	152	8	0	0	0	269
NNW	0	146	144	1	0	0	0	291
Total	0	1,858	6,537	1,595	264	27	1	10,282

485 Calm Winds
57 Missing Winds

Amended Huntington Beach Energy Project
Figure 5.1C-1a
First Quarter Wind Rose
September 2015

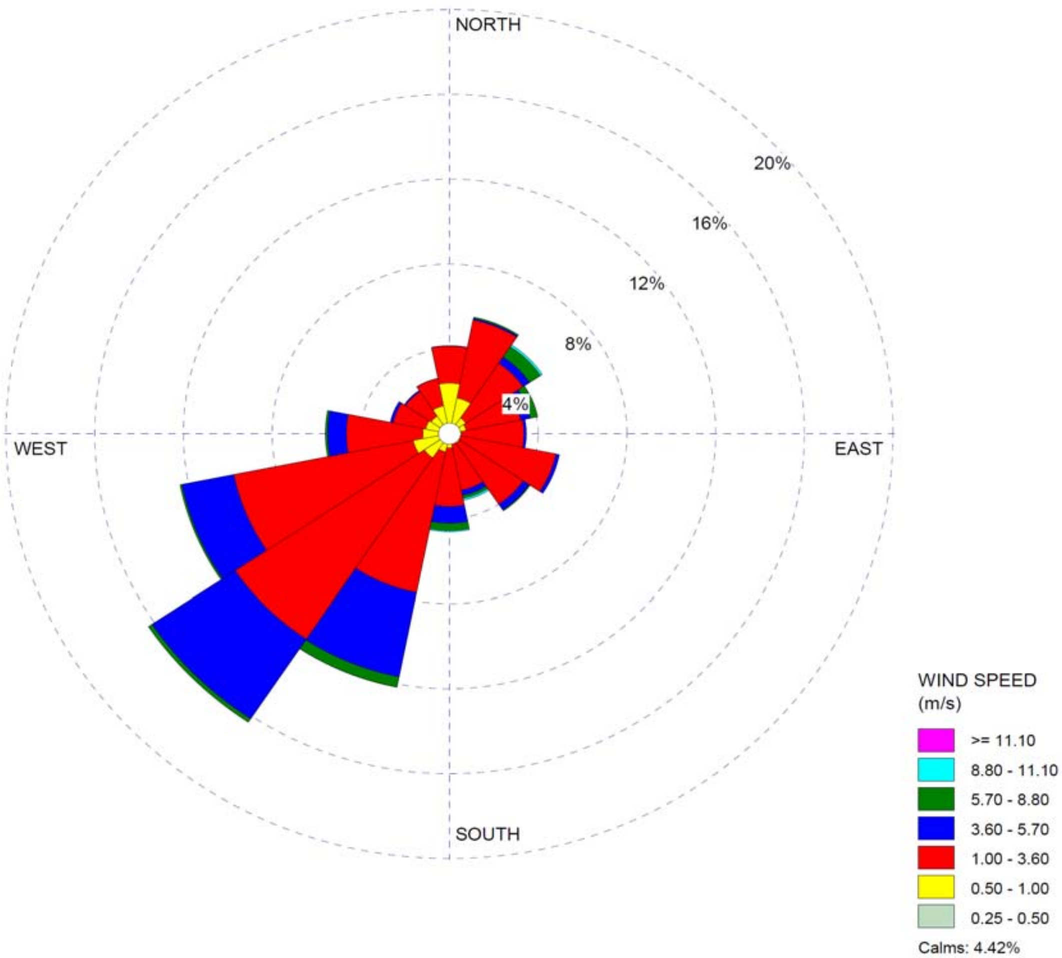
Date Range: January 1 – March 31 (2010-2014)

WIND ROSE PLOT:

AERMET 14134 Meteorological Data
National Weather Service Station - John Wayne Airport

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
	Start Date: 1/1/2010 - 00:00 **End Date: 3/31/2014 - 23:00**	MODELER:	
	CALM WINDS: **4.42%**	TOTAL COUNT: **10767 hrs.**	
	AVG. WIND SPEED: **2.19 m/s**	DATE: **8/31/2015**	PROJECT NO.:

Amended Huntington Beach Energy Project
Figure 5.1C-1b
Second Quarter Wind Rose
September 2015

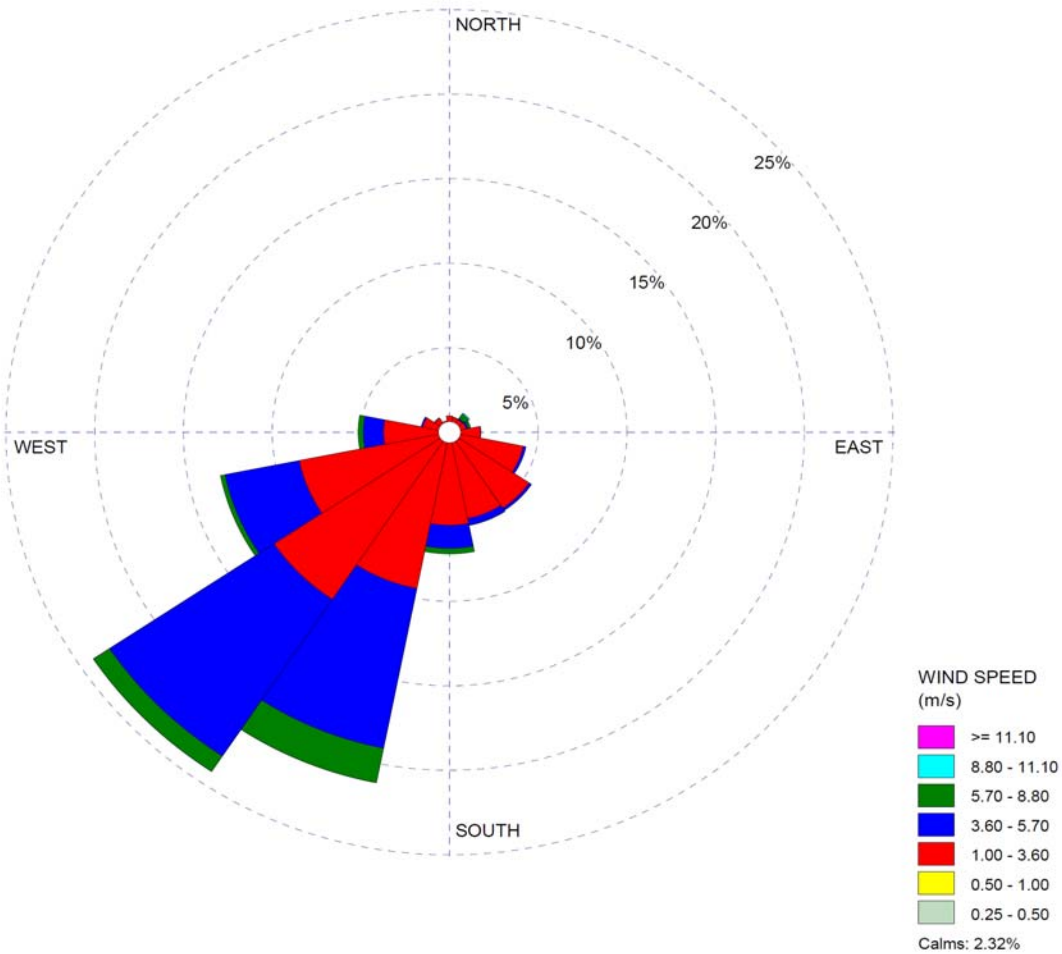
Date Range: April 1 – June 30 (2010-2014)

WIND ROSE PLOT:

AERMET 14134 Meteorological Data
National Weather Service Station - John Wayne Airport

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:

DATA PERIOD:

Start Date: 4/1/2010 - 00:00
End Date: 6/30/2014 - 23:00

COMPANY NAME:

MODELER:

CALM WINDS:

2.32%

TOTAL COUNT:

10845 hrs.

AVG. WIND SPEED:

2.95 m/s

DATE:

8/31/2015

PROJECT NO.:

Amended Huntington Beach Energy Project
Figure 5.1C-1c
Third Quarter Wind Rose
September 2015

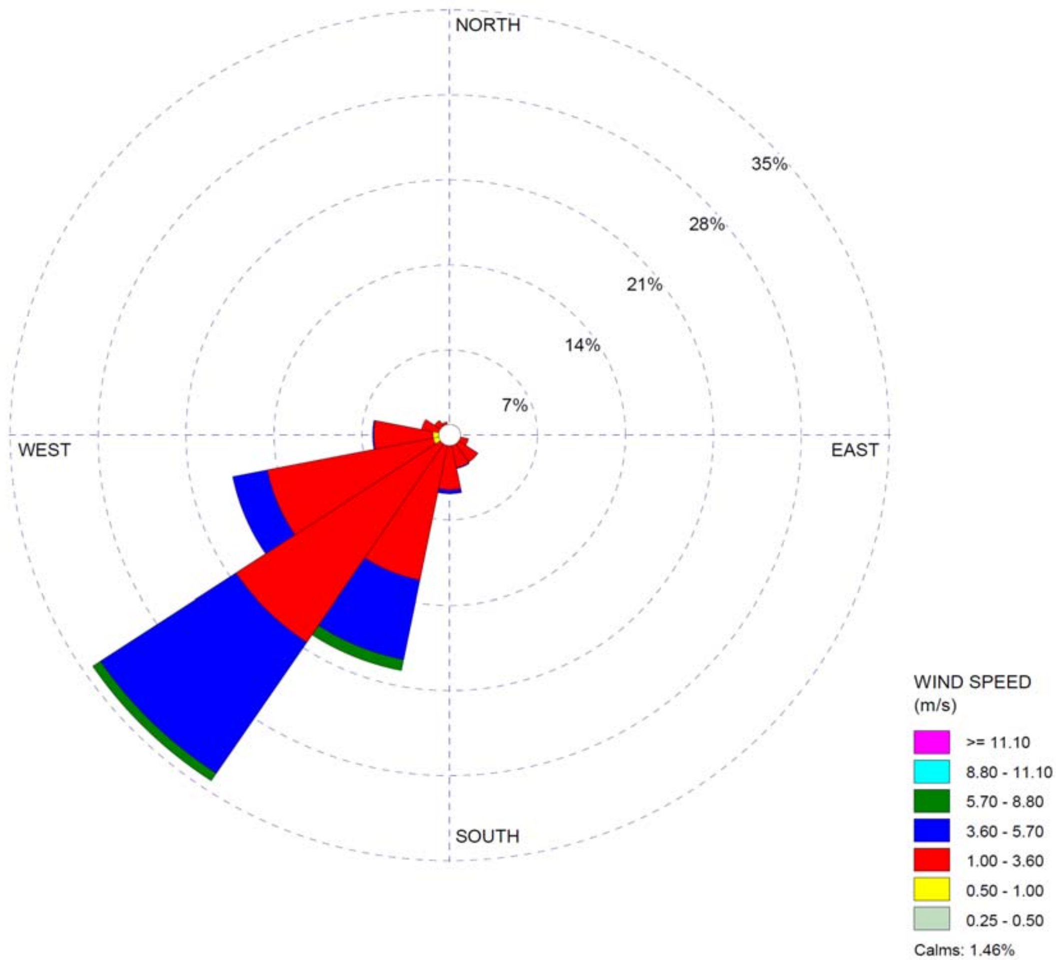
Date Range: July 1 – September 30 (2010-2014)

WIND ROSE PLOT:

AERMET 14134 Meteorological Data
National Weather Service Station - John Wayne Airport

DISPLAY:

Wind Speed
Direction (blowing from)

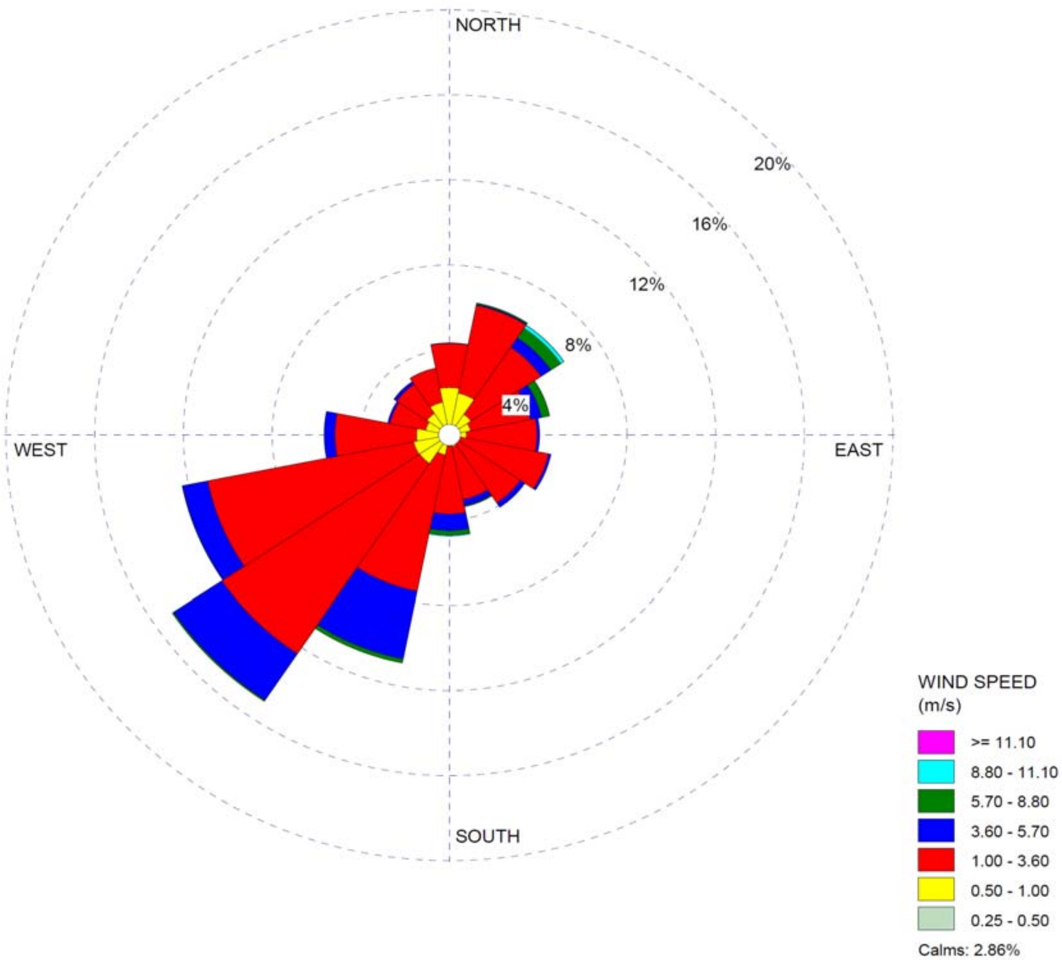


COMMENTS:	DATA PERIOD:	COMPANY NAME:	
	Start Date: 7/1/2010 - 00:00 **End Date: 9/30/2014 - 23:00**	MODELER:	
	CALM WINDS: **1.46%**	TOTAL COUNT: **11004 hrs.**	
	AVG. WIND SPEED: **2.59 m/s**	DATE: **8/31/2015**	PROJECT NO.:

Amended Huntington Beach Energy Project
Figure 5.1C-1d
Fourth Quarter Wind Rose
September 2015

Date Range: October 1 – December 31 (2010-2014)

WIND ROSE PLOT:	DISPLAY:
AERMET 14134 Meteorological Data **National Weather Service Station - John Wayne Airport**	**Wind Speed** **Direction (blowing from)**



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
	Start Date: 10/1/2010 - 00:00 **End Date: 12/31/2014 - 20:00**	MODELER:	
	CALM WINDS: **2.86%**	TOTAL COUNT: **10996 hrs.**	
	AVG. WIND SPEED: **2.04 m/s**	DATE: **8/31/2015**	PROJECT NO.:

Amended Huntington Beach Energy Project
Figure 5.1C-1e
Annual Wind Rose
September 2015

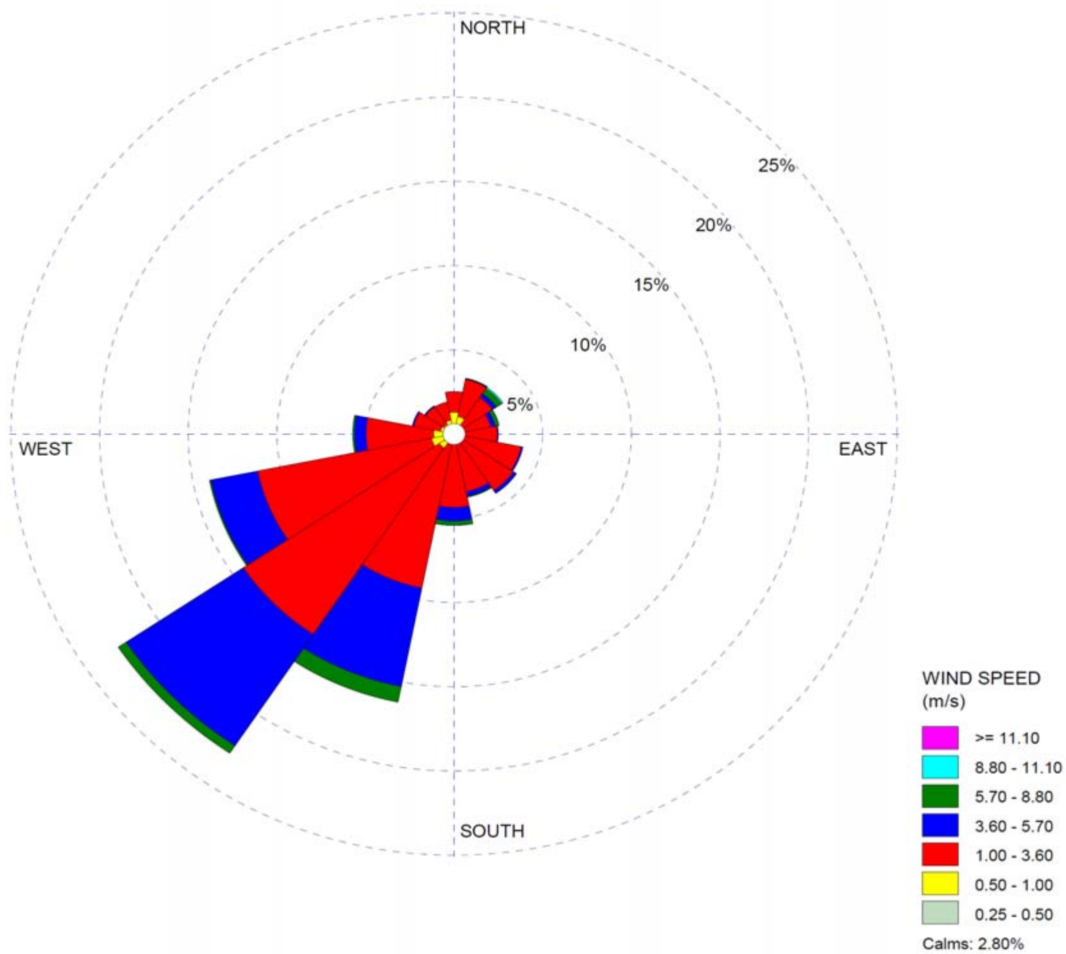
Date Range: January 1 – December 31 (2010-2014)

WIND ROSE PLOT:

AERMET 14134 Meteorological Data
National Weather Service Station - John Wayne Airport

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:

DATA PERIOD:

Start Date: 1/1/2010 - 00:00
End Date: 12/31/2014 - 20:00

COMPANY NAME:

MODELER:

CALM WINDS:

2.80%

TOTAL COUNT:

43612 hrs.

AVG. WIND SPEED:

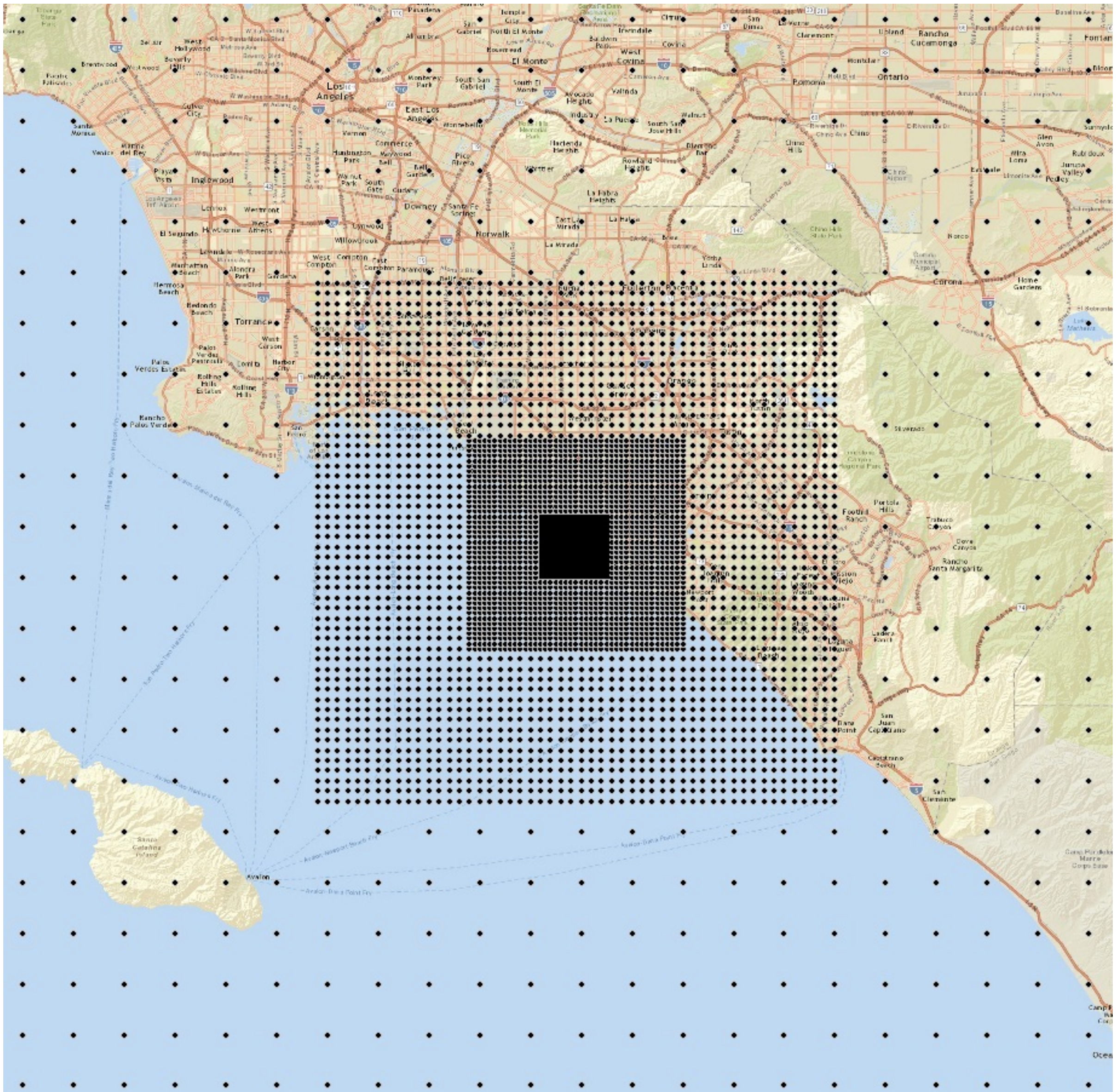
2.44 m/s

DATE:

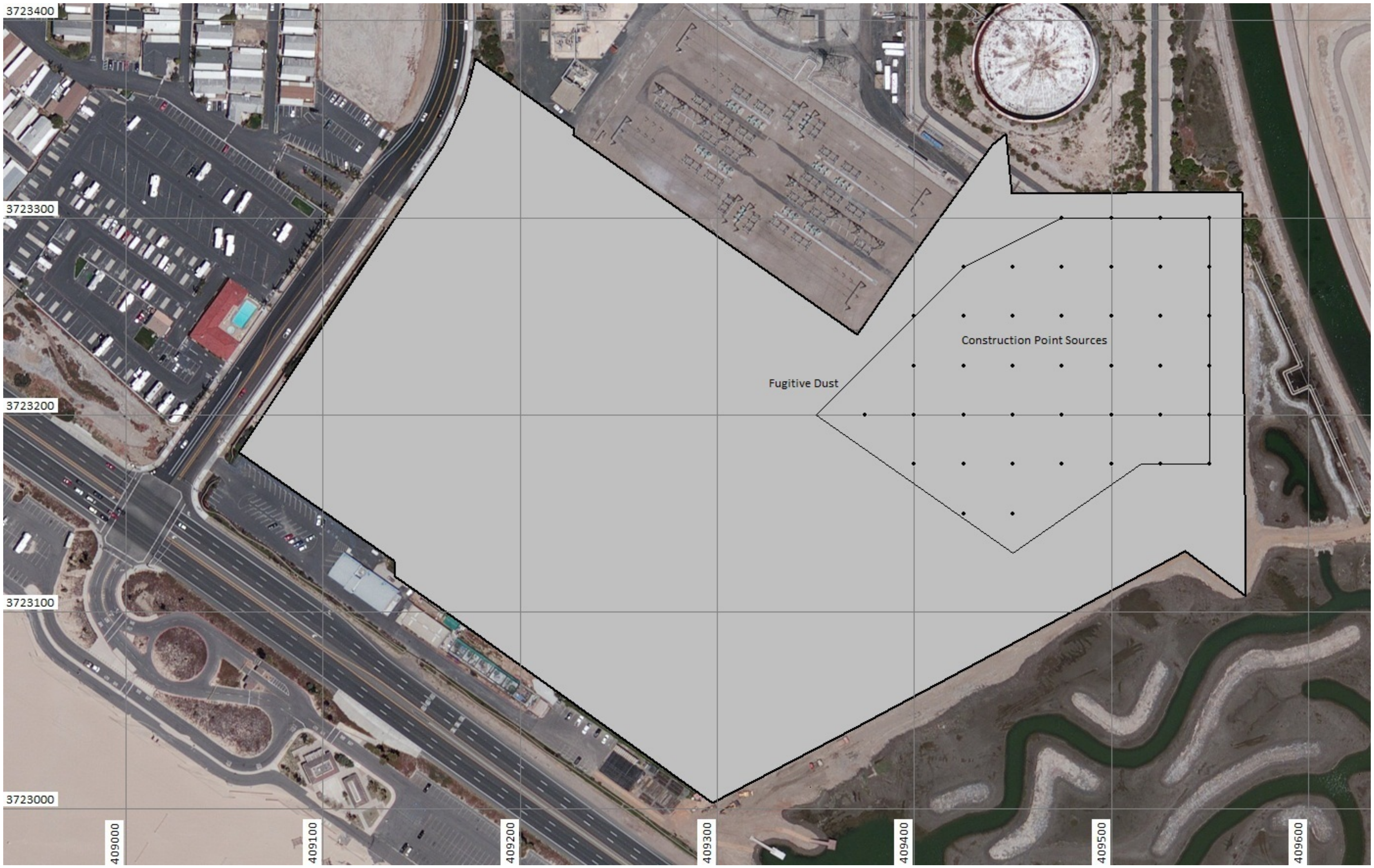
8/31/2015

PROJECT NO.:

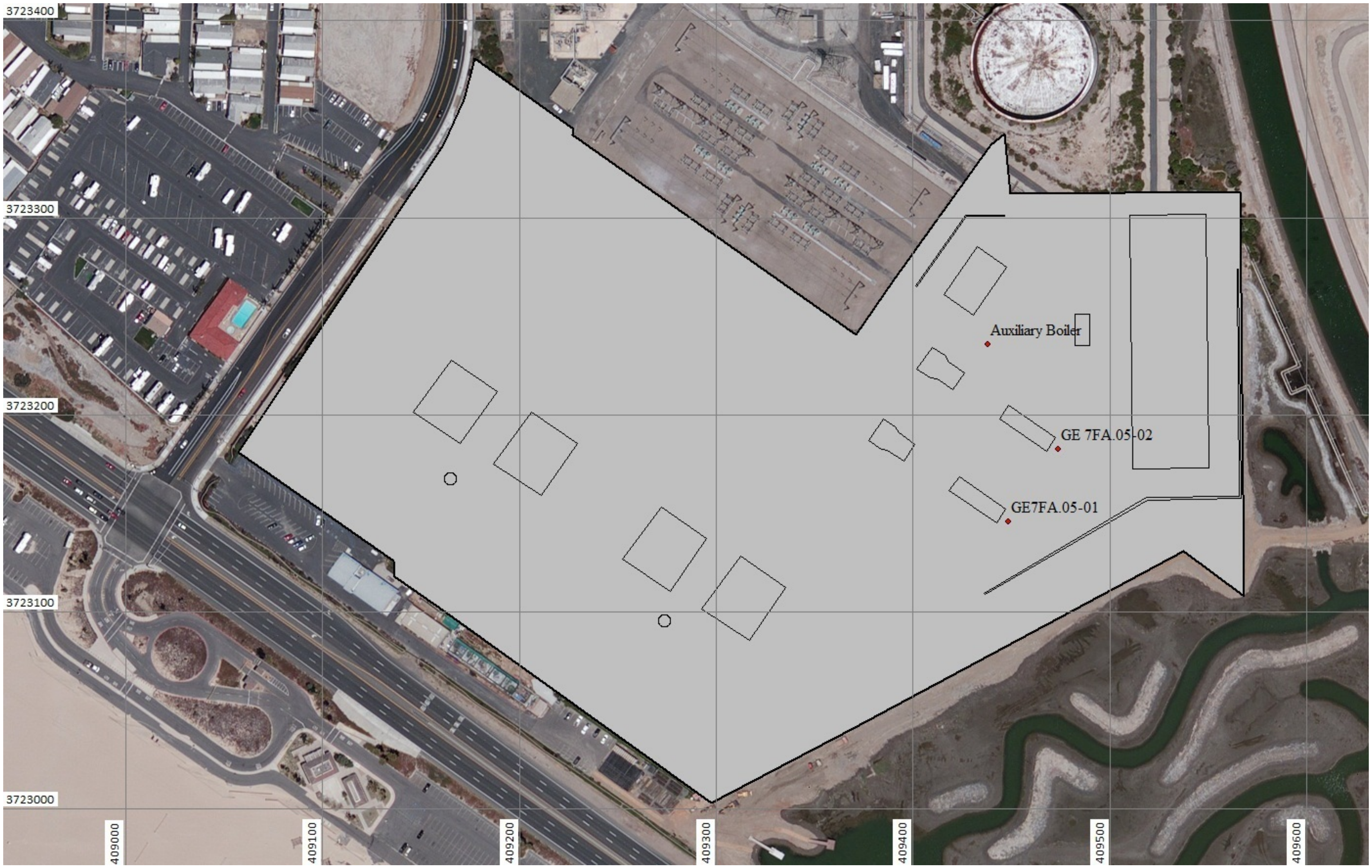
Amended Huntington Beach Energy Project
Figure 5.1C-2
Receptor Grid for Amended HBEP Modeling
September 2015



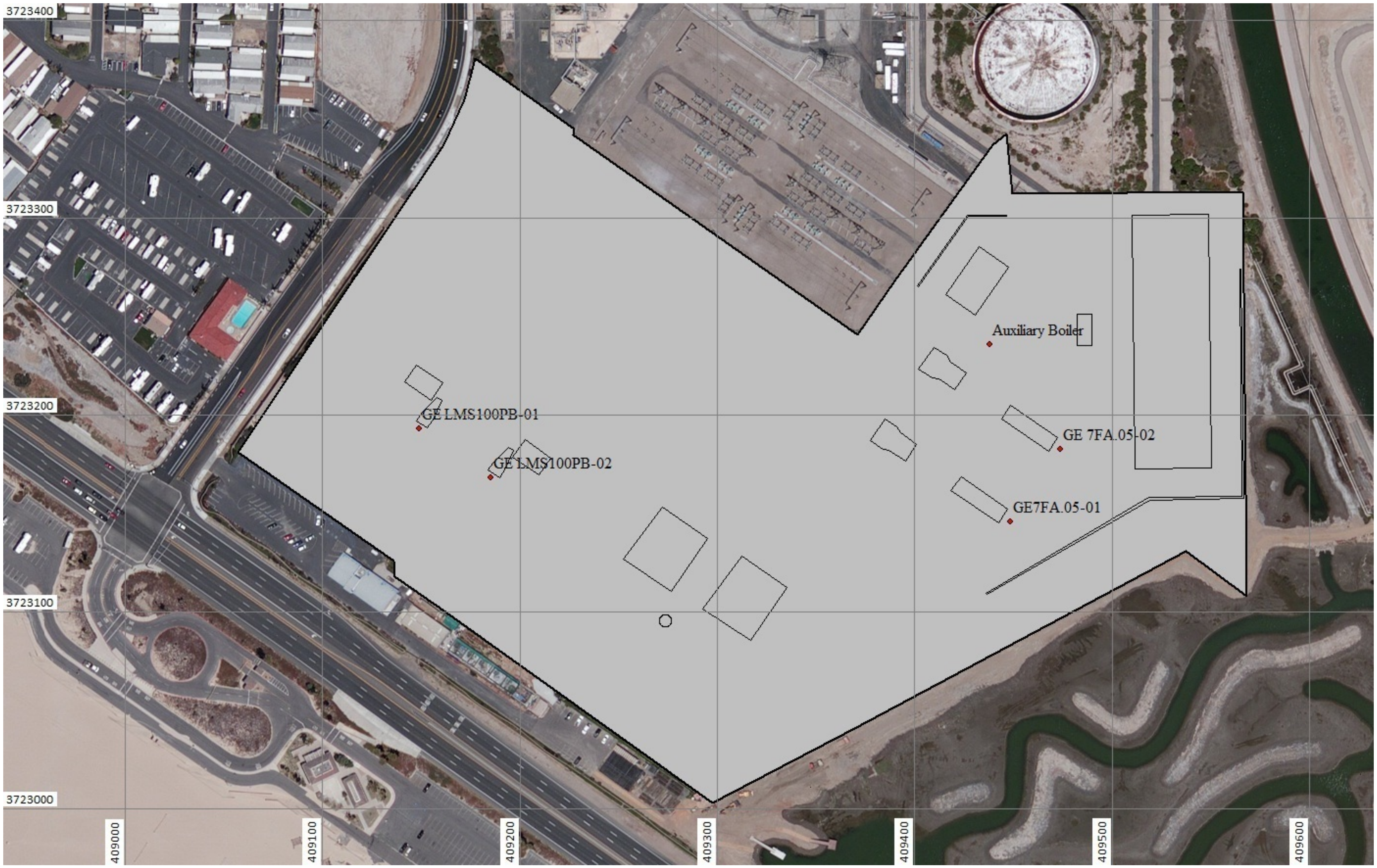
Amended Huntington Beach Energy Project
Figure 5.1C-3
AERMOD Construction Model Setup
September 2015



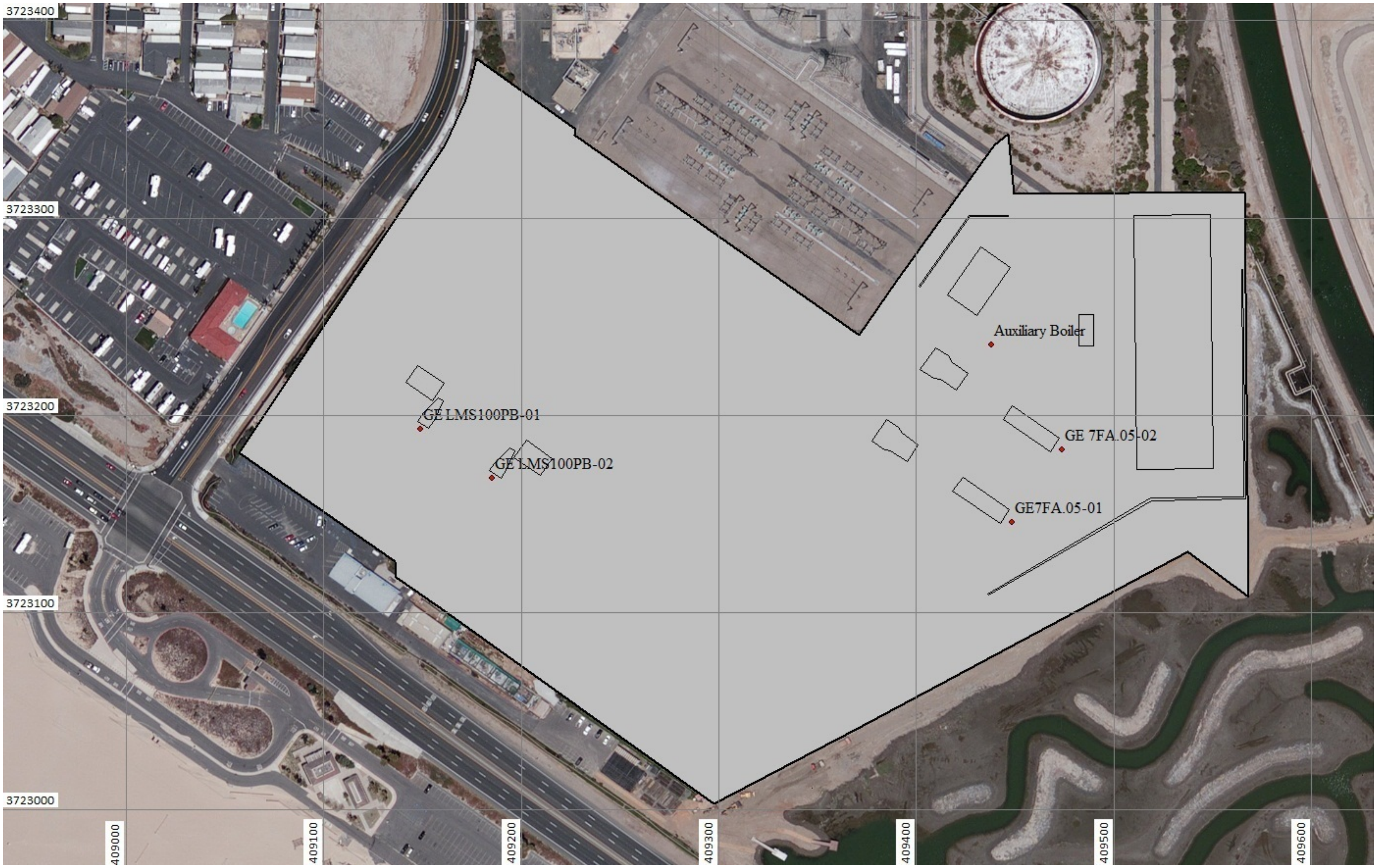
Amended Huntington Beach Energy Project
Figure 5.1C-4
AERMOD 7FA.05 Commissioning Model Setup
September 2015



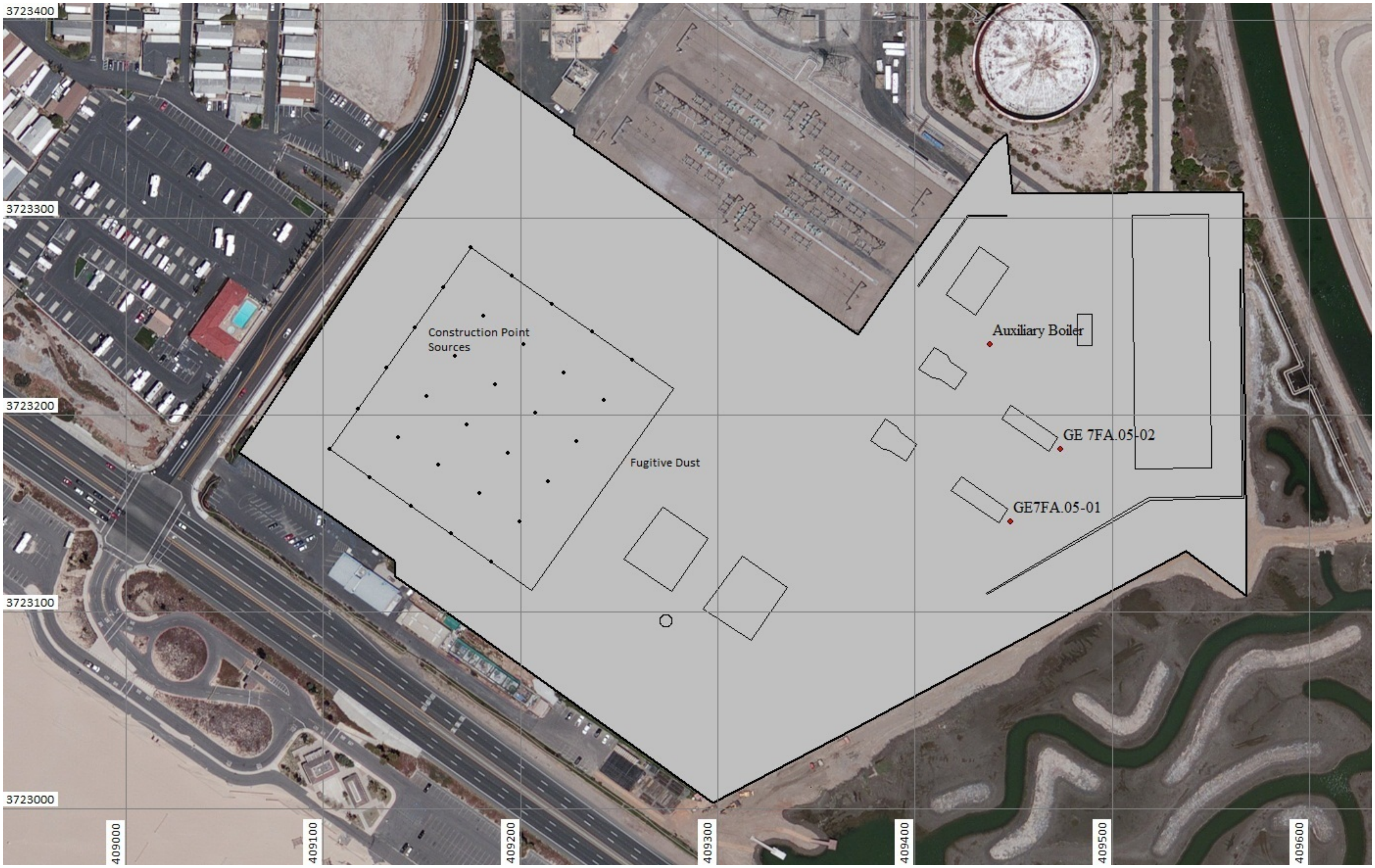
Amended Huntington Beach Energy Project
Figure 5.1C-5
AERMOD LMS 100PB Commissioning Model Setup
September 2015



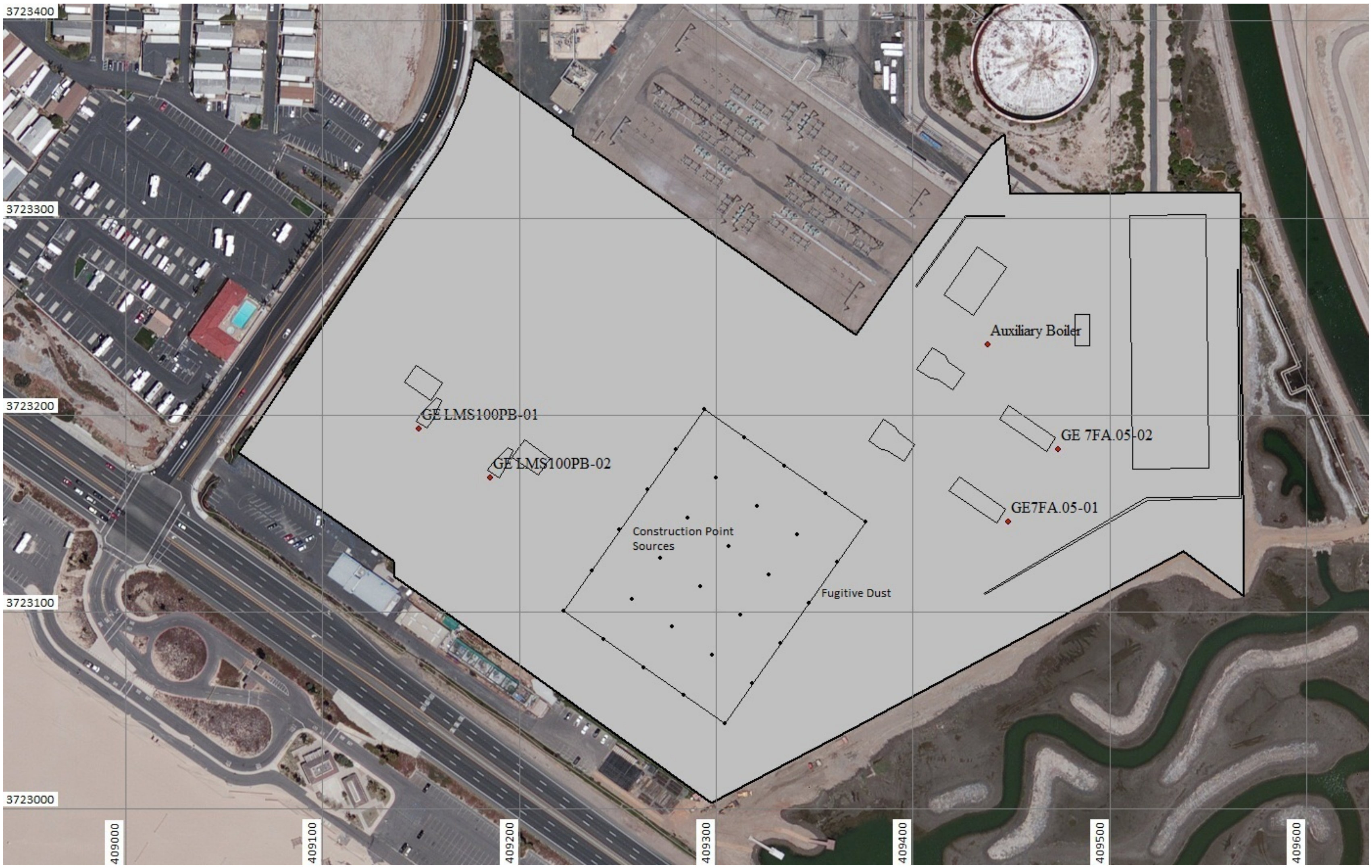
Amended Huntington Beach Energy Project
Figure 5.1C-6
AERMOD Operational Model Setup
September 2015



Amended Huntington Beach Energy Project
Figure 5.1C-7
AERMOD Combined Cycle Power Block Operation with Simple Cycle Power Block Construction Model Setup
September 2015



Amended Huntington Beach Energy Project
Figure 5.1C-8
AERMOD Amended HBEP Operation with Units 1 and 2 Demolition Model Setup
September 2015



Amended Huntington Beach Energy Project
Figure 5.1C-9
Competing Source Receptor Grid
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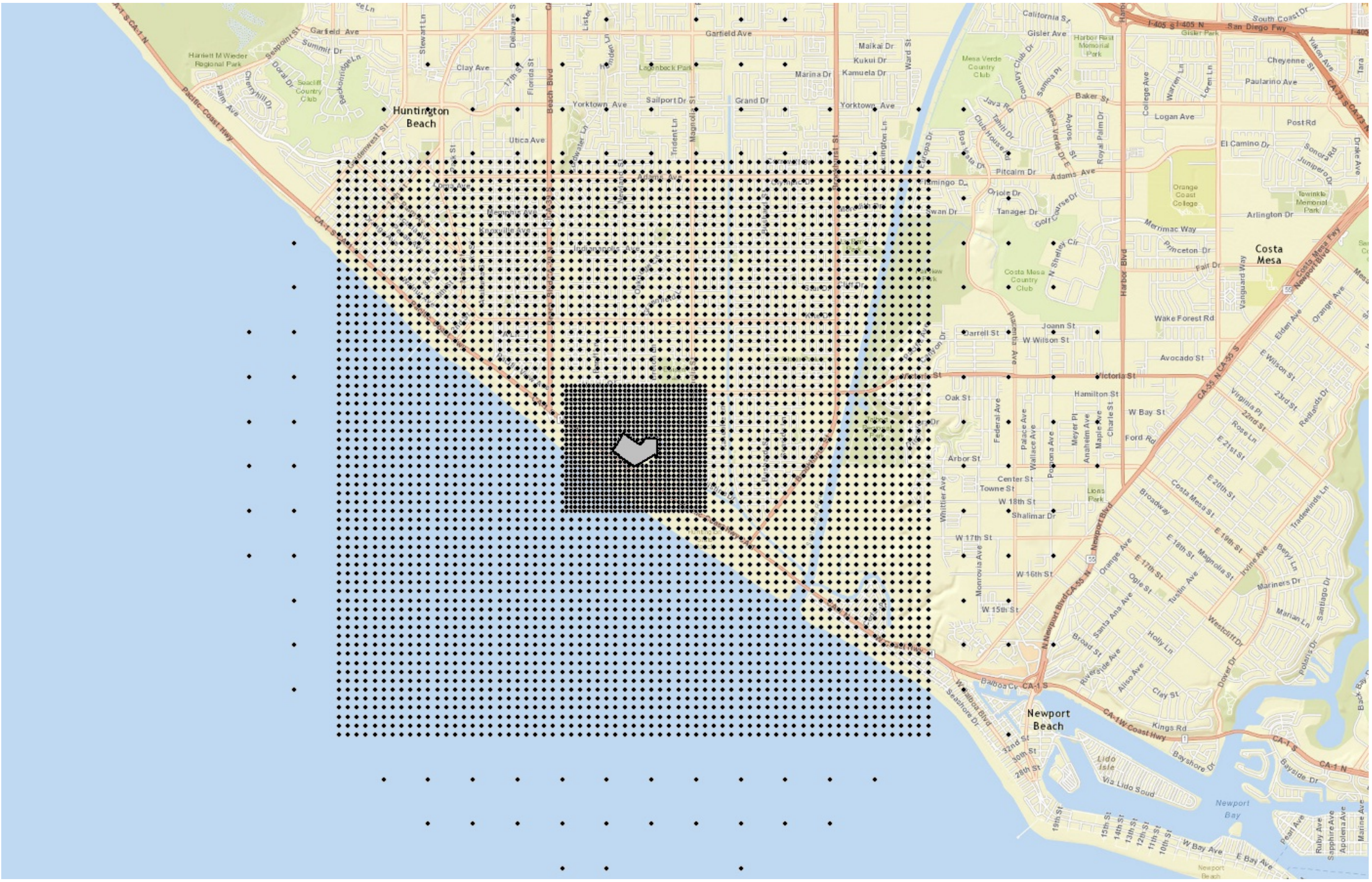

Appendix 5.1D
Criteria Pollutant and Greenhouse Gas BACT Analysis

APPENDIX 5.1D

Criteria Pollutant and Greenhouse Gas BACT Analysis

This Appendix contains the criteria pollutant and greenhouse gas Best Available Control Technology (BACT) analysis for the Amended Huntington Beach Energy Project. The files contained within this Appendix are as follows:

BACT Analysis Addendum	BACT Determination for the Amended Huntington Beach Energy Project (as updated from the 2012 BACT Analysis)
2012 BACT Analysis	BACT Determination for the (Licensed) Huntington Beach Energy Project

BACT Analysis Addendum for the Amended Huntington Beach Energy Project

PREPARED FOR: AES Southland Development, LLC

PREPARED BY: CH2M HILL

DATE: September 3, 2015

AES Southland Development, LLC (AES) proposes to construct the Amended Huntington Beach Energy Project (HBEP or project) at the existing AES Huntington Beach Generating Station site, located at 21730 Newland Street in Huntington Beach, California. The California Energy Commission (CEC) issued a license for the construction and operation of the HBEP on October 29, 2014. In November 2014, AES received notice from Southern California Edison (SCE) that it was shortlisted for a power purchase agreement (PPA). The power plant configuration selected by SCE for a PPA was different from the HBEP configuration licensed by the CEC. Therefore, AES is amending the HBEP's CEC license to be consistent with the SCE PPA.

The Amended HBEP will consist of one two-on-one combined-cycle power block and one simple-cycle power block with a net capacity of 844 megawatts (MW). The combined-cycle power block will consist of two General Electric (GE) 7FA.05 natural-gas-fired combustion turbines, one steam turbine, and an air-cooled condenser. Each combustion turbine will be equipped with a heat recovery steam generator (HRSG). The HRSG will **not** be fitted with supplemental natural gas firing (duct firing). The turbines will use advanced combustion controls, dry low oxides of nitrogen (NO_x) burners, and selective catalytic reduction (SCR) to limit NO_x emissions to 2 parts per million by volume (ppmv). Emissions of carbon monoxide (CO) and volatile organic compounds (VOC) will be limited to 2 ppmv and 2 ppmv, respectively, through the use of advanced combustion controls, combined with the use of an oxidation catalyst. The combined-cycle power block of the Amended HBEP will also include a natural-gas-fired auxiliary boiler, used to decrease the startup duration and air emissions of the combined-cycle turbines. The auxiliary boiler will include ultra-low-NO_x burners and/or SCR to control NO_x emissions to 5 ppmv.

The Amended HBEP simple-cycle power block will consist of two GE LMS-100PB natural-gas-fired combustion turbines and two closed-loop cooling fin fan coolers. The turbines will use advanced combustion controls, dry low NO_x burners, and SCR to limit NO_x emissions to 2.5 ppmv. Emissions of CO and VOC will be limited to 4 ppmv and 2 ppmv, respectively, through the use of advanced combustion controls, combined with the use of an oxidation catalyst. Good combustion practices and burning pipeline-quality natural gas will minimize emissions of the remaining pollutants for both the simple-cycle and combined-cycle turbines.

The Amended HBEP will be permitted through the South Coast Air Quality Management District's (SCAQMD) New Source Review (NSR) process. Because the Amended HBEP includes the use of steam to generate electricity, the Amended HBEP is also categorized as one of the 28 Prevention of Significant Deterioration (PSD) major source categories (40 Code of Federal Regulations [CFR] 52.21(b)(1)(i)). Therefore, the Amended HBEP is considered a new major source subject to PSD permitting requirements.

The Amended HBEP's potential to emit (PTE) is expected to exceed the 100 tons per year (tpy) threshold and will exceed the significant emission rates for VOC, CO, NO_x, particulate matter ($PM_{10/2.5}$), and greenhouse gas (GHG) air pollutants. Therefore, the Amended HBEP will be considered a major stationary source in accordance with PSD regulations. The SCAQMD has also been delegated partial PSD permitting authority. Therefore, the PSD Best Available Control Technology (BACT) analysis will be submitted to the SCAQMD as part of the permitting process.

The following memorandum provides an addendum to the BACT analysis previously prepared and submitted to the SCAQMD. The methodology and context for preparing this addendum BACT analysis are consistent with the BACT determination for the Licensed HBEP, as presented in *BACT Determination for the Huntington Beach Energy Project* (CH2M HILL, 2012).

The Amended HBEP's proposed emission rates for VOC, CO, NO_x, sulfur dioxide (SO_2), $PM_{10/2.5}$, ammonia, and GHG are presented in Table 1. These emission rates are consistent with previous BACT determinations issued by the SCAQMD.

TABLE 1
Maximum Pollutant Emission Rates for Operation of the Amended HBEP

Pollutant	Emission Limits (at 15% O_2)		
	One GE 7FA.05 [a]	**One GE LMS-100PB** [b]	**One Auxiliary Boiler** [c]
VOC	2 ppmv (averaged over 1-hour)	2 ppmv (averaged over 1-hour)	0.28 lb/hr
CO	2 ppmv (averaged over 1-hour)	4 ppmv (averaged over 1-hour)	50 ppmv (averaged over 1-hour)
NO_x	2 ppmv (averaged over 1-hour)	2.5 ppmv (averaged over 1-hour)	5 ppmv (averaged over 1-hour)
SO_2	<0.75 grain of sulfur per 100 dry standard cubic feet of natural gas		0.048 lb/hr
$PM_{10/2.5}$	9.00 lb/hr	6.24 lb/hr	0.30 lb/hr
Ammonia	5 ppmv	5 ppmv	5 ppmv
GHG [d]	766 lb CO_2/MWh (Net)	1,161 lb CO_2/MWh (Net)	N/A

[a] Maximum values are for each turbine at an ambient temperature of 32°F and excludes startups and shutdowns.

[b] Maximum values are for each turbine at an ambient temperature of 65.8°F and excludes startups and shutdowns.

[c] Maximum hourly emission rates assume 100 percent load.

[d] Includes an 8 percent degradation.

Notes:

CO_2 = carbon dioxide
°F = degrees Fahrenheit
N/A = not applicable (i.e., BACT analysis not required)
O_2 = oxygen
lb/hr = pound(s) per hour
lb/MWh = pound(s) per megawatt-hour

Accordingly, applicable BACT clearinghouse determinations and the Bay Area Air Quality Management District, California Air Resources Board (ARB), SCAQMD, and San Joaquin Valley Air Pollution Control District BACT determinations were reviewed to identify which criteria pollutant emission rates have been achieved in practice for other combined-cycle and simple-cycle natural-gas-fired combustion turbine projects.

After identifying recent BACT determinations (from the sources identified above), it was determined that recent BACT determinations for CO, NO_x, SO_2, and $PM_{10/2.5}$ are equal to or higher than the proposed BACT levels presented in Table 1. However, recent VOC determinations for combined-cycle combustion turbines were lower, ranging between 1 and 2 ppmv (see Table 2). Recently, the SCAQMD determined that the VOC BACT emission rate for combined-cycle power plants is 2 ppmv. Therefore, the Amended HBEP's proposed VOC BACT emission rate of 2 ppmv is consistent with this recent determination.

TABLE 2
Summary of VOC Emission Limits for Combined-cycle Combustion Turbines

Facility	Facility ID Number	VOC Emission Limit	Units
WEST DEPTFORD ENERGY	NJ-0074	1.9	ppmvd @15% O_2 (1-hour)
KING POWER STATION	TX-0590	1.8	ppmvd @15% O_2 (3-hour)
CPV CUNNINGHAM CREEK	VA-0261	1.8	ppmvd @15% O_2
LIBERTY GENERATING STATION	NJ-0043	1.7	ppmvd @15% O_2
FPL WEST COUNTY ENERGY CENTER	FL-0286	1.5	ppmvd @15% O_2
GENOVA ARKANSAS I, LLC	AR-0070	1.4	ppmvd @15% O_2
CPV ATLANTIC POWER GENERATING FACILITY	FL-0219	1.4	ppmvd @15% O_2
EL PASO BROWARD ENERGY CENTER	FL-0225	1.4	ppmvd @15% O_2
EL PASO MANATEE ENERGY CENTER	FL-0226	1.4	ppmvd @15% O_2
EL PASO BELLE GLADE ENERGY CENTER	FL-0227	1.4	ppmvd @15% O_2
NINEMILE POINT ELECTRIC GENERATING PLANT	LA-0254	1.4	ppmvd @15% O_2 (1-hour)
FPL MARTIN PLANT	FL-0244	1.3	ppmvd @15% O_2
FPL MANATEE PLANT - UNIT 3	FL-0245	1.3	ppmvd @15% O_2
TECO BAYSIDE POWER STATION	FL-0246	1.3	ppmvd @15% O_2
FPL TURKEY POINT POWER PLANT	FL-0263	1.3	ppmvd @15% O_2
COGEN TECHNOLOGIES LINDEN VENTURE, L.P	NJ-0059	1.2	ppmvd @15% O_2
CONECTIV BETHLEHEM, INC.	PA-0189	1.2	ppmvd @15% O_2
VA POWER - POSSUM POINT	VA-0255	1.2	ppmvd @15% O_2
FAIRBAULT ENERGY PARK	MN-0053	1	ppmvd @15% O_2 (3-hour)
LIBERTY GENERATING STATION	NJ-0043	1	ppmvd @15% O_2
EMPIRE POWER PLANT	NY-0100	1	ppmvd @15% O_2

Notes:

This table does not include all projects listed in the BACT databases. The purpose of this table is to present a summary of the most-stringent emission limits and to highlight any projects with an emission limit less than 2.0 ppm VOC identified during the database search.

ppmvd = part(s) per million by volume, dry

Source: U.S. Environmental Protection Agency (EPA), 2015; ARB, 2015

Similarly, the Amended HBEP's proposed BACT for the auxiliary boiler is consistent with the SCAQMD's determination for a similarly sized engine, as presented in Table 3.

TABLE 3
BACT Determination for Auxiliary Boiler (78.6 MMBtu/hr)

Pollutant	Emission Limits (at 3% O_2)
VOC	N/A
CO	400 ppmvd (averaged over 15 minutes)
NO_x	9 ppmvd (averaged over 15 minutes), except when flue gas temperature < 510°F
SO_2	N/A
PM	N/A
Ammonia	20 ppmvd (averaged over 15 minutes)
GHG	N/A

Source: SCAQMD, 2015

Notes:

MMBtu/hr = million British thermal units per hour

N/A = not applicable (i.e., no BACT determination made)

References

California Air Resources Board (ARB). 2015. BACT Clearinghouse. http://www.arb.ca.gov/bact/bactnew/rptpara.htm. Accessed September 3.

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South Coast Air Quality Management District (SCAQMD). 2015. *Section I – SCAQMD LAER/BACT Determinations*. http://www.aqmd.gov/home/permits/bact/guidelines/i---scaqmd-laer-bact. Accessed September 3.

U.S. Environmental Protection Agency (EPA). 2015. RACT/BACT/LAER Clearinghouse (RBLC). http://cfpub.epa.gov/rblc/. Accessed September 3.

BACT Determination for the Huntington Beach Energy Project

Prepared for

AES Southland Development, LLC

Submitted to

South Coast Air Quality Management District
EPA Region IX

June 2012

CH2MHILL®

Contents

Acronyms and Abbreviations

°F	degree(s) Fahrenheit
AES-SLD	AES Southland Development, LLC
AFC	Application for Certification
BAAQMD	Bay Area Air Quality Management District
BACT	best available control technology
Btu/kWh	British thermal units per kilowatt-hour
CAISO	California Independent System Operator
CARB	California Air Resources Board
CCS	carbon capture and storage
CEC	California Energy Commission
CFR	Code of Federal Regulations
CH_4	methane
CO	carbon monoxide
CO_2	carbon dioxide
CPUC	California Public Utilities Commission
CPV	Competitive Power Ventures
CTG	combustion turbine generator
DLN	dry low NO_x
DOE	U.S. Department of Energy
EOR	enhanced oil recovery
EPA	U.S. Environmental Protection Agency
GHG Tailoring Rule	Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule
GHG	greenhouse gases
GWh	gigawatt-hour(s)
H_2	hydrogen
HBEP	Huntington Beach Energy Project
HFC	hydrofluorocarbon
HHV	higher heating value
HRSG	heat recovery steam generator
IPCC	Intergovernmental Panel on Climate Change
LAER	Lowest Achievable Emission Rate
lb/hr	pound(s) per hour
lb/MMBtu	pound(s) per million British thermal unit
LHV	lower heating value
Mandatory Reporting Rule	EPA Final Mandatory Reporting of Greenhouse Gases Rule
MMBtu	million British thermal units
MMBtu/hr	million British thermal units per hour
MPSA	Mitsubishi Power Systems Americas
$MTCO_2$/MWh	metric ton(s) of carbon dioxide per megawatt-hour
MW	megawatt(s)
MWh	megawatt-hour(s)
N_2	nitrogen

N_2O	nitrous oxide
NATCARB	National Carbon Sequestration Database and Geographic Information System
NETL	National Energy Technology Laboratory
NGCC	natural gas combined-cycle
NO	nitric oxide
NO_2	nitrogen dioxide
NO_x	oxides of nitrogen
NSR	New Source Review
O_2	oxygen
OTC	once-through cooling
PFC	perfluorocarbons
PM_{10}	and particulate matter less than 10 microns in diameter
$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
ppm	part(s) per million
ppmv	part(s) per million by volume
ppmvd	part(s) per million dry volume
PSA	pressure swing adsorption
PSD	Prevention of Significant Deterioration
psig	pound(s) of force per square inch gauge
PTE	Potential to Emit
RACT	Retrofit Available Control Technology
RCEC	Russell City Energy Center
RPS	Renewable Portfolio Standard
SCAQMD	South Coast Air Quality Management District
scf	standard cubic feet
SCR	selective catalytic reduction
SF_6	sulfur hexafluoride
SJVAPCD	San Joaquin Valley Air Pollution Control District
SNCR	selective non-catalytic reduction
SO_2	sulfur dioxide
SoCalCarb	Southern California Carbon Sequestration Research Consortium
SoCalGas	Southern California Gas
SO_x	sulfur oxides
STG	steam turbine generator
SWRCB	State Water Resources Control Board
tpy	ton(s) per year
VOC	volatile organic compound
WestCarb	West Coast Regional Carbon Sequestration Partnership

SECTION 1
Project Description

1.1 Project Overview

AES Southland Development, LLC (AES-SLD) proposes to construct the Huntington Beach Energy Project (HBEP) at the existing AES Huntington Beach Generating Station site at 21730 Newland Street, Huntington Beach, California 92646. HBEP will consist of two, three-on-one combined-cycle power blocks with a net capacity of 939 megawatts (MW). Each power block will consist of three Mitsubishi Power Systems Americas (MPSA) 501DA combustion turbines (CTG), one steam turbine generator (STG), and an air-cooled condenser. Each combustion turbine will be equipped with a heat recovery steam generator (HRSG) and will employ supplemental natural gas firing (duct burning). The turbines will use dry low NO_x (DLN) burners and selective catalytic reduction (SCR) to limit NO_x (oxides of nitrogen) emissions to 2 parts per million by volume (ppmv). Emissions of carbon monoxide (CO) will be limited to 2 ppmv and volatile organic compounds (VOC) to 1 ppmv through the use of best combustion practices and an oxidation catalyst. Best combustion practices and burning pipeline-quality natural gas will minimize emissions of the remaining pollutants.

HBEP will retain the use of the two existing 275-horsepower diesel-fired emergency fire water pumps installed during the Huntington Beach Generating Station Units 3 and 4 retooling project in 2001. Because the existing fire water pumps are permitted sources by the South Coast Air Quality Management District (SCAQMD) and are not being modified nor will change their operating profile, the project owner has not included the fire pumps in the best available control technology (BACT) analysis for HBEP.

Authorization for the construction and operation of HBEP will be through the California Energy Commission (CEC) Application for Certification (AFC) licensing process and the SCAQMD New Source Review/Prevention of Significant Deterioration (NSR/PSD) permitting process. Because HBEP includes the use of steam to generate electricity, the project is also categorized as one of the 28 major PSD source categories (40 Code of Federal Regulations [CFR] 52.21(b)(1)(i)). Therefore, the project is subject to PSD permitting requirements if the Potential to Emit (PTE) from the project exceeds 100 tons per year (tpy) for any regulated pollutant, with the exception of greenhouse gases (GHG). The threshold for GHGs is a PTE of 100,000 tpy. Because the existing Huntington Beach Generating Station Units 1 and 2 will be retired and removed as part of the project, the maximum 2-year historical past actual emissions from these two units between calendar years 2007 and 2011 will be subtracted from the PTE for HBEP.

Despite the netting analysis, the resulting PTE is still expected to exceed the 100-tpy or 100,000-tpy threshold for at least one of the PSD-regulated pollutants. Therefore, the project will be considered a major stationary source in accordance with PSD regulations. The SCAQMD has also been delegated partial PSD permitting authority.[1] Therefore, the PSD BACT analysis is being submitted to the SCAQMD as part of the permitting process.

1.2 Project Objectives

HBEP’s key design objective is to provide up to 939 MW of environmentally responsible, cost-effective, operationally flexible, and efficient generating capacity to the western Los Angeles Basin Local Reliability Area in general, and specifically to the coastal area of Orange County. The project would serve local area reliability needs, southern California energy demand and provide controllable generation to allow the integration of the ever increasing contribution of intermittent renewable energy into the electrical grid. The project will displace older and less efficient generation in Southern California, and has been designed to start and stop very quickly and be able to quickly ramp up and down through a wide range of generating capacity. As more renewable electrical resources are brought on line as a result of electric utilities meeting California’s Renewable Portfolio Standard,

[1] http://www.epa.gov/region09/air/permit/pdf/full-scagmd-psd-delegation.pdf

projects strategically located within load centers and designed for fast starts and ramp-up and down capability, such as HBEP, will be critical in supporting both local electrical reliability and grid stability.

HBEP will provide needed electric generation capacity with improved efficiency and operational flexibility to help meet southern California's long-term electricity needs. The California Independent System Operator (CAISO) has identified a need for new power generation facilities in the western Los Angeles Basin Local Reliability Area to replace the ocean water once-through-cooling (OTC) plants that are expected to retire as a result of the California State Water Resources Control Board's (SWRCB) *Water Quality Control Policy on the Use of Coastal and Estuarine Waters for Power Plant Cooling* (OTC Policy) (CAISO, 2012a; SWRCB, 2010). The base case study results from CAISO's year 2021 long-term Local Capacity Requirement proceeding estimates that between 2,424 and 3,834 MW of new generation is required in the Los Angeles Basin due to planned OTC retirements consistent with SWRCB OTC Policy. The requirement for new generation in light of OTC retirements in the Los Angeles Basin is also confirmed in CAISO's Once-Through Cooling and AB-1318 Study Results presented on December 8, 2011 (CAISO, 2011). CAISO also notes that many of the OTC facilities have characteristics that support renewable integration and that repower or replacement generating capacity must retain or improve upon such capabilities (CAISO, 2012b).

The project objectives are also contingent on the use of the offset exemption contained within the SCAQMD's Rule 1304(a)(2) that allows for the replacement of older, less-efficient electric utility steam boilers with specific new generation technologies on a megawatt-to-megawatt basis (that is, the replacement megawatts are equal to or less than the megawatts from the electric utility steam boilers). The offset exemption in Rule 1304(a)(2) requires the electric utility steam boiler be replaced with one of several specific technologies, including the combined-cycle configuration used by HBEP.

HBEP was designed to address the local capacity requirements within the Los Angeles Basin with the following objectives:

- Provide the most efficient, reliable, and predictable power supply available by using combined-cycle, natural-gas-fired combustion turbine technology to replace the OTC generation, support the local capacity requirements of Southern California's Western Los Angeles Basin and be consistent with SCAQMD Rule 1304(a)(2).
- Develop a 939-MW project that provides efficient operational flexibility with rapid-start and steep ramping capability (30 percent per minute) to allow for the efficient integration of renewable energy sources into the California electrical grid with competitive electrical generation pricing.
- Reuse existing electrical, water, wastewater, and natural gas infrastructure and land to the extent possible to minimize terrestrial resource and environmental justice impacts by developing on a brownfield site.
- Secure a sufficient-sized site to maintain existing generating capacity to meet regional grid reliability requirements during the development of HBEP.
- Site the project to serve the Western Los Angeles Basin load center without constructing new transmission facilities.
- Assist the State of California in developing increased local generation projects, thus reducing dependence on imported power.
- Site the project on property that has industrial land use designation with consistent zoning.
- Ensure potential environmental impacts can be avoided, eliminated, or mitigated to a less-than-significant level.

Locating the project on an existing power plant site avoids the need to construct new linear facilities, including gas and water supply lines, discharge lines, and transmission interconnections. This reduces potential offsite environmental impacts, and the cost of construction. The proposed HBEP site meets all project siting objectives.

The HBEP will provide power to the grid to help meet the need for electricity and to help replace dirtier, less efficient fossil fuel generation resources retired because of the use of OTC. HBEP will enhance the reliability of the state's electrical system by providing power generation near the centers of electrical demand and providing fast response generating capacity to enable increased renewable energy development. Additionally, as demonstrated by the analyses contained in this AFC, the project would not result in any significant environmental impacts.

SECTION 2

Criteria Pollutant BACT Analysis

Based on the SCAQMD's BACT definition and major source thresholds (SCAQMD Rule 1302 and 1303), a BACT analysis is required for the uncontrolled emissions of NO_x, VOCs, CO, sulfur oxides (SO_x), and particulate matter less than 10 microns in diameter (PM_{10}) and particulate matter less than 2.5 microns in diameter ($PM_{2.5}$). Also, the U.S. Environmental Protection Agency (EPA) requires a BACT analysis for the emissions of GHGs as part of the PSD permit application required under the EPA Tailoring Rule. The GHG BACT analysis is included in the following section.

The project owner plans to rely on the response characteristics of the MPSA 501DA combustion turbines and duct burners to provide a wide range of efficient, operationally flexible, fast-start, fast-ramping capacity to allow for the efficient integration of renewable energy sources into the California electrical grid. The project owner has proposed two separate permit levels to allow the flexibility of operating the turbines with and without duct burners. The HBEP emission limits are presented in Table 2-1.

TABLE 2-1
Proposed Emission Limits for the Huntington Beach Energy Project

	Emission Limit (at 15 percent O_2)	
Pollutant	**Without Duct Burners**	**With Duct Burners**
NO_x	2.0 ppm (averaged over 1 hour)	2.0 ppm (averaged over 1 hour)
CO	2.0 ppm (averaged over 1 hour)	2.0 ppm (averaged over 1 hour)
VOC	1.0 ppm (averaged over 1 hour)	1.0 ppm (averaged over 3 hours)
PM_{10}	4.5 lb/hr	9.5 lb/hr
$PM_{2.5}$	4.5 lb/hr	9.5 lb/hr
SO_x	<0.75 grain of sulfur/100 scf of natural gas	<0.75 grain of sulfur/100 scf of natural gas

Notes:

lb/hr = pound(s) per hour
O_2 = oxygen
ppm = part(s) per million
scf = standard cubic feet

The following discussion presents an assessment of the BACT for HBEP (with and without duct burners) and includes the following components:

- Outline of the methodology used to conduct the criteria pollutant BACT analyses
- Discussion of the available technology options for controlling NO_x, CO, VOCs, PM_{10}, $PM_{2.5}$, and SO_x emissions
- Presentation of the proposed BACT emission levels identified for the HBEP

2.1 Methodology for Evaluating the Criteria Pollutant BACT Emission Levels

The NO_x, CO, VOC, PM_{10}, $PM_{2.5}$, and SO_x BACT analysis for the HBEP is based on the EPA's top-down analysis method. The following top-down analysis steps are listed in the EPA's *New Source Review Workshop Manual* (EPA, 1990):

- Step 1: Identify all control technologies
- Step 2: Eliminate technically infeasible options
- Step 3: Rank remaining control technologies by control effectiveness
- Step 4: Evaluate the most-effective controls, and document the results
- Step 5: Select the BACT

As part of the control technology ranking step (Step 3), emission limits for other recently permitted natural-gas-fired combustion turbines (with and without DUCT BURNERS) were compiled based on a search of the various federal, state, and local BACT, Retrofit Available Control Technology (RACT), and Lowest Achievable Emission Rate (LAER) databases. The following databases were included in the search:

- **EPA RACT/BACT/LAER Clearinghouse (EPA, 2012)**
  - Search included the NO_x, CO, VOC, PM, and sulfur dioxide (SO_2) BACT/LAER determinations for combined-cycle and cogeneration, large combustion turbines (greater than 25 MW) with permit dates between 2001 and April 2012.
- **California Air Pollution Control Officers Association / California Air Resources Board (CARB) BACT Clearinghouse (CARB, 2012)**
  - Search included the BACT determinations listed in CARB's BACT clearinghouse for combined-cycle turbines from all California air districts.
- **Local Air Pollution Control Districts BACT Guidelines/Clearinghouses:**
  - **SCAQMD BACT Guidelines (SCAQMD, 2012)**
    - Search included the BACT determinations for combined-cycle gas turbines listed in SCAQMD BACT Guidelines for major sources.
  - **Bay Area Air Quality Management District (BAAQMD) BACT/Toxics BACT Guidelines (BAAQMD, 2012)**
    - Search included the BACT determinations for combined-cycle turbines equal to or greater than 40 MW in Section 2, Combustion Sources, in the BAAQMD BACT Guidelines.
  - **San Joaquin Valley Air Pollution Control District (SJVAPCD) BACT Clearinghouse (SJVAPCD, 2012)**
    - Search included the BACT determinations listed under the SJVAPCD BACT Guideline Section 3.4.2 (combined-cycle, uniform-load gas turbines greater than 50 MW)
- **BACT Analyses for Recently Permitted Combustion Turbine CEC Projects (CEC, 2012)**
  - Review included the BACT analysis for the Pio Pico, GWF Tracy, Hanford, and Henrietta projects, the Oakley Generating Station Project, the Mariposa Energy Project, the Russell City Energy Center, the Los Esteros Critical Energy Facility – Phase 1 and Phase 2, the Palmdale Hybrid Power Project, and the Watson Cogeneration and Electric Reliability Project.

The natural-gas-fired combustion turbine permit emission limits for each of the BACT pollutants at other recently permitted facilities were then compared to the proposed emission limits for the HBEP, as set forth in Table 2-1. If the emission limits at other facilities were less than the values in Table 2-1, additional research was conducted to find which turbine technology had been selected and whether the facilities had been constructed (Step 3). If it could be demonstrated that other units with lower emission rates either had not yet been built or used a different turbine technology than that selected for the HBEP, the proposed emission limits for the HBEP were determined to be BACT (Step 5).

2.2 Criteria Pollutant BACT Analysis

2.2.1 Oxides of Nitrogen

NO_x is a byproduct of the combustion of an air-and-fuel mixture in a high-temperature environment. NO_x is formed when the heat of combustion causes the nitrogen (N_2) molecules in the combustion air to dissociate into individual N_2 atoms, which then combine with O_2 atoms to form nitric oxide (NO) and nitrogen dioxide (NO_2). The principal form of nitrogen oxide produced during turbine combustion is NO, but NO reacts quickly to form NO_2, creating a mixture of NO and NO_2 commonly called NO_x.

2.2.1.1 Identification of Combustion Turbine NO_x Emissions Control Technologies – Step 1

Several combustion and post-combustion technologies are available for controlling turbine NO_x emissions. Combustion controls minimize the amount of NO_x created during the combustion process, and post-combustion controls remove NO_x from the exhaust stream after the combustion has occurred. Following are the three basic strategies for reducing NO_x during the combustion process:

1. Reduction of the peak combustion temperature
2. Reduction in the amount of time the air and fuel mixture is exposed to the high combustion temperature
3. Reduction in the O_2 level in the primary combustion zone

Following is a discussion of the potential control technologies for combined-cycle and cogeneration combustion turbines:

NO_x Combustion Control Technologies. The two combustion controls for combustion turbines are (1) the use of water or steam injection, and (2) DLN combustors, which include lean premix and catalytic combustors.

Water or Steam Injection. The injection of water or steam into the combustor of a gas turbine quenches the flame and absorbs heat, reducing the combustion temperature. This temperature reduction reduces the formation of thermal NO_x. Water or steam injection also allows more fuel to be burned without overheating critical turbine parts, increasing the combustion turbine maximum power output. Combined with a post-combustion control technology, water or injection can achieve a NO_x emission of 25 part(s) per million dry volume (ppmvd) at 15 percent O_2, but with the added economic, energy, and environmental expense of using water.

DLN Combustors. Conventional combustors are diffusion-controlled. The fuel and air are injected separately, with combustion occurring at the stoichiometric interfaces. This method of combustion results in combustion “hot spots,” which produce higher levels of NO_x. The lean premix and catalytic technologies are two types of DLN combustors that are available alternatives to the conventional combustors to reduce NO_x combustion “hot spots.”

In the lean premix combustor, which is the most popular DLN combustor available, the combustors reduce the formation of thermal NO_x through the following: (1) using excess air to reduce the flame temperature (i.e., lean combustion); (2) reducing combustor residence time to limit exposure in a high-temperature environment; (3) mixing fuel and air in an initial “pre-combustion” stage to produce a lean and uniform fuel/air mixture that is delivered to a secondary stage where combustion takes place; and/or (4) achieving two-stage rich/lean combustion using a primary fuel-rich combustion stage to limit the amount of O_2 available to combine with N_2 and then a secondary lean burn-stage to complete combustion in a cooler environment. Lean premix combustors have only been developed for gas-fired turbines. The more-advanced designs are capable of achieving a 70- to 90 percent NO_x reduction with a vendor-guaranteed NO_x concentration of 9 to 25 ppmvd.

Catalytic combustors use a catalyst to allow the combustion reaction to take place with a lower peak flame temperature to reduce thermal NO_x formation. The catalytic combustor uses a flameless catalytic combustion module, followed by completion of combustion (at lower temperatures) downstream of the catalyst.

Neither water injection nor DLN combustors can control NO_x formed from the use of duct burners to supplementally fire the HRSGs in a combined cycle configuration. NO_x from duct burners is controlled by limiting the amount of duct firing required and with post-combustion pollution control technologies.

Post-combustion NO_x Control Technologies. Three post-combustion controls are available for combustion turbines: (1) SCR, (2) SCONOx™ (that is, EMx), and (3) selective non-catalytic reduction (SNCR). Both SCR and EMx control technologies use a catalyst bed to control the NO_x emissions and, combined with DLN or water injection, are capable of achieving NO_x emissions levels of 2.0 ppmvd for combined-cycle gas turbines. EMx uses a hydrogen regeneration gas to convert the NO_x to elemental N_2 and water. SNCR also uses ammonia to control NO_x emissions but without a catalyst.

Selective Catalytic Reduction. SCR is a post-combustion control technology designed to control NO_x emissions from gas turbines. The SCR system is placed inside the exhaust ductwork and consists of a catalyst bed with an ammonia injection grid located upstream of the catalyst. The ammonia reacts with the NO_x and O_2 in the presence of a catalyst to form N_2 and water. The catalyst consists of a support system with a catalyst coating typically of titanium dioxide, vanadium pentoxide, or zeolite. A small amount of ammonia is not consumed in the reaction and is emitted in the exhaust stream; this is referred to as "ammonia slip."

EMx System. The EMx system uses a single catalyst to remove NO_x emissions in the turbine exhaust gas by oxidizing NO to NO_2 and then absorbing NO_2 onto the catalytic surface using a potassium carbonate absorber coating. The potassium carbonate coating reacts with NO_2 to form potassium nitrites and nitrates, which are deposited onto the catalyst surface. The optimal temperature window for operation of the EMx catalyst is from 300 to 700 degrees Fahrenheit (°F). EMx does not use ammonia, so there are no ammonia emissions from this catalyst system (CARB, 2004).

When all of the potassium carbonate absorber coating has been converted to N_2 compounds, NO_x can no longer be absorbed and the catalyst must be regenerated. Regeneration is accomplished by passing a dilute hydrogen-reducing gas across the surface of the catalyst in the absence of O_2. Hydrogen in the gas reacts with the nitrites and nitrates to form water and N_2. Carbon dioxide (CO_2) in the gas reacts with the potassium nitrite and nitrates to form potassium carbonate, which is the absorbing surface coating on the catalyst. The regeneration gas is produced by reacting natural gas with a carrier gas (such as steam) over a steam-reforming catalyst (CARB, 2004).

Selective Non-catalytic Reduction. SNCR involves injection of ammonia or urea with proprietary conditioners into the exhaust gas stream without a catalyst. SNCR technology requires gas temperatures in the range of 1,600 to 2,100 °F[2]. This technology is not available for combustion turbines because gas turbine exhaust temperatures are below the minimum temperature required of 1,600°F.

2.2.1.2 Eliminate Technically Infeasible Options – Step 2

Pre-combustion NO_x Control Technologies

Water or Steam Injection. The use of water or steam injection is considered a feasible technology for reducing NO_x emissions to 25 ppmvd when firing natural gas under most ambient conditions. Combined with SCR, water or steam injection can achieve 2 ppmvd NO_x levels but at a slightly lower thermal efficiency as compared to DLN combustors.

DLN Combustors. The use of DLN combustors is a feasible technology for reducing NO_x emissions from the HBEP. DLN combustors are capable of achieving 9 to 25 ppmvd NO_x emission over a relatively large operating range (70 to 100 percent load), and when combined with SCR can achieve controlled NO_x emissions of 2 ppmvd.

The XONON™ technology has been demonstrated successfully in a 1.5-MW simple-cycle pilot facility, and it is commercially available for turbines rated up to 10 MW, but catalytic combustors such as XONON™ have not been demonstrated on an industrial E Class gas turbine. Therefore, the technology is not considered feasible for the proposed HBEP.

Post-combustion NO_x Control Technologies

Selective Catalytic Reduction. The use of SCR, with an ammonia slip of less than 5 ppm, is considered a feasible technology for reducing NO_x emissions to 2 ppmvd at 15 percent O_2 when firing natural gas.

EMx System. In the Palmdale Hybrid Power Project PSD permit, EPA noted that it appears EMx has only been demonstrated to achieve 2.5 ppm NO_x (EPA, 2011). In addition, the BAAQMD concluded in a recent permitting case that "it is clear that EMx is not as developed as SCR at this time and cannot achieve the same level of emissions performance that SCR is capable of" (BAAQMD, 2011). Therefore, EMx technology is not considered feasible for achieving the proposed HBEP NO_x limit of 2.0 ppm NO_x.

[2] http://www.icac.com/i4a/pages/index.cfm?pageid=3399

Selective Non-catalytic Reduction. SNCR requires a temperature window that is higher than the exhaust temperatures from natural-gas-fired combustion turbine installations. Therefore, SNCR is not considered technically feasible for the proposed HBEP.

2.2.1.3 Combustion Turbine NO_x Control Technology Ranking – Step 3

Based on the preceding discussion, the use of water injection, DLN combustors, and SCR are the effective and technically feasible NO_x control technologies available for the HBEP. DLN combustors were selected because these allow for lower NO_x emission rate (9 ppmvd) from the combustion turbine over either water or steam (wet) injection (25 ppmvd). Furthermore, DLN combustors result in a very slight improvement in thermal efficiency over the wet injection NO_x control alternative and reduce the HBEP's water consumption. When used in combination with SCR, these technologies will control NO_x emissions to 2.0 ppm (1-hour) with and without duct burners.

Applicable BACT clearinghouse determinations and the BAAQMD, CARB, SCAQMD, and SJVAPCD BACT determinations were reviewed to identify which NO_x emission rates have been achieved in practice for other natural-gas-fired combustion turbine projects. The results of this review are presented in Table 2-2.

TABLE 2-2
Summary of NO_x Emission Limits for Combustion Turbines
Technology Ranking for Turbines With and Without Duct Burning

Facility	Facility ID Number	NO_x Emission Limit at 15 percent O_2
Middleton Facility	ID-0010	3.0 ppm (24-hour) without duct burners; 3.5 ppm (24-hour) with duct burners
Mirant Gastonia Power Facility	NC-0095	2.5 ppm (24-hour) for first 500 hour, 3.5 ppm (24-hour) after
Berrien Energy, LLC	MI-0366	2.5 ppm (24-hour)
Black Hills Corp./Neil Simpson	WY-0061	2.5 ppm (24-hour)
COB Energy Facility, LLC	OR-0039	2.5 ppm (4-hour)
Kelson Ridge	MD-0033	2.5 ppm (3-hour)
Kyrene Generating Station, Salt River Project	AZ-0041	2.5 ppm (3-hour)
Duke Energy Wythe, LLC	VA-0289	2.5 ppm
Port Westward Plant	OR-0035	2.5 ppm
FPL Martin Plant	FL-0244	2.5 ppm
Empire Power Plant	NY-0100	2.0 ppm (3-hour) without duct burners; 3.0 ppm (3-hour) with duct burners
Tracy Substation Expansion Project	NV-0035	2.0 ppm (3-hour)
Langley Gulch Power Plant	ID-0018	2.0 ppm (3-hour)
Palomar Escondido – SDG&E	2001-AFC-24	2.0 ppm (1-hour); 2.0 ppm (3-hour) with duct burners or transient hour of +25 MW
Warren County Facility	VA-0308	2.0 ppm with or without duct burners
Ivanpah Energy Center, L.P.	NV-0038	2.0 ppm (1-hour) without duct burners; 13.96 lb/hr with duct burners
Gila Bend Power Generating Station	AZ-0038	2.0 ppm (1-hour)
Duke Energy Arlington Valley	AZ-0043	2.0 ppm (1-hour)
Colusa II Generation Station	2006-AFC-9	2.0 ppm (1-hour)
Avenal Energy – Avenal Power Center, LLC	2008-AFC-1	2.0 ppm (1-hour)
Russell City Energy Center	2001-AFC-7	2.0 ppm (1-hour)

TABLE 2-2
Summary of NO_x Emission Limits for Combustion Turbines
Technology Ranking for Turbines With and Without Duct Burning

Facility	Facility ID Number	NO_x Emission Limit at 15 percent O_2
CPV Warren	VA-0291	2.0 ppm (1-hour)
IDC Bellingham	CA-1050	2.0 ppm/1.5 ppm (1-hour)
Oakley Generating Station	2009-AFC-4	2.0 ppm (1-hour)
GWF Tracy Combined-cycle Project	2008-AFC-7	2.0 ppm (1-hour)
Watson Cogeneration Project	2009-AFC-1	2.0 ppm (1-hour)

Note: This table does not include all projects listed in the BACT databases. The purpose of this table is to present a summary of the most-stringent emission limits and to highlight any projects with an emission limit less than 2.0 ppm NO_x identified during the database search.

Source: EPA RACT/BACT/LAER Clearinghouse and the California Energy Commission (EPA, 2012 and CEC, 2012)

The review of these recent determinations identified only the IDC Bellingham Project as having emission limits less than the proposed BACT emission limit for the HBEP of 2.0 ppm NO_x. Based on the Final Determination of Compliance for the Oakley Generating Station Project, BAAQMD noted that the IDC Bellingham facility in Massachusetts was permitted with a two-tiered NO_x emission limit that imposed an absolute not-to-exceed limit of 2.0 ppm but also required the facility to maintain emissions below 1.5 ppm during normal operations (BAAQMD, 2011). However, BAAQMD also noted that the IDC Bellingham facility was never built, and that the emission limit was therefore never achieved in practice (BAAQMD, 2011). As a result, the proposed emission rate of 2.0 ppm (1-hour) with and without duct burners for HBEP is the lowest NO_x emission rate achieved in practice for similar sources and, therefore, is the BACT emission limit for NO_x control.

2.2.1.4 Evaluate Most-effective Controls and Document Results – Step 4

Based on the information presented in this BACT analysis, the proposed NO_x emission rates of 2.0 ppm (1-hour) with and without duct burners are the lowest NO_x emission rates achieved in practice at similar sources. Therefore, an assessment of the economic and environmental impacts is not necessary.

2.2.1.5 NO_x BACT Selection – Step 5

The proposed BACT for NO_x emissions from the HBEP is the use of DLN combustors with SCR to control NO_x emissions to 2.0 ppmvd (1-hour average) with and without duct burners.

2.2.2 CO

CO is discharged into the atmosphere when some of the fuel remains unburned or is only partially burned (incomplete combustion) during the combustion process. CO emissions are also affected by the gas turbine operating load conditions. CO emissions can be higher for gas turbines operating at low loads than for similar gas turbines operating at higher loads (EPA, 2006).

2.2.2.1 Identification of Combustion Turbine CO Emissions Control Technologies – Step 1

Effective combustor design and post-combustion control using an oxidation catalyst are two technologies (discussed below) for controlling CO emissions from a combustion turbine. As noted in the NO_x BACT analysis, the EMx and XONON technologies were determined to not be feasible for HBEP.

Best Combustion Control. CO is formed during the combustion process as a result of incomplete combustion of the carbon present in the fuel. The formation of CO is limited by designing the combustion system to completely oxidize the fuel carbon to CO_2. This is achieved by ensuring that the combustor is designed to allow complete mixing of the combustion air and fuel at combustion temperatures (in excess of 1,800°F) with an excess of combustion air. Higher combustion temperatures tend to reduce the formation of CO but increase the formation of NO_x. The application of water injection or staged combustion (DLN combustors) tends to lower combustion temperatures (in order to reduce NO_x formation), potentially increasing CO formation. However, using good combustor design and following best operating practices will minimize the formation of CO while reducing the combustion temperature and NO_x emissions.

Oxidation Catalyst. An oxidation catalyst is typically a precious metal catalyst bed located in the HRSG. The catalyst enhances oxidation of CO to CO_2, without the addition of any reactant. Oxidation catalysts have been successfully installed on numerous simple- and combined-cycle combustion turbines.

2.2.2.2 Eliminate Technically Infeasible Options – Step 2

Using good combustor design, following best operating practices, and using an oxidation catalyst are technically feasible options for controlling CO emissions from the proposed HBEP.

2.2.2.3 Combustion Turbine CO Control Technology Ranking – Step 3

Based on the preceding discussion, using best combustor control and an oxidation catalyst are technically feasible combustion turbine control technologies available to control CO emissions. Accordingly, the project owner proposes to control CO emissions using both methods to meet a CO emission limit of 2.0 ppmvd (1-hour) with and without duct burners.

Applicable BACT clearinghouse determinations and the SCAQMD, EPA, BAAQMD, CARB, and SJVAPCD BACT determinations were reviewed to determine whether CO emission rates less than the proposed HBEP levels have been achieved in practice for other natural-gas-fired combustion turbine projects. A summary of the emission limits for projects identified in the database is presented in Table 2-3. As this table demonstrates, most projects have CO emission rates that are the same as or higher than the CO emission rate proposed for the HBEP. However, three projects have CO emission rates that are lower than the CO emission rate proposed for the HBEP. These projects are discussed below.

TABLE 2-3
Summary of CO Emission Limits for Combined-cycle Turbines
Emission Control Ranking for Turbines With and Without Duct Burner Firing

Facility	Facility ID Number	CO Emission Limit at 15 percent O_2
La Paz Generating Facility	AZ-0049	3.0 ppm (3-hour)
Rocky Mountain Energy Center	CO-0056	3.0 ppm
Welton Mohawk Generating Station	AZ-0047	3.0 ppm with duct burners (3-hour)
Copper Mountain Power	NV-0037	3.0 ppm with duct burners (3-hour)
Currant Creek	UT-0066	3.0 ppm (3-hour)
Lawrence Energy	OH-0248	2.0 ppm without duct burners; 10.0 ppm with duct burners
Berrien Energy, LLC	MI-0366	2.0 ppm without duct burners (3-hour); 4.0 ppm with duct burners (3-hour)
COB Energy Facility	OR-0039	2.0 ppm (4-hour)
Avenal Energy – Avenal Power Center, LLC	2008-AFC-1	2.0 ppm (3-hour)
Wallula Power Plant	WA-0291	2.0 ppm (3-hour)
Duke Energy Arlington Valley (AVEFII)	AZ-0043	2.0 ppm (3-hour)
Wanapa Energy Center	OR-0041	2.0 ppm (3-hour)
Vernon City Light and Power	CA-1096	2.0 ppm (3-hour)
Mariposa Energy Project	2009-AFC-3	2.0 ppm (3-hour)
Palmdale Hybrid Power Plant Project	08-AFC-9	2.0 ppm without duct burners (1-hour); 3.0 ppm with duct burners (1-hour)

TABLE 2-3
Summary of CO Emission Limits for Combined-cycle Turbines
Emission Control Ranking for Turbines With and Without Duct Burner Firing

Facility	Facility ID Number	CO Emission Limit at 15 percent O_2
Wansley Combined-cycle Energy Facility	GA-0102	2.0 ppm with duct burners
McIntosh Combined-cycle Facility	GA-0105	2.0 ppm with duct burners
Sumas Energy 2 Generation Facility	WA-0315	2.0 ppm (1-hour)
Oakley Generating Station	2009-AFC-4	2.0 ppm (1-hour)
Goldendale Energy	WA-302	2.0 ppm (1-hour)
IDC Bellingham	CA-1050	2.0 ppm (1-hour)
Russell City Energy Center	2001-AFC-7	2.0 ppm with duct burners (1-hour)
Watson Cogeneration Project	2009-AFC-1	2.0 ppm with duct burners (1-hour)
Magnolia Power Project	CA-1097	2.0 ppm with duct burners (1-hour)
CPV Warren	VA-0291	1.3 ppm without duct burners; 1.2 ppm with duct burners
Warren County Facility	VA-0308	1.3 ppm without duct burners
Kleen Energy Systems	CT-0151	0.9 ppm (1-hour)

Note: This table does not include all projects listed in the BACT databases. The purpose of this table is to present a summary of the most-stringent emission limits and to highlight any projects with an emission limit less than 2.0 ppm CO identified during the database search.

Source: EPA RACT/BACT/LAER Clearinghouse and the California Energy Commission (EPA, 2012 and CEC, 2012).

Competitive Power Ventures (CPV) Warren and Warren County Facilities. A new PSD permit application was submitted in April 2010 to the Virginia Department of Environmental Quality by Virginia Electric Power and Power Company (Dominion), and the final PSD permit was issued on December 21, 2010. The final PSD permit includes CO emission limits of 1.5 ppm and 2.4 ppm, on a 1-hour averaging basis for operating conditions without and with duct burner, respectively. Based on publically available information, Dominion expects commercial operation of the Warren facility to occur in late 2014 or early 2015. Therefore, this level of control has not been demonstrated in practice on a long-term basis with a short (1-hour) averaging period.

Kleen Energy Systems. The Kleen Energy Systems facility conducted the initial source tests in June 2011. Based on a November 2011 letter from the Connecticut Department of Energy & Environmental Protection, the facility was able to successfully demonstrate compliance with the CO emission limits of 0.9 and 1.5 ppmvd for unfired and fired operation, respectively. However, given the lack of long-term compliance with these lower emission limits, these CO emission levels are not considered achieved in practice at this time.

Conclusion. As shown in Table 2-3, the proposed CO emission rate of 2.0 ppmvd (1-hour) with and without duct burners for the HBEP is the lowest CO emission rate achieved in practice for other facilities using good combustion practices and an oxidation catalyst.

2.2.2.4 Evaluate Most Effective Controls and Document Results – Step 4

The proposed CO emission rate of 2.0 ppmvd (1-hour) with and without duct burners for the HBEP is the lowest CO emission rate achieved or verified with long-term compliance records for other similar facilities. Therefore, an assessment of the economic and environmental impacts is not necessary.

2.2.2.5 CO BACT Selection – Step 5

The BACT for CO emissions from the HBEP is good combustion design and the installation of an oxidation catalyst system to control CO emissions to 2.0 ppmvd (1-hour) with and without duct burners.

2.2.3 VOCs

The pollutants commonly classified as VOCs are discharged into the atmosphere when some of the fuel remains unburned or is only partially burned (incomplete combustion) during the combustion process

2.2.3.1 Identification of Combustion Turbine VOC Emissions Control Technologies – Step 1

Effective combustor design and post-combustion control using an oxidation catalyst are two technologies for controlling VOC emissions from a combustion turbine. The industrial combustion turbine proposed for HBEP is able to achieve relatively low, uncontrolled VOC emissions of approximately 3 ppmvd because the combustors have a firing temperature of approximately 2,500°F with an exhaust temperature of approximately 1,000°F. A DLN-equipped combustion turbine that incorporates an oxidation catalyst system can achieve VOC emissions in the 2 ppmvd range. As noted in the NOx BACT analysis, the EMx and XONON technologies were determined to not be feasible for HBEP.

Best Combustion Control. As previously discussed, VOCs are formed during the combustion process as a result of incomplete combustion of the carbon present in the fuel. The formation of VOC is limited by designing the combustion system to completely oxidize the fuel carbon to CO_2. This is achieved by ensuring that the combustor is designed to allow complete mixing of the combustion air and fuel at combustion temperatures with an excess of combustion air. Higher combustion temperatures tend to reduce the formation of VOC but increase the formation of NO_x. The application of water injection or staged combustion (DLN combustors) tends to lower combustion temperatures (to reduce NO_x formation), potentially increasing VOC formation. However, good combustor design and best operating practices will minimize the formation of VOC while reducing the combustion temperature and NO_x emissions.

Oxidation Catalyst. An oxidation catalyst is typically a precious metal catalyst bed located in the exhaust duct. The catalyst enhances oxidation of VOC to CO_2 without the addition of any reactant. Oxidation catalysts have been successfully installed on numerous simple- and combined-cycle combustion turbines.

2.2.3.2 Eliminate Technically Infeasible Options – Step 2

Good combustor design and the use of an oxidation catalyst are both technically feasible options for controlling VOC emissions from the proposed HBEP.

2.2.3.3 Combustion Turbine VOC Control Technology Ranking – Step 3

Based on the preceding discussion, using good combustor control and an oxidation catalyst are technically feasible combustion turbine control technologies available to control VOC emissions. Accordingly, the project owner proposes to control VOC emissions using both methods to meet a VOC emission limit of 1.0 ppmvd (1-hour) without duct burners and 1.0 ppmvd (3-hour) with duct burners.

Applicable BACT clearinghouse determinations and the SCAQMD, EPA, BAAQMD, CARB, and SJVAPCD BACT determinations were reviewed to determine whether VOC emission rates less than the proposed HBEP levels have been achieved in practice for other natural-gas-fired combustion turbine projects. A summary of the emission limits for projects identified in the database is presented in Table 2-4.

TABLE 2-4
Summary of VOC Emission Limits for Combined-cycle Turbines
Emission Control Ranking for Turbines With and Without Duct Burner Firing

Facility	Facility ID Number	VOC Emission Limit at 15 percent O_2
Florida Power and Light Martin Plant	FL-0244	1.3 ppm without duct burners; 4 ppm with duct burners
Duke Energy Arlington Valley (AVEFII)	AZ-0043	1 ppm without duct burners (3-hour); 4 ppm with duct burners (3-hour)
Fairbault Energy Park	MN-0071	1.5 ppm without duct burners; 3.0 ppm with duct burners
VA Power – Possum Point	VA-0255	1.2 ppm without duct burners; 2.3 ppm with duct burners

TABLE 2-4
Summary of VOC Emission Limits for Combined-cycle Turbines
Emission Control Ranking for Turbines With and Without Duct Burner Firing

Facility	Facility ID Number	VOC Emission Limit at 15 percent O_2
Los Esteros Critical Energy Facility – Phase 2c	2003-AFC-2	2.0 ppm with duct burners (3-hour)
GWF Tracy Combined-cycle Project	2008-AFC-7	1.5 ppm without duct burners (3-hour); 2.0 ppm with duct burners (3-hour)
Avenal Energy – Avenal Power Center, LLC	2008-AFC-1	1.4 ppm without duct burners; 2.0 ppm with duct burners (3-hour)
Watson Cogeneration Project	2009-AFC-1	2.0 ppm without duct burners (1-hour); 2.0 ppm with duct burners (1-hour)
Palmdale Hybrid Power Plant Project	SE 09-01	1.4 without duct burners (1-hour); 2.0 ppm with duct burners (1-hour)
Victorville Hybrid Gas-Solar	2007-AFC-1	1.4 ppm without duct burners; 2.0 ppm with duct burners
Colusa II Generation Station	2006-AFC-9	1.38 ppm without duct burners; 2.0 ppm with duct burners
FPL Turkey Point Power Plant	FL-0263	1.6 ppm without duct burners; 1.9 with duct burners
Plant McDonough Combined-cycle	GA-0127	1.0 ppm (1-hour) without; 1.8 ppm with duct burners (3-hour)
FPL West County Energy Center Unit 3	FL-0303	1.2 ppm with duct burners; 1.5 with duct burners
Gila Bend Power Generating Station	AZ-0038	1.4 ppm with duct burners
Liberty Generating Station	NJ-0043	1.0 ppm (no duct burners)
Empire Power Plant	NY-0100	1.0 ppm (no duct burners)
Fairbault Energy Park	MN-0053	1.0 ppm (3-hour) (no duct burners)
Oakley Generating Station	2009-AFC-4	1.0 ppm (1-hour) (no duct burners)
Sutter – Calpine	1997-AFC-02	1.0 ppm with duct burners (calendar day average)
Russell City Energy Center	2001-AFC-7	1.0 ppm with duct burners (1-hour)
CPV Warren	VA-0291	0.7 without duct burners; 1.6 with duct burners; (3-hour)
Warren County Facility	VA-0308	0.7 without duct burners; 1.0 with duct burners
Chouteau Power Plant	OK-0129	0.3 ppm (3-hour) with duct burners

Note: This table does not include all projects listed in the BACT databases. The purpose of this table is to present a summary of the most-stringent emission limits and to highlight any projects with an emission limit less than 1.0 ppm VOC identified during the database search.

Source: EPA RACT/BACT/LAER Clearinghouse and the CEC (EPA, 2012 and CEC, 2012).

As this table demonstrates, most projects have VOC emission rates that are the same as or higher than the VOC emission rate proposed for the HBEP. However, the following projects have VOC emission rates that are lower than the VOC emission rate proposed for the HBEP:

- Russell City Energy Center
- CPV Warren and Warren County facilities
- Chouteau Power Plant

Russell City Energy Center. The Russell City Energy Center (RCEC) has a VOC permit limit of 1.0 ppmvd at 15 percent O_2 with and without duct burners averaged over 1 hour. Although the 1.0 ppmvd limit averaged over a 1-hour period for the duct burners scenario is more restrictive than the proposed HBEP limit of 1.0 ppmvd at 15 percent O_2 averaged over a 3-hour period, construction of the RCEC has not been completed. Therefore, long-term demonstration of compliance with the proposed emission rate and averaging period has not been demonstrated in practice.

CPV Warren and Warren County Facilities. The Warren County Facility and CPV Warren are the same facility (Permit Number 81391). A new application submitted in April 2010 to the Virginia Department of Environmental Quality by Virginia Electric Power and Power Company (Dominion) will replace the listed determinations, and the final PSD permit was issued on December 21, 2010. The final PSD permit includes VOC emission limits of 0.7 ppm and 1.6 ppm on a 3-hour averaging basis for operating conditions without and with duct burner, respectively. Based on publically available information, Dominion expects commercial operation of the Warren facility to occur in late 2014 or early 2015. Therefore, this level of control has not been demonstrated in practice on a long-term basis.

Chouteau Power Plant. The Oklahoma Air Quality Division issued the Chouteau Power Plant a construction permit on January 20, 2009. The facility was built and is currently operational. The BACT analysis for the Chouteau Power Plant concluded that good combustion practices with an emission limit of 0.3 ppmvd at 15 percent O_2 for the Siemens-Westinghouse V84.3A model industrial frame combustion turbines was BACT (Fielder, 2009). However, the construction permit for the Chouteau Power Plant does not include a VOC concentration limit consistent with the BACT determination, but rather includes a mass emission limit of 5.27 pounds per hour with duct burners operating. The permit also includes the heat input for each turbine/HRSG of 1,882 million British thermal units per hour (MMBtu/hr). Using these values, the VOC emission rate in pound(s) per million British thermal unit (lb/MMBtu) is 0.028, whereas the HBEP maximum VOC emission rate is 0.0012 lb/MMBtu. Therefore, HBEP's VOC emission rate is lower than the Chouteau Power Plant permit value defined in units of lb/MMBtu.

Conclusion. As shown in Table 2-4, the proposed VOC emission rate of 1.0 ppmvd (1-hour) without duct burners and 1.0 ppmvd with duct burners (3-hour) for the HBEP is the lowest VOC emission rate demonstrated in practice or permitted for other facilities using good combustion practices and an oxidation catalyst.

2.2.3.4 Evaluate Most Effective Controls and Document Results – Step 4

The proposed VOC emission rate of 1.0 ppmvd (1-hour) without duct burners and 1.0 ppmvd with duct burners (3-hour) for the HBEP is the lowest VOC emission rate achieved or permitted for other similar facilities. Therefore, an assessment of the economic and environmental impacts is not necessary.

2.2.3.5 VOC BACT Selection – Step 5

The BACT for VOC emissions from the HBEP is good combustion design and the installation of an oxidation catalyst system to control VOC emissions to 1.0 ppmvd (1-hour) without duct burners and 1.0 ppmvd (3-hour) with duct burners.

2.2.4 PM_{10} and $PM_{2.5}$

PM from natural gas combustion has been estimated to be less than 1 micron in equivalent aerodynamic diameter, has filterable and condensable fractions, and is usually hydrocarbons of larger molecular weight that are not fully combusted (EPA, 2006). Because the particulate matter is less than 2.5 microns in diameter, the BACT control technology discussion assumes the control technologies for PM_{10} and $PM_{2.5}$ are the same.

2.2.4.1 Identification of Combustion Turbine PM_{10} and $PM_{2.5}$ Emissions Control Technologies – Step 1

Pre-combustion Particulate Control Technologies. The major sources of PM_{10} and $PM_{2.5}$ emissions from a natural-gas-fired gas turbine equipped with SCR for post-combustion control of NOx are: (1) the conversion of fuel sulfur to sulfates and ammonium sulfates; (2) unburned hydrocarbons that can lead to the formation of PM in the exhaust stack; and (3) PM in the ambient air entering the gas turbine through the inlet air filtration system, and the aqueous ammonia dilution air. Therefore, the use of clean-burning, low-sulfur fuels such as natural gas will result in minimal formation of PM_{10} and $PM_{2.5}$ during combustion. Best combustion practices will ensure proper air/fuel mixing ratios to achieve complete combustion, minimizing emissions of unburned hydrocarbons that can lead to formation of PM at the stack. In addition to good combustion, use of high-efficiency filtration on the inlet air and SCR dilution air system will minimize the entrainment of PM into the exhaust stream.

Post-combustion Particulate Control Technologies. Two post-combustion control technologies designed to reduce PM emissions from industrial sources are electrostatic precipitators and baghouses. However, neither of these control technologies is appropriate for use on natural-gas-fired turbines because of the very low levels and small aerodynamic diameter of PM from natural gas combustion.

2.2.4.2 Eliminate Technically Infeasible Options – Step 2

Electrostatic precipitators and baghouses are typically used on solid/liquid-fuel fired or other types of sources with high PM emission concentrations, and are not used in natural-gas-fired applications, which have inherently low PM emission concentrations. Therefore, electrostatic precipitators and baghouses are not considered technically feasible control technologies. However, best combustion practices, clean-burning fuels, and inlet air filtration are considered technically feasible for control of PM_{10} and $PM_{2.5}$ emissions from the HBEP.

2.2.4.3 Combustion Turbine PM_{10} and $PM_{2.5}$ Control Technology Ranking – Step 3

The use of best combustion practices, clean-burning fuels, and inlet air filtration are the technically feasible natural-gas-fired turbine control technologies proposed by the project owner to control PM_{10} and $PM_{2.5}$ emissions to 4.5 lb/hr without duct burners and 9.5 lb/hr with duct burners. Furthermore, because no add-on control devices are technically feasible to control PM emissions from natural-gas-fired turbines, there would be little an applicant could do beyond using best combustion practice and using clean-burning fuels and inlet air filtration to control particulate emissions (BAAQMD, 2011).

2.2.4.4 Evaluate Most Effective Controls and Document Results – Step 4

Based on the information presented in this BACT analysis, using proposed good combustion practice, pipeline-quality natural gas, and inlet air filtration to control $PM_{10}/PM_{2.5}$ emissions to 4.5 lb/hr without duct burners and 9.5 lb/hr with duct burners is consistent with BACT at other similar sources. Therefore, an assessment of the economic and environmental impacts is not necessary.

2.2.4.5 PM_{10} and $PM_{2.5}$ BACT Selection – Step 5

The BACT for $PM_{10}/PM_{2.5}$ emissions from the HBEP is using good combustion practice, pipeline-quality natural gas, and inlet air filtration to control $PM_{10}/PM_{2.5}$ emissions to 4.5 lb/hr without duct burners and 9.5 lb/hr with duct burners.

2.2.5 SO_2

Emissions of SO_x are entirely a function of the sulfur content in the fuel rather than any combustion variables. During the combustion process, essentially all the sulfur in the fuel is oxidized to SO_2.

2.2.5.1 Identification of Combustion Turbine SO_2 Emissions Control Technologies – Step 1

Two primary mechanisms are used to reduce SO_2 emissions from combustion sources: (1) reduce the amount of sulfur in the fuel, and (2) remove the sulfur from the combustion exhaust gases.

Limiting the amount of sulfur in the fuel is a common practice for natural-gas-fired turbines. For instance, natural-gas-fired turbines in California are typically required to combust only California Public Utilities Commission (CPUC) pipeline-quality natural gas with a sulfur content of less than 1 grain of sulfur per 100 scf. The HBEP would be supplied with natural gas from the Southern California Gas (SoCalGas) pipeline, which is limited by tariff Rule 30 to a maximum total fuel sulfur content of less than 0.75 grain of sulfur per 100 scf. Therefore, the use of pipeline-quality natural gas with low sulfur content is a BACT control technique for SO_2.

There are two principal types of post-combustion control technologies for SO_2—wet scrubbing and dry scrubbing. Wet scrubbers use an alkaline solution to remove the SO_2 from the exhaust gases. Dry scrubbers use an SO_2 sorbent injected as powder or slurry to remove the SO_2 from the exhaust stream. However, the SO_2

concentrations in the natural gas exhaust gases are too low for the scrubbing technologies to work effectively or to be technically feasible.

2.2.5.2 Eliminate Technically Infeasible Options – Step 2

Use of pipeline-quality natural gas with very low sulfur content is technically feasible for the HBEP. However, because sulfur emissions from natural-gas-fired turbines are extremely low when using pipeline-quality natural gas, the two post-combustion SO_2 controls for natural-gas fired turbines (wet and dry scrubbers) are not technically feasible.

2.2.5.3 Combustion Turbine SO_2 Control Technology Ranking – Step 3

Use of pipeline-quality natural gas with very low sulfur content is the only technically feasible SO_2 control technology for natural-gas-fired turbines, and it is the most effective SO_2 control technology used by all other natural-gas-fired turbines in California. Therefore, using pipeline-quality natural gas with a regulatory limit of 0.75 grain of sulfur per 100 scf of natural gas for the HBEP is BACT for SO_2.

2.2.5.4 Evaluate Most Effective Controls and Document Results – Step 4

Based on the information presented in this BACT analysis, the use of pipeline-quality natural gas with a maximum of 0.75 grain of sulfur per 100 scf of natural gas as a BACT control technique for SO_2 will achieve the lowest SO_2 emission rates achieved in practice at other similar sources. Therefore, an assessment of the economic and environmental impacts is not necessary.

2.2.5.5 SO_2 BACT Selection – Step 5

The BACT for SO_2 from the HBEP is use of pipeline-quality natural gas with a sulfur content of less than 0.75 grain of sulfur per 100 scf of natural gas.

2.2.6 BACT for Startups and Shutdowns

Startup and shutdown events are a normal part of the power plant operation, but they involve NO_x, CO, and VOC emissions rates that are highly variable and greater than emissions than during steady-state operation[3]. This is because emission control systems are not fully functional during these events. In the case of the DLN combustors, the turbines must achieve a minimum operating rate before these systems are functional. Likewise, the SCR and oxidation catalyst systems must be heated to a specific minimum temperature before the catalyst systems become effective. Furthermore, startup and shutdown emissions are dependent on a number of project specific factors; therefore, permitted startup and shutdown emission limits are highly variable. For these reasons, BACT for startup and shutdown will consider only the duration of these events.

2.2.6.1 Control Devices and Techniques to Limit Startup and Shutdown Emissions

The available approach to reducing startup and shutdown emissions from combustion turbines is to use best work practices. By following the plant equipment manufacturers' recommendations, power plant operators can limit the duration of each startup and shutdown event to the minimum duration achievable. Plant operators also use their own operational experience with their particular turbines and ancillary equipment to optimize startup and shutdown emissions. The proposed numerical emission limits for the startup and shutdowns are outlined below.

2.2.6.2 Determination of BACT Emissions Limit for Startups and Shutdowns

Startups. The combustion turbine vendor (MPSA) has determined a turbine startup period of 10 minutes from first fire to full load operation. This startup period does not include the warm-up time required by the SCR and oxidation catalyst systems, which is affected by the length of time the system has been inactive. The length of time is related to the temperature and pressure of the steam cycle. Three startup cases (hot, warm, and cold) were provided based on engineering estimates to reflect the different length of time between combustion turbine activity. A hot startup is defined as the turbine being inactive for up to 9 hours. A warm startup is defined as the

[3] Because $PM_{10/2.5}$ and SO_2 emissions are dependent on the amount of fuel combusted, $PM_{10/2.5}$ and SO_2 emissions during startup and shutdown would be less than full load operations since less fuel is consumed as compared to full load operations.

turbine being inactive for between 9 and 49 hours, and a cold startup is defined as the turbine being inactive for more than 49 hours. Table 2-5 presents the proposed startup emissions and durations proposed as BACT.

TABLE 2-5
Facility Startup Emission Rates Per Turbine

Startup	NO_x (lb/event)	CO (lb/event)	VOC (lb/event)	NO_x (lb/hr)	CO (lb/hr)	VOC (lb/hr)	Duration (minutes/event)
Cold	28.7	116	27.9	25.5	115.3	25.9	90
Warm	16.6	46.0	21.0	23.2	50.0	21.6	32.5
Hot	16.6	33.6	20.4	23.2	37.6	21.0	32.5

Shutdowns. The turbine vendor also supplied the emission estimates for a typical shutdown event occurring over 10 minutes, which was combined with engineering estimates to determine shutdown emissions. The shutdown process begins with the combustion turbine reducing load until the DLN system is no longer functional but the SCR and oxidation remain functional. Table 2-6 presents the shutdown emissions and duration proposed as BACT.

TABLE 2-6
Facility Shutdown Emission Rates Per Turbine

	NO_x (lb/event)	CO (lb/event)	VOC (lb/event)	NO_x (lb/hr)	CO (lb/hr)	VOC (lb/hr)	Duration (minutes/event)
Shutdown	9.0	45.3	31.0	17.8	50.7	31.8	10

2.2.6.3 Summary of the Proposed BACT for Startups and Shutdowns

The project owner proposes to limit individual startups and shutdown durations to an enforceable BACT permit limit of 32.5 minutes for a hot and warm startup, 90 minutes for a cold startup, and 10 minutes for a shutdown event.

SECTION 3

GHG BACT

3.1 Introduction

This BACT evaluation was prepared to address GHG emissions from HBEP, and the evaluation follows EPA regulations and guidance for BACT analyses as well as the EPA's PSD and Title V Permitting Guidance for Greenhouse Gases (EPA, 2011b). GHG pollutants are emitted during the combustion process when fossil fuels are burned. One of the possible ways to reduce GHG emissions from fossil fuel combustion is to use inherently lower GHG-emitting fuels and to minimize the use of fuel, which in this case is achieved by using thermally efficient CTGs, well-designed HRSGs, and STGs to generate additional power from the heat of the CTG exhaust. In the HBEP process, the fossil fuel burned will be pipeline quality natural gas, which is the lowest GHG-emitting fossil fuel available. The HBEP gas turbines selected to meet the project's objectives have a high operating turndown rate while maintaining a high thermal efficiency.

3.1.1 Regulatory Overview

Based on a series of actions, including the 2007 Supreme Court decision, the 2009 EPA Endangerment Finding and Cause and Contribute Finding, and the 2010 Light-Duty Vehicle Rule, GHGs became subject to permitting under the Clean Air Act. In May 2010, EPA issued the GHG permitting rule officially known as the "Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule" (GHG Tailoring Rule), in which EPA defined six GHG pollutants (collectively combined and measured as CO_2e) as NSR-regulated pollutants and therefore subject to PSD permitting when new projects emitted those pollutants above certain threshold levels. Under the GHG Tailoring Rule, beginning July 1, 2011, new sources with a GHG PTE equal to or greater than 100,000 tpy of CO_2e will be considered a major source and will be required to undergo PSD permitting, including preparation of a BACT analysis for GHG emissions. Modifications to existing major sources (CO_2e PTE of 100,000 tpy or greater) that result in an increase of CO_2e greater than 75,000 tpy are similarly required to obtain a PSD permit, which includes a GHG BACT analysis. The project results in an emissions increase above the new source PSD thresholds for CO_2e. Therefore, the project is subject to the GHG Tailoring Rule, and is required to obtain a PSD permit for GHGs.

3.1.2 BACT Evaluation Overview

BACT requirements are intended to ensure that a proposed project will incorporate control systems that reflect the latest control technologies that have been demonstrated in practice for the type of facility under review. BACT is defined under the Clean Air Act (42 U.S.C. Section 7479[3]) as follows:

> *The term "best available control technology" means an emission limitation based on the maximum degree of reduction of each pollutant subject to regulation under this chapter emitted from or which results from any major emitting facility, which the permitting authority, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such facility through application of production processes and available methods, systems, and techniques, including fuel cleaning, clean fuels, or treatment or innovative fuel combustion techniques for control of each such pollutant. BACT is defined as the emission control means an emission limitation (including opacity limits) based on the maximum degree of reduction which is achievable for each pollutant, taking into account energy, environmental, and economic impacts, and other costs. ….*

EPA guidance specifies that a BACT analysis should be performed using a top-down approach in which all applicable control technologies are evaluated based on their effectiveness and are then ranked by decreasing level of control. If the most-effective control technology is not being selected for the project, the control technologies on the list are evaluated as to whether they are infeasible because of energy, environmental, and/or economic impacts. The most effective control technology in the ranked list that cannot be so eliminated is then defined as BACT for that pollutant and process. A further analysis must be conducted to establish the emission limit that is BACT, based on determining the lowest emission limit that is expected to be consistently achievable over the life of the plant, taking into account site-specific and project-specific requirements.

The steps required for a "top-down" BACT review are the following:

1. Identify available control technologies.
2. Eliminate technically infeasible options.
3. Rank remaining technologies.
4. Evaluate remaining technologies (in terms of economic, energy, and environmental impacts).
5. Select BACT (the most-effective control technology and lowest consistently achievable emission limit) that has not been eliminated for economic, energy, or environmental impact reasons.

For a facility subject to the GHG Tailoring Rule, the six covered GHG pollutants are:

- CO_2
- Nitrous oxide (N_2O)
- Methane (CH_4)
- Hydrofluorocarbons (HFC)
- Perfluorocarbons (PFC)
- Sulfur hexafluoride (SF_6)

Although the top-down BACT analysis is applied to GHGs, there are "unique" issues in the analysis for GHG that do not arise in BACT for criteria pollutants (EPA, 2011b). For example, EPA recognizes that the range of potentially available control options for BACT Step 1 is currently limited and emphasizes the importance of energy efficiency in BACT reviews. Specifically, EPA states that (EPA, 2011b):

> *The application of methods, systems, or techniques to increase energy efficiency is a key GHG-reducing opportunity that falls under the category of "lower-polluting processes/practices." Use of inherently lower-emitting technologies, including energy efficiency measures, represents an opportunity for GHG reductions in these BACT reviews. In some cases, a more energy efficient process or project design maybe used effectively alone; whereas in other cases, an energy efficient measure may be used effectively in tandem with end-of-stack controls to achieve additional control of criteria pollutants.* (EPA, 2011b)

Based on this reasoning, EPA provides permitting authorities with the discretion to use energy-efficient measures as "the foundation for a BACT analysis for GHGs . . ." (EPA, 2011b).

3.2 GHG BACT Analysis

3.2.1 Assumptions

During the completion of the GHG BACT analysis, the following assumptions were made:

- The HBEP BACT analysis for criteria pollutants will result in the installation of a SCR system for NO_x emissions reduction and an oxidation catalyst for control of CO and VOCs for each turbine.
- During actual combustion turbine operation, the oxidation catalyst may result in minimal increases in CO_2 from the oxidation of any CO and CH_4 in the flue gas. However, the EPA Final Mandatory Reporting of Greenhouse Gases Rule (Mandatory Reporting Rule) (40 CFR 98) factors for estimating CO_2e emissions from natural gas combustion assume complete combustion of the fuel. While the oxidation catalyst has the potential of incrementally increasing CO_2 emissions, these emissions are already accounted for in the Mandatory Reporting Rule factors and included in the CO_2e totals.
- Similarly, the SCR catalyst may result in an increase in N_2O emissions. Although quantifying the increase is difficult, it is generally estimated to be very small or negligible. From the HBEP GHG emissions inventory, the estimated N_2O emissions only total 45.8 metric tons per year. Therefore, even if there were an

order-of-magnitude increase in N_2O as a result of the SCR, the impact to CO_2e emissions would be insignificant as compared to total estimated HBEP CO_2e emissions.

Use of the SCR and oxidation catalyst slightly decreases the project thermal efficiency due to backpressure on the turbines (these impacts are already included in the emission inventory) and, as noted above, may create a marginal but unquantifiable increase to N_2O emissions. Although elimination of the NO_x and CO/VOC controls could conceivably be considered as an option within the GHG BACT, the environmental benefits of the NO_x, CO, and VOC control are assumed to outweigh the marginal increase to GHG emissions. Therefore, even if carried forward through the GHG BACT analysis, they would be eliminated in Step 4 because of other environmental impacts. Therefore, omission of these controls within the BACT analysis was not considered.

3.2.2 BACT Determination

The top-down GHG BACT determination for the combustion turbines and HRSGs with duct burners is presented below. This BACT analysis is based on one power block consisting of three combustion turbines, three HRSGs, one steam turbine, and ancillary facilities.

The primary GHG of concern for HBEP is CO_2. This analysis primarily presents the GHG BACT analysis for CO_2 emissions because CH_4 and N_2O emissions are insignificant, at less than one percent of facility GHG CO_2e emissions. HBEP will emit insignificant quantities of SF_6, HFCs or PFCs pollutants, used in electrical switch gear and comfort cooling systems. Therefore, the primary sources of GHG emissions would be the natural-gas-fired combustion turbines with duct burners.

This determination follows EPA's top-down analysis method, as specified in EPA's GHG Permitting Guidance (EPA, 2011b). The following top-down analysis steps are listed in the EPA's *New Source Review Workshop Manual* (EPA, 1990):

- Step 1: Identify all control technologies
- Step 2: Eliminate technically infeasible options
- Step 3: Rank remaining control technologies by control effectiveness
- Step 4: Evaluate most effective controls and document results
- Step 5: Select BACT

Each of these steps, described in the following sections, was conducted for GHG emissions from the CTGs and HRSGs with duct burners. The following top-down BACT analysis has been prepared in accordance with the EPA's *New Source Review Workshop Manual* (EPA, 1990) and takes into account energy, environmental, economic, and other costs associated with each alternative technology.

The previous and current emission limits reported for combined-cycle and cogeneration turbines were based on a search of the various federal, state, and local BACT, RACT, and LAER databases. The search included the following databases:

- EPA BACT/LAER Clearinghouse (EPA, 2012)
  - Search included the CO_2 BACT/LAER determinations for combined-cycle and cogeneration, large combustion turbines (greater than 25 MW) with permit dates for the years 2001 through 2011.
- BACT Analyses for Recently Permitted Combined-cycle CEC Projects (CEC, 2012)
  - Review included the GHG BACT analysis for the RCEC, the Palmdale Hybrid Power Project, and the Watson Cogeneration Project.

3.2.2.1 Identification of Available GHG Emissions Control Technologies – Step 1

There are two basic alternatives for limiting the GHG emissions from the HBEP combined-cycle equipment:

- Carbon capture and storage (CCS)
- Thermal efficiency

The proposed HBEP design and operation will consist of two “3-by-1” combined-cycle generating power blocks, both including three natural-gas-fired Mitsubishi 501DA CTGs with fired HRSGs, and one STG. The project owner has determined that this configuration is the only alternative that meets all of the project objectives as further detailed in Section 1.2. Several of the primary objectives of the HBEP are to backstop variable renewable resources with a multiple stage generator project that incorporates fast start capability, a high degree of turndown, fast ramping capability, and a high thermal efficiency. Therefore, other potentially lower emitting renewable generation technologies were not evaluated in this BACT analysis because this would change the fundamental business purpose of the HBEP.

This is consistent with EPA’s March 2011 *PSD and Title V Permitting Guidance for Greenhouse Gases,* which states:

> *EPA has recognized that a Step 1 list of options need not necessarily include inherently lower polluting processes that would fundamentally redefine the nature of the source proposed by the permit applicant…", and "…the permitting authority should keep in mind that BACT, in most cases, should not regulate the applicant’s purpose or objective for the proposed facility… (p. 26).*

The only identified GHG emission “control” options are post-combustion CCS and thermal efficiency of the proposed generation facility.

Carbon Capture and Storage. CCS technology is composed of three main components: (1) CO_2 capture and/or compression, (2) transport, and (3) storage.

CO_2 Capture and Compression. CCS systems involve use of adsorption or absorption processes to separate and capture CO_2 from the flue gas, with subsequent desorption to produce a concentrated CO_2 stream. The concentrated CO_2 is then compressed to “supercritical” temperature and pressure, a state in which CO_2 exists neither as a liquid nor a gas, but instead has physical properties of both liquids and gases. The supercritical CO_2 would then be transported to an appropriate location for underground injection into a suitable geological storage reservoir, such as a deep saline aquifer, or depleted coal seam, ocean storage site, or used in crude oil production for enhanced oil recovery.

The capture of CO_2 from gas streams can be accomplished using either physical or chemical solvents or solid sorbents. Applicability of different processes to particular applications will depend on temperature, pressure, CO_2 concentration, and contaminants in the gas or exhaust stream. Although CO_2 separation processes have been used for years in the oil and gas industries, the characteristics of the gas steams are markedly different than power plant exhaust. CO_2 separation from power plant exhaust has been demonstrated in large pilot-scale tests, but it has not been commercially implemented in full-scale power plant applications.

After separation, the CO_2 must be compressed to supercritical temperature and pressure for suitable pipeline transport and geologic storage properties. Although compressor systems for such applications are proven, commercially available technologies, specialized equipment is required, and operating energy requirements are very high.

CO_2 Transport. The supercritical CO_2 would then be transported to an appropriate location for injection into a suitable storage reservoir. The transport options may include pipeline or truck transport, or in the case of ocean storage, transport by ocean-going vessels.

Because of the extremely high pressures, as well as the unique thermodynamic and dense-phase fluid properties of supercritical CO_2, specialized designs are required for CO_2 pipelines. Control of potential propagation fractures and corrosion also require careful attention to contaminants such as oxygen, nitrogen, methane, water, and hydrogen sulfide.

While transport of CO_2 via pipeline is proven technology, doing so in urban areas will present additional concerns. Development of new rights–of-way in congested areas would require significant resources for planning and execution, and public concern about potential for leakage may present additional barriers.

CO_2 Storage. CO_2 storage methods include geologic sequestration, oceanic storage, and mineral carbonation. Oceanic storage has not been demonstrated in practice, as discussed below. Geologic sequestration is the process of injecting captured CO_2 into deep subsurface rock formations for long-term storage, which includes the use of a deep saline aquifer or depleted coal seams, as well as the use of compressed CO_2 to enhance oil recovery in crude oil production operations.

Under geologic sequestration, a suitable geological formation is identified close to the proposed project, and the captured CO_2 from the process is compressed and transported to the sequestration location. CO_2 is injected into that formation at a high pressure and to depths generally greater than 2,625 feet (800 meters). Below this depth, the pressurized CO_2 remains "supercritical" and behaves like a liquid. Supercritical CO_2 is denser and takes up less space than gaseous CO_2. Once injected, the CO_2 occupies pore spaces in the surrounding rock, like water in a sponge. Saline water that already resides in the pore space would be displaced by the denser CO_2. Over time, the CO_2 can dissolve in residual water, and chemical reactions between the dissolved CO_2 and rock can create solid carbonate minerals, more permanently trapping the CO_2.

The U.S. Department of Energy (DOE) National Energy Technology Laboratory (NETL), via the West Coast Regional Carbon Sequestration Partnership (WestCarb) has researched potential geologic storage locations including those in Southern California. This information has been presented in NETL's 2010 *Carbon Sequestration Atlas of the United States and Canada* (http://www.netl.doe.gov/technologies/carbon_seq/refshelf/atlasIII/index.html), NETL's National Carbon Sequestration Database and Geographic Information System (NATCARB) database (http://www.netl.doe.gov/technologies/carbon_seq/natcarb/storage.html) and Southern California Carbon Sequestration Research Consortium's (SoCalCarb) Carbon Atlas (http://socalcarb.org/atlas.html). As shown in Figures 1 and 2, a number of deep saline aquifers and oil and gas reservoirs have been found to be potentially suitable for CO_2 storage. No potential for storage in depleted coal seams or basalt formations was identified.

The *Carbon Sequestration Atlas* lists the deep saline formations in Ventura and Los Angeles Basins as the "most promising" locations in Southern California, and it states that "California may also be a candidate for CO_2 storage in offshore basins, although the lack of available data has limited the assessment of their CO_2 storage potential to areas where oil and gas exploration has occurred." The atlas also notes the potential for use of oil and gas reservoirs in the Los Angeles and Ventura Basins, although it states that "Reservoirs in highly fractured shales within the Santa Maria and Ventura Basins are not good candidates for CO_2 storage."

Funded via the American Recovery and Reinvestment Act, the Wilmington Graben project is an ongoing, comprehensive research program for characterization of the potential for CO_2 storage in the Pliocene and Miocene sediments offshore from Los Angeles and Long Beach. The study includes analysis of existing and new well cores, seismic studies, engineering analysis of potential pipeline systems, and risk analyses. However, no pilot studies of CO_2 injection into onshore or offshore geologic formations in the vicinity of the project site have been conducted to date.

Thermal Efficiency. Because CO_2 emissions are directly related to the quantity of fuel burned, the less fuel burned per amount of energy produced (greater energy efficiency), the lower the GHG emissions per unit of energy produced. As a means of quantifying feasible energy efficiency levels, the State of California established an emissions performance standard for California power plants. California Senate Bill 1368 limits long-term investments in baseload generation by the state's utilities to power plants that meet an emissions performance standard jointly established by the CEC and the CPUC. CEC regulations establish a standard for baseload generation (that is, with capacity factors in excess of 60 percent) of 1,100 pounds (or 0.55 ton) CO_2 per megawatt-hour (MWh). This emission standard corresponds to a heat rate of approximately 9,400 British thermal units per kilowatt-hour (Btu/kWh) (CEC, 2010).

The HBEP is a highly efficient multiple-staged generator project that incorporates a high degree of turndown, fast start, and ramping capability that will support grid reliability as renewable generating sources comprise a larger share of California's energy production. This allows an increased use of wind power and other renewable energy sources, with backup power available from the HBEP. A natural-gas-fired plant such as the HBEP uses a relatively small amount of electricity to operate the facility compared to the energy in the fossil fuel combusted. Therefore, minimal benefit occurs in terms of energy efficiency and GHG emission reductions of the facility associated with lowering electricity usage at the facility compared to increasing the thermal efficiency of the process.

The addition of the high thermal efficiency of the HBEP's generation to the state's electricity system will facilitate the integration of renewable resources in California's generation supply and will displace other less-efficient, higher GHG-emitting generation.

California's Renewable Portfolio Standard (RPS) requirement was increased from 20 percent by 2010 to 33 percent by 2020, with the adoption of Senate Bill 2 on April 12, 2011. To meet the new RPS requirements, the amount of dispatchable, high-efficiency, natural gas generation used as regulation resources, fast-ramping resources, or load-following or supplemental energy dispatches will have to be significantly increased. The HBEP will aid in the effort to meet California's RPS standard, because a significant attribute of the HBEP is that the combined-cycle facility can operate similarly to a peaking plant but at higher thermal efficiency.

Based on proprietary design and operational adjustments, the HBEP will allow a rapid startup of the combustion turbines. As presented in Figure 3, all combustion turbines in a power block can be started and taken from ignition to full load (~350 MW) in a 10-minute period. The HBEP HRSG operation will be integrated into the startup sequence, and full steam turbine generator output can be expected in approximately 40 minutes after fuel ignition for a hot or warm startup scenario. At maximum firing rate, the maximum power island ramp rate is 110 MW/minute for increasing in load and 250 MW/minute for decreasing load. At other load points, the load ramp rate is 30 percent.

The HBEP Mitsubishi 501DA combustion turbines allow for a unique operating configuration when integrated with the HRSG and duct burner operation. Over the anticipated projected load dispatch range presented in Figure 4, the HBEP 3-by-1 configuration maintains an efficient heat rate over almost the entire load range. Operation within this high efficiency band is maintained through operational changes by the combustion turbine, HRSG/steam turbine, and duct burners. These operational adjustments allow efficient operation over most of the project operating range. In traditional combined-cycle facilities, the duct burners are used in a peaking or power augmentation capacity. However, the HBEP closes the MW production gap between starting the second and third combustion turbines of a power block through the use of the duct burners, which tend to decrease thermal efficiency of the system but make available more MW in less time and at a lower heat rate as compared to a peaking facility.

In summary, using the Mitsubishi 501DA turbines with the flexible operational integration scheme allows the project goals to be met, while maintaining a higher efficiency than comparable peaking combustion turbine applications. The ability to produce fast-ramping power to augment renewable power sources to the grid make the HBEP a highly energy-efficient system.

3.2.2.2 Eliminate Technically Infeasible Options – Step 2

The second step for the BACT analysis is to eliminate technically infeasible options from the control technologies identified in Step 1. For each option that was identified, a technology evaluation was conducted to assess its technical feasibility. The technology is feasible only when it is available and applicable. A technology that is not commercially available for the scale of the project was considered infeasible. An available technology is considered applicable only if it can be reasonably installed and operated on the proposed project.

Carbon Capture and Storage. Although many believe that CCS will allow the future use of fossil fuels while minimizing GHG emissions, there are a number of technical barriers concerning the use of this technology for the HBEP, as follows:

- No full-scale systems for solvent-based carbon capture are currently in operation to capture CO_2 from dilute exhaust steams such as those from natural-gas-fired electrical generation systems at the scale proposed for the HEBP.
- Use of captured CO_2 for enhanced oil recovery (EOR) is widely believed to represent the practical first opportunity for CCS deployment; however, identification of suitable oil reservoirs with the necessary willing and able owners and operators is not feasible for HBEP to undertake. Oil and gas production in the vicinity of HBEP is available for EOR; however, only pilot-scale projects are known in the region and only estimates are available on the capacity of these miscible oil fields.

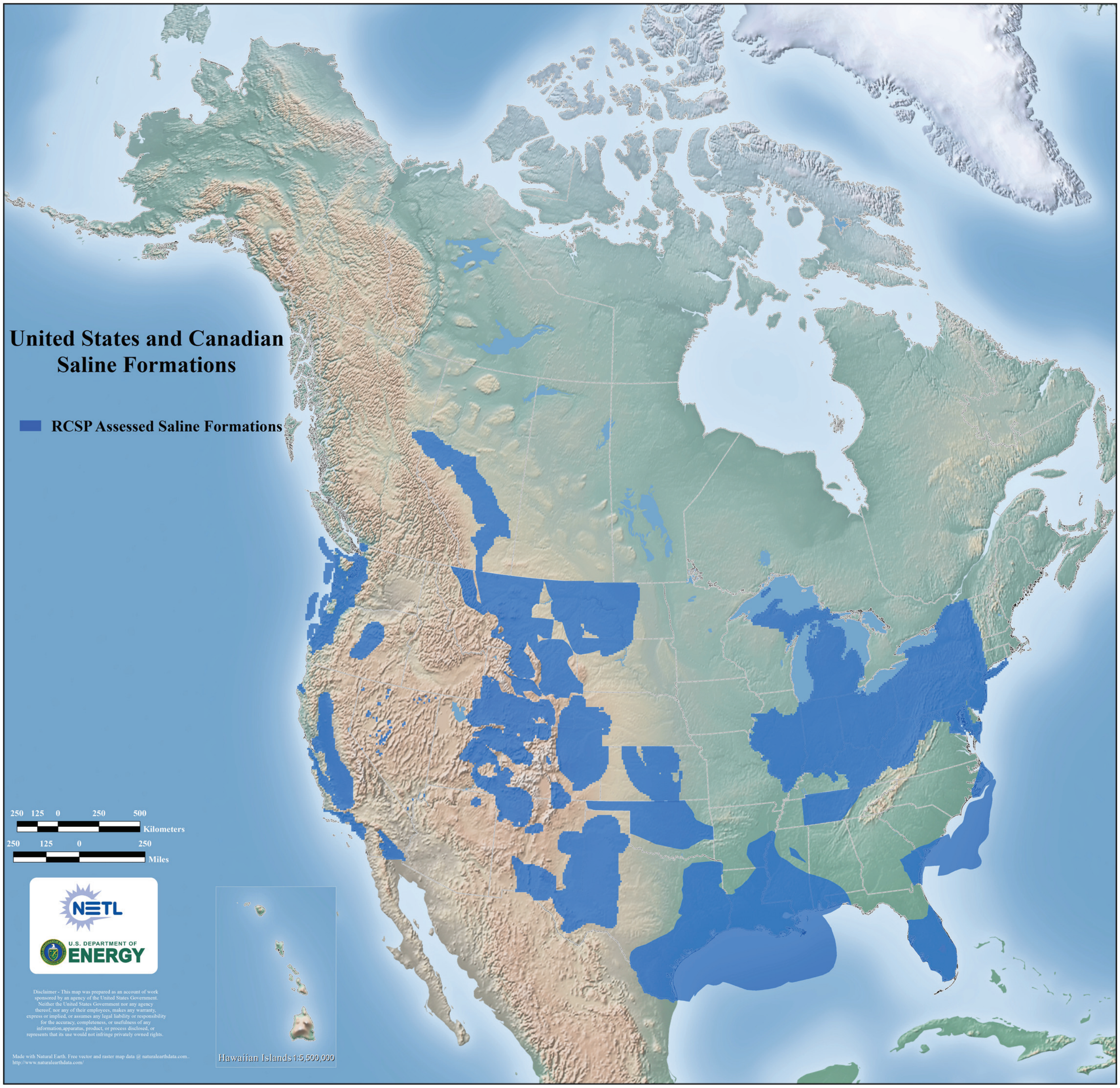

FIGURE 1
United States and Canadian Saline Formations
AES Huntington Beach Energy Project
Huntington Beach, California

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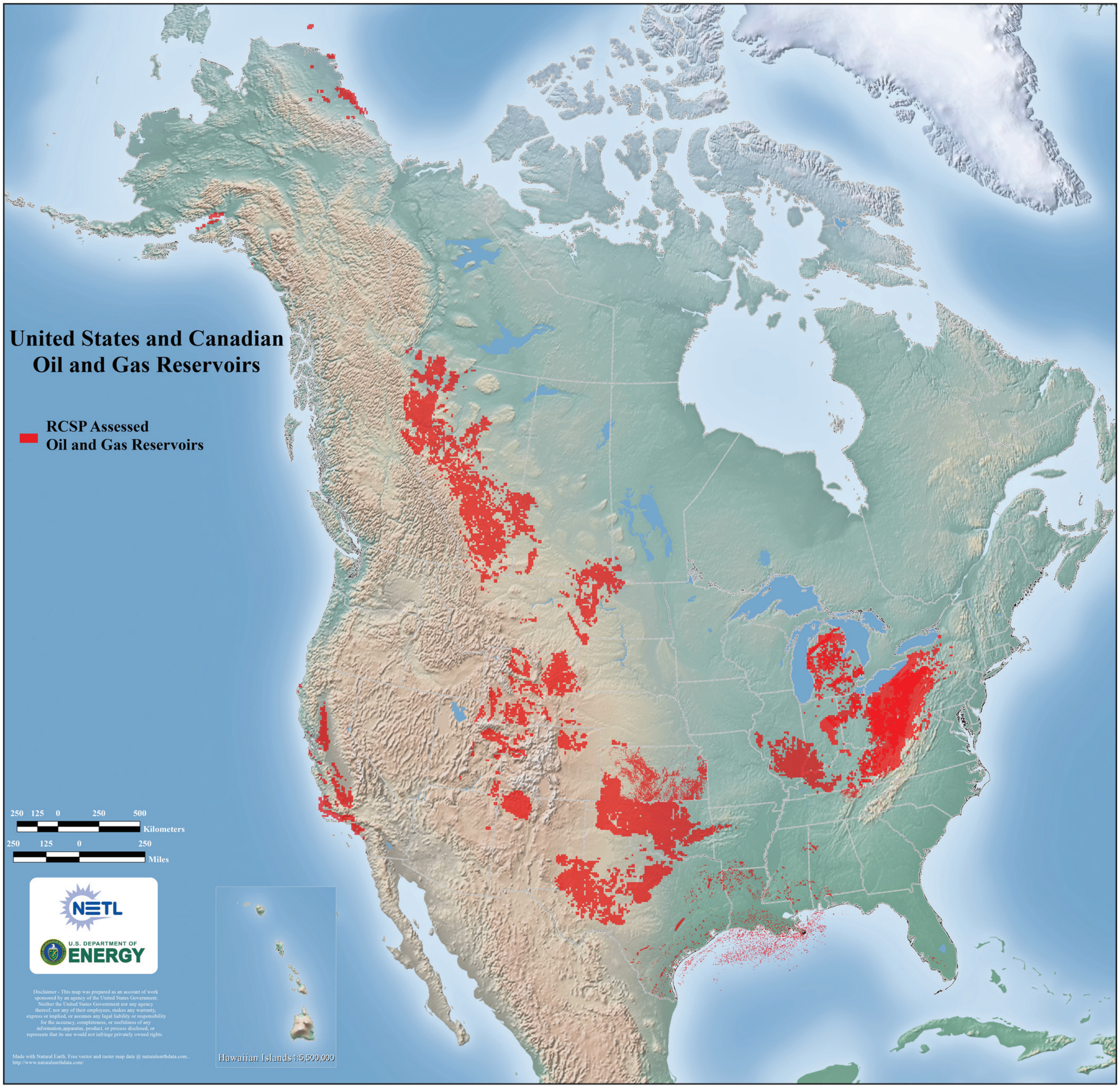
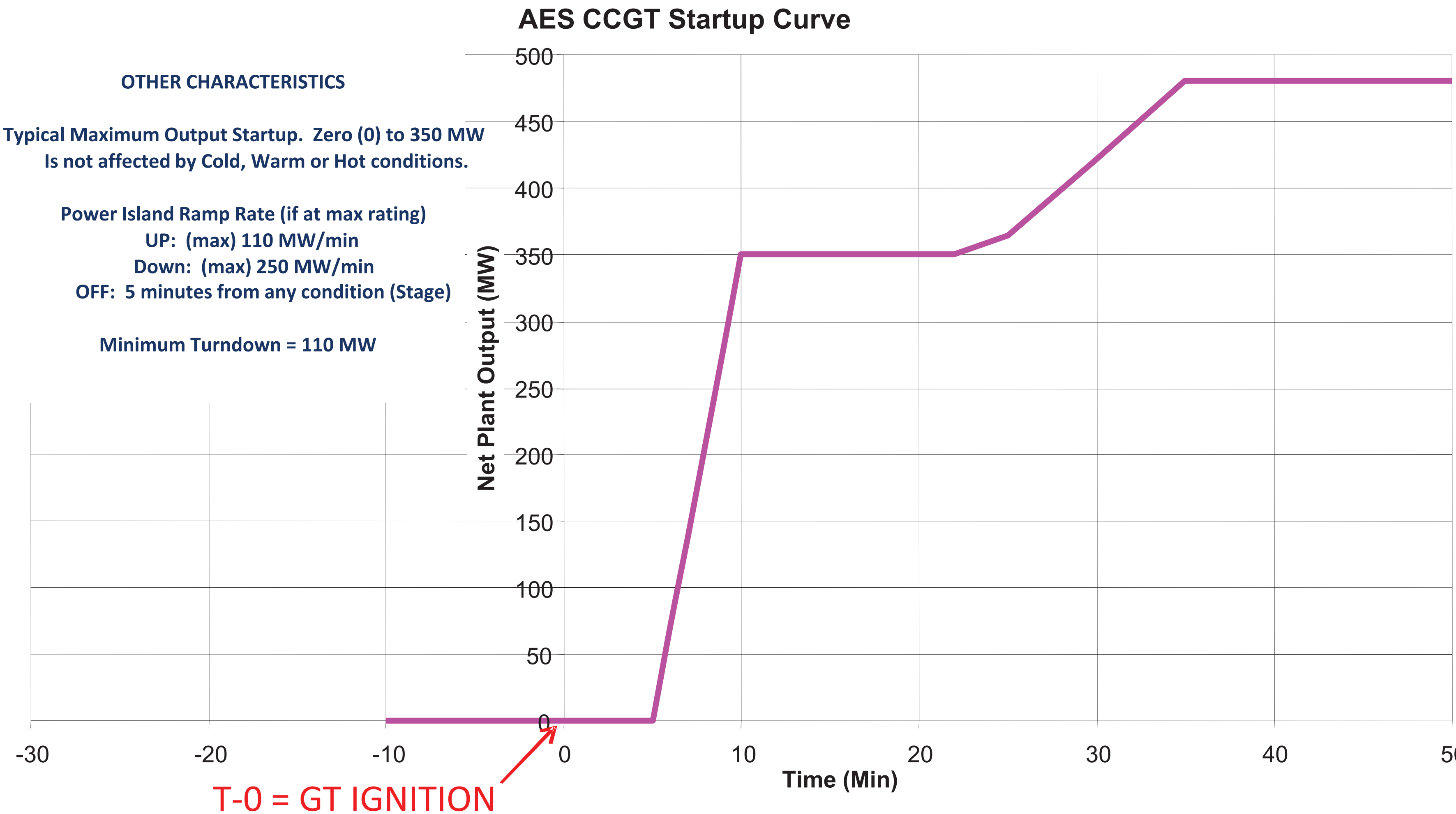
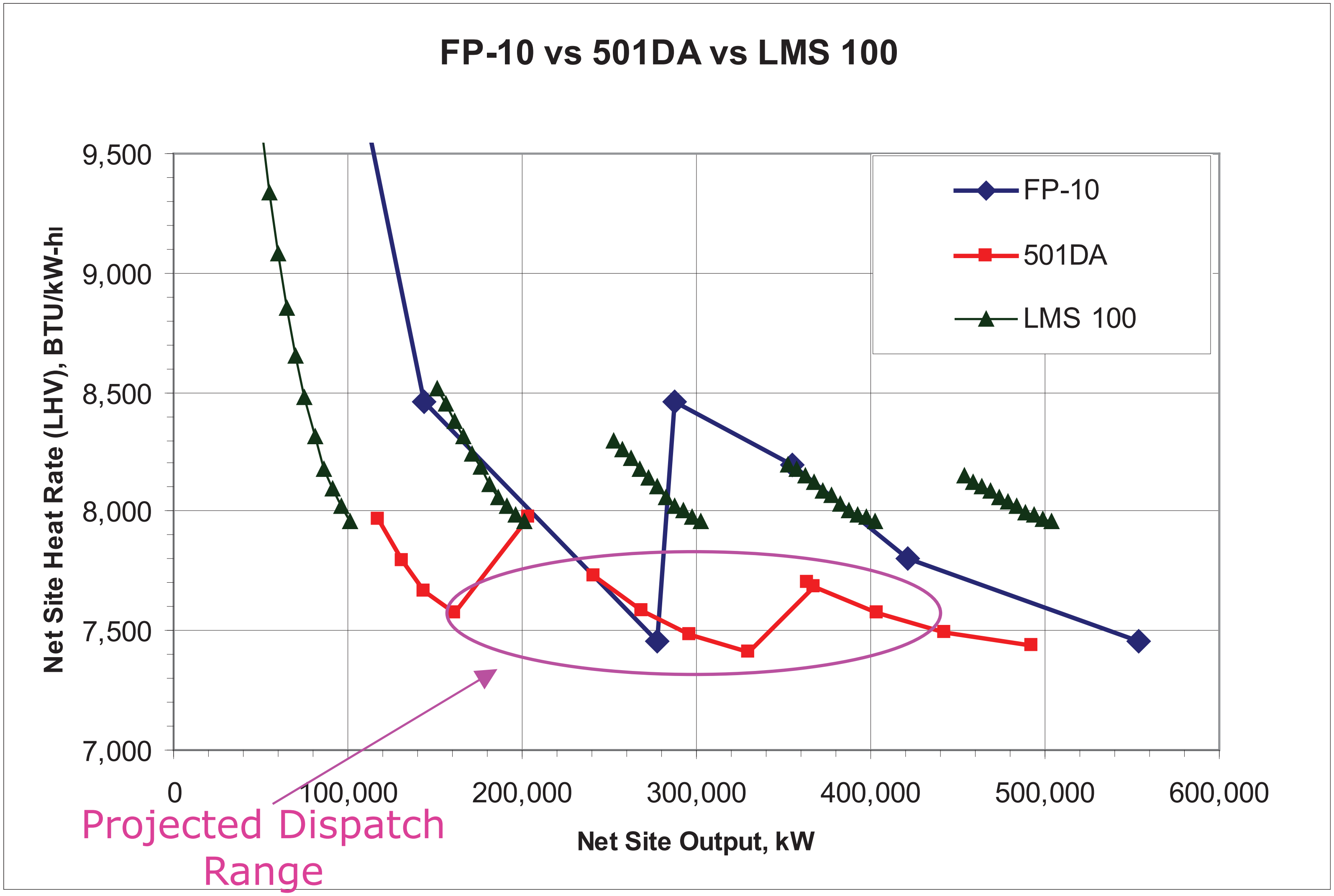


FIGURE 2
United States and Canadian Oil and Gas Reservoirs
AES Huntington Beach Energy Project
Huntington Beach, California



Source: AES Southland Development, LLC, as presented to the South Coast Air Quality Management District on April 19, 2012

FIGURE 3
HBEP Startup Curve
AES Huntington Beach Energy Project
Huntington Beach, California



Source: AES Southland Development, LLC, as presented to the South Coast Air Quality Management District on April 19, 2012

FIGURE 4
Comparison of HBEP and Alternative Design Heat Rates
AES Huntington Beach Energy Project
Huntington Beach, California

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- Little experience exists with other types of storage systems, such as deep saline aquifers (geological sequestration) or ocean systems (ocean sequestration). These storage systems are not commercially available technology.
- Because of the developmental nature of CCS technology, vendors and contractors do not provide turnkey offerings; separate contracting would be required for capture system design and construction; compression and pipeline system routing, siting and licensing, engineering and construction; and geologic storage system design, deployment, operations, and monitoring. Because no individual facility could be expected to take on all of these requirements to implement a control technology, this demonstrates that the technology as a whole is not yet commercially available.
- Significant legal uncertainties continue to exist regarding relationship between land surface ownership rights and subsurface (pore space) ownership, and potential conflicts with other uses of land such as exploitation of mineral rights, management of risks and liabilities, and so on.
- The potential for frequent startup and shutdown, as well as intended rapid load fluctuations, of generation units at the HBEP facility makes CCS impractical for two reasons – inability of capture systems to start up in the same short time frame as combustion turbines, and infeasibility for potential users of the CO_2 such as EOR systems to use uncertain and intermittent flows. As described above, the units at the HBEP facility are designed to accommodate rapidly fluctuating power and steam demands from renewable electrical generation sources.

These issues are discussed in more detail below.

As suggested in the *EPA New Source Review Workshop Manual*, control technologies should be demonstrated in practice on full-scale operations to be considered available within a BACT analysis: "Technologies which have not yet been applied to (or permitted for) full scale operations need not be considered available; an applicant should be able to purchase or construct a process or control device that has already been demonstrated in practice" (EPA, 1990). As discussed in more detail below, carbon capture technology has not been demonstrated in practice in power plant applications. Other process industries do have carbon capture systems that are demonstrated in practice; however, the technology used for these processes cannot be applied to power plants at the scale of HBEP.

Three fundamental types of carbon capture systems are employed throughout various process and energy industries: sorbent adsorption, physical absorption, and chemical absorption. Use of carbon capture systems on power plant exhaust is inherently different from other commercial-scale systems currently in operation, mainly because of the concentration of CO_2 and other constituents in the gas streams.

For example, CO_2 is separated from petroleum in refinery hydrogen plants in a number of locations, but this is typically accomplished on the product gas from a steam CH_4reforming process that contains primarily hydrogen (H_2), unreacted CH_4, and CO_2. Based on the stoichiometry of the reforming process, the CO_2 concentration is approximately 80 percent by weight, and the gas pressure is approximately 350 pounds of force per square inch gauge (psig). Because of the high concentration and high pressure, a pressure swing adsorption (PSA) process is used for the separation. In the PSA process, all non-hydrogen components, including CO_2 and CH_4, are adsorbed onto the solid media under high pressure; after the sorbent becomes saturated, the pressure is reduced to near atmospheric conditions to desorb these components. The CO_2/CH_4 mixture in the PSA tail gas is then typically recycled to the reformer process boilers to recover the heating value; however, where the CO_2 is to be sold, an additional amine absorption process would be required to separate the CO_2 from CH_4. In its May 2011 *Department of Energy's (DOE)/NETL Advanced Carbon Dioxide Capture R&D Program: Technology Update*, NETL notes the different applications for chemical solvent absorption, physical solvent absorption, and sorbent adsorption processes. As noted in Section 4.B, "When the fluid component has a high concentration in the feed stream (for example, 10 percent or more), a PSA mechanism is more appropriate" (NETL, 2011).

In another example, at the Dakota Gasification Company's Great Plains Synfuels Plant in North Dakota, CO_2 is separated from intermediate fuel streams produced from gasification of coal. The gas from which the CO_2 is separated is a mixture of primarily H_2, CH_4, and 30 to 35 percent CO_2; a physical absorption process (Rectisol) is used. In contrast, as noted on page 29 of the *Report of the Interagency Task Force on Carbon Capture and Storage* (DOE and EPA, 2010), CO_2 concentrations for natural-gas-fired systems are in the range of 3 to 5 percent. This adds significant technical challenges to separation of CO_2 from natural-gas-fired power plant exhaust as compared to other systems.

In Section 4.A of the above-referenced technology update, NETL notes this difference between pre-combustion CO_2 capture such as that from the North Dakota plant versus the post-combustion capture such as that required from a natural-gas-fired power plant: "Physical solvents are well suited for pre-combustion capture of CO_2 from syngas at elevated pressures; whereas, chemical solvents are more attractive for CO_2 capture from dilute low-pressure post-combustion flue gas" (NETL, 2011).

In the 2010 report noted above, the task force discusses four currently operating post-combustion CO_2 capture systems associated with power production. All four are on coal-based power plants where CO_2 concentrations are higher (typically 12 to 15 percent), with none noted for natural gas-based power plants (typically 3 to 5 percent).

The DOE/NETL is a key player in the nation's efforts to realize commercial deployment of CCS technology. A downloadable database of worldwide CCS projects is available on the NETL website (http://www.netl.doe.gov/technologies/carbon_seq/global/database/index.html). Filtering this database for projects that involve both capture and storage, which are based on post-combustion capture technology (the only technology applicable to natural gas turbine systems) and are shown as "active" with "injection ongoing" or "plant in operation," yields four projects. Three projects, one of which is a pilot-scale process noted in the interagency task force report as described above, are listed at a capacity of 274 tons per day (100,000 tpy), and the fourth has a capacity of only 50 tons per day. Post-combustion CCS has not been accomplished on a scale of the HEBP facility, which could produce up to approximately 3.2 million tpy or 8,662 tons per day CO_2e. Furthermore, scale-up involving a substantial increase in size from pilot scale to commercial scale is unusual in chemical processes and would represent significant technical risk.

A chemical solvent CCS approach would be required to capture the approximate 3 to 5 percent CO_2 emitted from the flue gas generated from the natural-gas-fired systems (combined-cycle) used at the HEPB facility. To date, a chemical solvent technology has not been demonstrated at the operating scale proposed.

As detailed in the August 2010 report, one goal of the task force is to bring 5 to 10 commercial demonstration projects online by 2016. With demonstration projects still years away, clearly the technology is not currently commercially available at the scale necessary to operate the HEBP facility. It is notable that several projects, including those with DOE funding or loan guarantees, were cancelled in 2011, making it further unlikely that technical information required to scale up these processes can be accomplished in the near future. For example, the AEP Mountaineer site (AEP; a former DOE demonstration commercial-scale project) was to expand capture capacity to 100,000 tpy; however, to date only the "Project Validation Facility" was completed and only accomplished capture of a total of 50,000 metric tons and storage of 37,000 metric tons of CO_2. AEP recently announced that the larger project will be cancelled after completion of the front-end engineering design because of uncertain economic and policy conditions.

EPA's Fact Sheet and Ambient Air Quality Impact Report for the Palmdale project states that "commercial CO_2 recovery plants have been in existence since the late 1970s, with at least one plant capturing CO_2 from gas turbines". However, on review of the fact sheet referenced for the gas turbine project (http://www.powermag.com/coal/2064.html), it is notable that the referenced project is not a commercial-scale operation; rather, it is a pilot study at a commercial power plant. The pilot system captured 365 tons per day of CO_2 from the power plant, in the range of the power pilot tests noted above. Full-scale capture of power plant CO_2 has not yet been accomplished anywhere in the world.

The interagency task force report notes the lack of demonstration in practice:

> *Current technologies could be used to capture CO_2 from new and existing fossil energy power plants; however, they are not ready for widespread implementation primarily because they have not been demonstrated at the scale necessary to establish confidence for power plant application.*

> *Since the CO_2 capture capacities used in current industrial processes are generally much smaller than the capacity required for the purposes of GHG emissions mitigation at a typical power plant, there is considerable uncertainty associated with capacities at volumes necessary for commercial deployment.* (DOE and EPA, 2010)

The ability to inject into deep saline aquifers as an alternative to EOR reservoirs is a major focus of the NETL research program. Although it is believed that saline aquifers are a viable opportunity, there are many uncertainties. Risk of mobilization of natural elements such as manganese, cobalt, nickel, iron, uranium, and barium into potable aquifers is of concern. Technical considerations for site selection include geologic siting, monitoring and verification programs, post-injection site care, long-term stewardship, property rights, and other issues.

At least one planned saline aquifer pilot project is underway in the Lower San Joaquin Valley near Bakersfield, California (the Kimberlina Saline Formation), that may act as a possible candidate location for geologic sequestration and storage. According to WestCarb, a pilot project plant operated by Clean Energy Systems is targeting the Vedder Sandstone formation at a depth of approximately 8,000 feet, where there is a beaded stream unit of saline formation that may be favorable for CO_2 storage. It is unclear when the project is planned for full scale testing, and no plans are currently available to build a pipeline within the area to transport CO_2 to the test site. As noted above, the Wilmington Graben project is a large-scale study of the potential for geologic storage in offshore formations near Los Angeles; however, no indications of near-term plans for pilot testing were noted in NETL or SoCalCarb's websites.

As noted above, presumably the CO_2 could be used for EOR applications within the Los Angeles and Ventura Basins, but the exact location, time frame, and needed flow rates for those existing or future EORs are unclear because this information is typically treated as being a trade secret. During a study to evaluate the "future oil recovery potential in the major oil basins and large oil fields in California," the DOE concluded that a number of oil fields in the Los Angeles Basin are "amendable to miscible CO_2-EOR." Two of those oil fields, the Santa Fe Springs and Dominquez fields, are located approximately 30 miles from the HEBP facility. However, the feasibility of obtaining the necessary permits to build infrastructure and a pipeline to transport CO_2 to these fields through a densely urbanized area is uncertain.

Figure 5 from the Interagency Task Force report shows that no existing CO_2 pipelines are shown in California. The report does note that nationally there are "many smaller pipelines connecting sources with specific customers"; however, based on lack of natural or captured CO_2 sources in Southern California, it is assumed that no pipelines exist. The SoCalCarb carbon atlas shows a number of existing pipelines in the region; however, these are petroleum product pipelines. As noted above, because of high pressures, potential for propagation facture, and other issues, CO_2 pipeline design is highly specialized, and product pipelines would not be suitable for re-use of CO_2 transport.

Regarding CO_2 storage security, the CCS task force report (DOE and EPA, 2010) notes such uncertainties:

> *"The technical community believes that many aspects of the science related to geologic storage security are relatively well understood. For example, the Intergovernmental Panel on Climate Change (IPCC) concluded that "it is considered likely that 99 percent or more of the injected CO_2 will be retained for 1,000 years" (IPCC, 2005). However, additional information (including data from large-scale field projects, such as the Kimberlina project, with comprehensive monitoring) is needed to confirm predictions of the behavior of natural systems in response to introduced CO_2 and to quantify rates for long-term processes that contribute to trapping and, therefore, risk profiles (IPCC, 2005). "*

Field data from the Kimberlina CCS pilot project will provide additional information regarding storage security for that and other locations. Meanwhile, some uncertainties will remain regarding safety and permanence aspects of storage in these types of formations.

The effectiveness of ocean sequestration as a full-scale method for CO_2 capture and storage is unclear given the limited availability of injection pilot tests and the ecological impacts to shallow and deep ocean ecosystems. Ocean sequestration is conducted by injecting supercritical liquid CO_2 from either a stationary or towed pipeline at targeted depth interval, typically below 3,000 feet. CO_2 is injected below the thermocline, creating either a rising droplet or a dense phase plume and sinking bottom gravity current. Through NETL, extensive research is being conducted by the Monterey Bay Aquarium Research Institute on the behavior of CO_2 hydrates and dispersion of these hydrates within the various depth horizons of the marine environment; however, the experiments are small in scale and the results may not be applicable to larger-scale injection projects in the near future. Long-term effects on the marine environment, including pH excursions, are ongoing, making the use of ocean sequestration technically infeasible at the current time. The feasibility of implementing a commercially available sequestration approach is further brought into question, with the IPCC stating:

> *Ocean storage, however, is in the research phase and will not retain CO_2 permanently as the CO_2 will re-equilibrate with the atmosphere over the course of several centuries…Before the option of ocean injection can be deployed, significant research is needed into its potential biological impacts to clarify the nature and scope of environmental consequences, especially in the longer term…Clarification of the nature and scope of long-term environmental consequences of ocean storage requires further research.* (IPCC, 2005).

Questions may also arise regarding the international legal implications of injecting industrial generated CO_2 into the ocean, which may eventually migrate to other international waters.

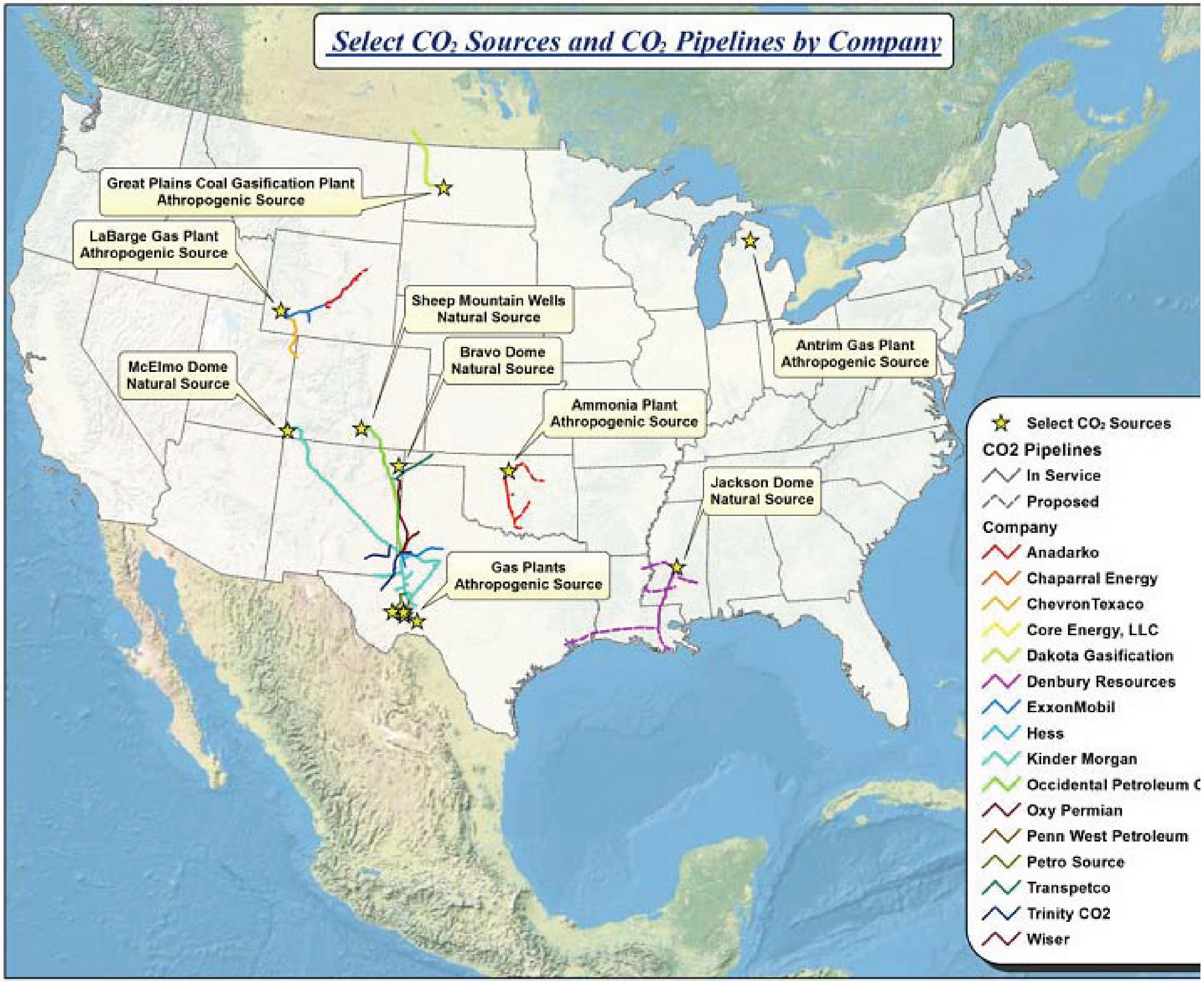
CCS technology development is dominated by vendors that are attempting to commercialize carbon capture technologies and by academia-led teams (largely funded by DOE) that are leading research into the geologic systems. The ability for electric utilities to contract for turn-key CCS systems simply does not exist at this time.

Most current carbon capture systems are based on amine or chilled ammonia technology, which are chemical absorption processes. Although capture system startup and shutdown time of vendor processes could not be confirmed within this BACT analysis, clearly both types of processes would require durations that exceed the time required for HBEP turbine startup or load response. As described above, HEBP may start or stop turbines and duct burners, and it may adjust the load on the operating turbines rapidly to meet grid reliability demands. In contrast, both amine and chilled ammonia systems require startup of countercurrent liquid-gas absorption towers and either chilling of the ammonia solution or heating of regeneration columns for the amine systems. It is technically infeasible for the carbon capture systems to start up and shut down or to make large adjustments in gas volume in the time frames required to serve this type of operation effectively; this means that portions of the HBEP operation would run without CO_2 capture even with implementation of a CCS system. Alternatively, the CCS system could be operated at a minimum load during periods of expected operation. However, this approach would consume energy, offsetting some of the benefit.

Finally, the potential to sell CO_2 to industrial or oil and gas operations is infeasible for an operation such as this, where daily operation of HBEP depends on grid dispatch needs, particularly to offset reductions from renewable energy sources. Even if a potential EOR opportunity could be identified, such an operation would typically need a steady supply of CO_2. Intermittent CO_2 supply from potentially short duration with uncertain daily operation would be virtually impossible to sell on the market, making the EOR option unviable. Therefore, CCS technology would be better suited for applications with low variability in operating conditions.

In the EPA PSD and Title V GHG permitting guidance, the issues noted above are summarized: "A number of ongoing research, development, and demonstration projects may make CCS technologies more widely applicable *in the future*" (EPA, 2011b; italics added). From page 36 of this guidance, it is noted:

> *While CCS is a promising technology, EPA does not believe that at this time CCS will be a technically feasible BACT option in certain cases. As noted above, to establish that an option is technically infeasible, the permitting record should show that an available control option has neither been demonstrated in practice nor is available and applicable to the source type under review. EPA recognizes the significant logistical hurdles that the installation and operation of a CCS system presents and that sets it apart from other add-on controls that are typically used to reduce emissions of other regulated pollutants and already have an existing reasonably accessible infrastructure in place to address waste disposal and other offsite needs. Logistical hurdles for CCS may include obtaining contracts for offsite land acquisition (including the availability of land), the*



Source: Figure B-1 from the "Report of the Interagency Task Force on Carbon Capture and Storage", August 2010.

FIGURE 5
Existing and Planned CO2 Pipelines in the United States with Sources
AES Huntington Beach Energy Project
Huntington Beach, California

> *need for funding (including, for example, government subsidies), timing of available transportation infrastructure, and developing a site for secure long-term storage. Not every source has the resources to overcome the offsite logistical barriers necessary to apply CCS technology to its operations, and smaller sources will likely be more constrained in this regard.* (EPA, 2011b)

The CCS alternative is not considered technically feasible for the HEBP, and it should therefore be eliminated from further consideration in Step 2. However, at the suggestion of EPA team members on other recent projects, economic feasibility issues will be discussed in Step 4.

Thermal Efficiency. Thermal efficiency is a standard measurement metric for combined-cycle facilities; therefore, it is technically feasible as a control technology for BACT consideration.

3.2.2.3 Combustion Turbine GHG Control Technology Ranking – Step 3

Because CCS is not technically feasible, the only remaining technically feasible GHG control technology for the HEBP is thermal efficiency. While CCS will be discussed further in Step 4, and if it were technically feasible would rank higher than thermal efficiency for GHG control, thermal efficiency is the only technically feasible control technology that is commercially available and applicable for the HEBP.

3.2.2.4 Evaluate Most Effective Controls – Step 4

Step 4 of the BACT analysis is to evaluate the remaining technically feasible controls and consider whether energy, environmental, and/or economic impacts associated with the remaining control technologies would justify selection of a less-effective control technology. The top-down approach specifies that the evaluation begin with the most-effective technology.

Carbon Capture and Sequestration. As demonstrated in Step 2, CCS is not a technically feasible alternative for the HEBP. Nonetheless, at the suggestion of the EPA team members on other recent projects, economic feasibility of CCS technology is reviewed in this step. Control options considered in this step therefore include application of CCS technology and plant energy thermal efficiency. As demonstrated below, CCS is clearly not economically feasible for the HEBP.

On page 42 of the EPA PSD and Title V Permitting Guidance, it is suggested that detailed cost estimates and vendor quotes should not be required where it can be determined from a qualitative standpoint that a control strategy would not be cost effective:

> *With respect to the valuation of the economic impacts of [AES] control strategies, it may be appropriate in some cases to assess the cost effectiveness of a control option in a less detailed quantitative (or even qualitative) manner. For instance, when evaluating the cost effectiveness of CCS as a GHG control option, if the cost of building a new pipeline to transport the CO_2 is extraordinarily high and by itself would be considered cost prohibitive, it would not be necessary for the applicant to obtain a vendor quote and evaluate the cost effectiveness of a CO_2 capture system.* (EPA, 2011b)

The guidance document also acknowledges the current high costs of CCS technology:

> *EPA recognizes that at present CCS is an expensive technology, largely because of the costs associated with CO_2 capture and compression, and these costs will generally make the price of electricity from power plants with CCS uncompetitive compared to electricity from plants with other GHG controls. Even if not eliminated in Step 2 of the technical feasibility of the BACT analysis, on the basis of the current costs of CCS, we expect that CCS will often be eliminated from consideration in Step 4 of the economical feasibility of the BACT analysis, even in some cases where underground storage of the captured CO_2 near the power plant is feasible.*(EPA, 2011b)

The costs of constructing and operating CCS technology are indeed extraordinarily high, based on current technology. Even with the optimistic assumption that appropriate EOR opportunities could be identified in order to lower costs, compared to “pure” sequestration in deep saline aquifers, or through deep ocean storage, additional costs to HBEP would include the following:

- Licensing of scrubber technology and construction of carbon capture systems
- Significant reduction to plant output due to the high energy consumption of capture and compression systems
- Identification of oil and gas companies holding depleted oil reservoirs with appropriate characteristics for effective use of CO_2 for tertiary oil recovery, and negotiation with those parties for long-term contracts for CO_2 purchases
- Construction of compression systems and pipelines to deliver CO_2 to EOR or storage locations
- Hiring of labor to operate, maintain, and monitor the capture, compression, and transport systems
- Resolving issues regarding project risk that would jeopardize the ability to finance construction

The interagency task force report provides an estimate of capital and operating costs for carbon capture from natural gas systems: “For a [550-MWe net output] NGCC plant, the capital cost would increase by $340 million and an energy penalty of 15 percent would result from the inclusion of CO_2 capture” (DOE and EPA, 2010). Using the ”Capacity Factor Method” for prorating capital costs for similar systems of different sizes as suggested by the Association for the Advancement of Cost Engineering and other organizations, the CO_2 capture system capital cost for the HEBP is estimated as at least $467 million. Based on an estimated HBEP capital cost of $500 million to $550 million for the plant and equipment, the capture system alone would nearly double the cost of the overall plant equipment capital cost.

As noted above, the effort required to identify and negotiate with oil and gas companies that may be able to utilize the CO_2 would be substantial. Prospective EOR oil fields are located within the area, but no active commercial facilities exist within the Los Angeles Basin, making predictions for CO_2 demand generated by CCS difficult. And, because of the patchwork of oil well ownership, many parties could potentially be involved in negotiations over CO_2 value.

Because of the extremely high pressures required to transport and inject CO_2 under supercritical conditions, the compressors required are highly specialized. For example, the compressors for the Dakota Gasification Company system are of a unique eight-stage design. It is unclear whether the Task Force natural gas combined-cycle (NGCC) cost estimate noted above includes the required compression systems; if not, then this represents another substantial capital cost.

Pipelines must be designed to withstand the very high pressures (over 2,000 psig) and the potential for corrosion if any water is introduced into the system. As noted above, if CCS were otherwise technically and economically feasible for the HEBP, the most realistic scenario could be to construct a pipeline from the Huntington Beach area to either the Santa Fe Springs or Dominquez oil fields near Los Angeles for EOR, assuming that permits and right-of-way agreements are obtained and there is an active EOR operation in this location. As noted above, the approximate distance of the pipeline to either of these two fields is approximately 30 miles. Based on engineering analysis by the designers of the Denbury CO_2 pipeline in Wyoming, costs for an 8-inch CO_2 pipeline are estimated at $600,000 per mile, for a total cost of $18 million. Therefore, the pipeline alone would represent an additional 3 percent increase to the capital cost assuming that the EOR opportunities could be realized; however, costs could be substantially higher to transport CO_2 to deep saline aquifer or ocean storage locations.

It is unlikely that financing could be approved for a project that combines CCS with generation, given the technical and financial risks. Also, as evidenced with utilities’ inability to obtain CPUC approval for integrated gasification / combined-cycle projects because of their unacceptable cost and risk to ratepayers (such as Wisconsin’s disapproval of the Wisconsin Electric Energy project), it is reasonable to assume that the same issues would apply in this case before the CEC.

In summary, capital costs for capture system and pipeline construction alone would almost double the project capital cost, and lost power sales resulting from the CCS system energy penalty would represent another major impact to the project financials and a multi-fold increase to project capital costs. Other costs, such as identification, negotiation, permitting studies, and engineering of EOR opportunities; operating labor and maintenance costs for capture, compression, and pipeline systems; uncertain financing terms or inability to finance; and difficulty in obtaining CEC approval would also impact the project also, it is unclear whether compression systems are included in the task force estimate of capture system costs. Not only is CCS not technically feasible at this project scale, as the above discussion demonstrates, but CCS is clearly not economically feasible for natural-gas-fired turbines at this time.

Thermal Efficiency. A search of the EPA's RACT/BACT/LAER Clearinghouse was performed for NGCC projects. GHG permit information was found for one source—Westlake Vinyls Company LP Cogeneration Plant (LA-0256)—which was issued a permit in December 2011. The record for this source includes only hourly and annual CO_2e emission limitations and no information of costs estimated performed for the GHG BACT determination. Recent GHG determinations were completed for the Russell City Energy Center and the Palmdale Hybrid Power Project in California. Both projects proposed the use of combined-cycle configurations to produce commercial power, and the BACT analyses for both projects concluded that plant efficiency was the only feasible combustion control technology. However, the Palmdale project includes a 251-acre solar thermal field that generates up to 50 MWs during sunny days, which reduces the project's overall heat rate.

Because CCS is not technically or economically feasible, thermal efficiency remains the most effective, technically feasible, and economically feasible GHG control technology for the HBEP. The operationally flexible turbine class and steam cycle designs selected for the HBEP are the most thermally efficient for the project design objectives, operating at the projected annual capacity factor of approximately 40 percent. Table 3-1 compares the HBEP heat rate with that of other recent projects.

TABLE 3-1
Comparison of Heat Rates and GHG Performance Values of Recently Permitted Projects

Plant Performance Variable	Heat Rate (Btu/kWh)	GHG Performance ($MTCO_2$/MWh)
Huntington Beach Energy Project	8,236[a]	0.479[b]
Watson Cogeneration Project[c]	5,027 to 6,327	0.219 to 0.318
Palmdale Hybrid Power Project	6,970[d]	0.370[d]
Russell City Energy Project	6,852[e]	0.371[f]

[a] Calculated higher heating value (HHV) net heat rate at 65.8°F at site elevation, relative humidity of 58.32 percent, no inlet air cooling, without duct burners. Heat rate varies over the anticipated load dispatch range.
[b] Calculated CO_2 emissions at conditions in footnote a above are 163,658 lb/hr with 166.3 combined MW (both combustion turbine and steam turbine generation)
[c] From Watson Cogeneration Project Commission Final Decision
[d] From Tables 3 and 4 of the Palmdale Hybrid Power Project Greenhouse Gas BACT Analysis (AECOM, 2011)
[e] Net design heat rate with no duct burners, from "GHG BACT Analysis Case Study, Russell City Energy Center; November 2009, updated February 3, 2010.
[f] From Russell City total heat input of 4,477 MMBtu/hr (from PSD Permit), generation of 653 MW was calculated utilizing design heat rate of 6,852 Btu/kwh. From reference document in footnote d above, 1-hour CO_2 limit is 242 $MTCO_2$/hr, which yields 0.371 $MTCO_2$/MWh.

Note:

$MTCO_2$/MWh = metric tons of carbon dioxide per megawatt-hour

As shown in Table 3-1, when comparing the HBEP heat rate and GHG performance values for other recently permitted facilities, the HBEP heat rate is greater than that of other recent projects. However, the HBEP operating configuration and project goals are different than those of other recently permitted projects. The Watson Cogeneration project is a combined heating and power project, and it is designed for base load operation and not for flexible, dispatchable, or fast ramping capability. While the Palmdale project was designed for fast ramping operation (15 MW/minute), the project is described as being designed as a base load project. The HBEP's design objectives are to be able to operate over a wide MW production range with an overall high thermal efficiency, in order to respond to the fast changing load demands and changes necessitated by renewable energy generation swings. This rapid response is accomplished by utilizing fast start/stop and ramping capability and the use of the duct burners to bridge the MW production when additional combustion turbines are started (as opposed to the duct burner's traditional roll of providing peaking power during periods of high electrical demand). At maximum firing rate, the maximum power island ramp rate is 110 MW/minute for increasing in load and 250 MW/minute for decreasing load. At other load points, the load ramp rate is 30 percent. The HBEP start time to 67 percent load of the power island is 10 minutes, and it is projected that the project will operate at an approximate 40 percent annual capacity factor.

The HBEP offers the flexibility of fast start and ramping capability of a simple-cycle configuration, as well as the high efficiency associated with a combined cycle. Therefore, comparison of operating efficiency and heat rate of the HBEP should be made with simple cycle or peaking units instead of combined-cycle or more base-loaded units. Table 3-2 shows that the HBEP compares very favorably to the peaker units listed.

TABLE 3-2
Generation Heat Rates and 2008 Energy Outputs[a]

Plant Name	Heat Rate (Btu/kWh)[b]	2008 Energy Output (GWh)	GHG Performance ($MTCO_2$/MWh)
La Paloma Generating	7,172	6,185	0.392
Pastoria Energy Facility L.L.C.	7,025	4,905	0.384
Sunrise Power	7,266	3,605	0.397
Elk Hills Power, LLC	7,048	3,552	0.374
Sycamore Cogeneration Co	12,398	2,096	0.677
Midway-Sunset Cogeneration	11,805	1,941	0.645
Kern River Cogeneration Co	13,934	1,258	0.761
Ormond Beach Generating Station	10,656	783	0.582
Mandalay Generating Station	10,082	597	0.551
McKittrick Cogeneration Plant	7,732	592	0.422
Mt Poso Cogeneration (coal/pet. coke)	9,934	410	0.930
South Belridge Cogeneration Facility	11,452	409	0.625
McKittrick Cogeneration	9,037	378	0.494
KRCD Malaga Peaking Plant[c]	9,957	151	0.528
Henrietta Peaker[c]	10,351	48	0.549
CalPeak Power – Panoche	10,376	7	0.550
Wellhead Power Gates, LLC[c]	12,305	5	0.652
Wellhead Power Panoche, LLC[c]	13,716	3	0.727
MMC Mid-Sun, LLC[c]	12,738	1.4	0.675
Fresno Cogeneration Partners, LP PKR[c]	16,898	0.8	0.896
Palmdale Hybrid Power Project (PHPP)	6,970	4,993 [d]	0.370

[a] Reference: From the Palmdale Hybrid Power Project AFC Final Decision, Page 6.1-14, Table 4 (CEC, 2011)
[b] Based on the HHV of the fuel.
[c] Peaker facilities.
[d] Based on continuous operation at peak capacity.

GWh = gigawatt-hour(s)

The HBEP will be dispatched remotely by a centralized control center over an anticipated load range of approximately 160 to 528 MW for each 3-by-1 power island. Over this load range, the HBEP anticipated heat rate is estimated at approximately 7,400 to 8,000 Btu/kWh lower heating value (LHV) (~ 8,140 to 8,800 Btu/kWh HHV). The HBEP will be able to start and provide 67 percent of the power island load in 10 minutes and provide 110 MW/min of upward ramp and 250 MW/min of downward ramp capability. Comparing the thermal efficiency of the HBEP to other recently permitted California projects demonstrates that the HBEP is more thermally efficient than other similar projects that are designed to operate as a peaker unit. Based both on its flexible operating characteristics and favorable energy and thermal efficiencies as compared with other comparable peaking gas turbine projects, the HBEP thermal efficiency is BACT for GHGs.

3.2.2.5 GHG BACT Selection – Step 5

Based on the above analysis, the only remaining feasible and cost-effective option is the “Thermal Efficiency” option, which therefore is selected as the BACT.

As shown above, the Mitsubishi 501DA combustion turbines operating in a multistage generator combined-cycle operating configuration compare favorably with other comparable turbines operating in a peaking capacity. The HBEP turbines and duct burners will combust natural gas to generate electricity from both the CTG and STG units. Therefore, the thermal efficiency for the project is best measured in terms of pounds of CO_2 per MWh.

The performance of all CTGs degrades over time. Typically, turbine degradation at the time of recommended routine maintenance is up to 10 percent. Additionally, thermal efficiency can vary significantly with combustion turbine turndown and steam turbine/duct burning combinations. Finally, annual metrics for output-based limits on GHG emissions are affected by startup and shutdown periods because fuel is combusted before useful output of energy or steam. Therefore, the annual average thermal efficiency performance of any turbine will be greater than the optimal efficiency of a new turbine operating continuously at peak load over the lifetime of the turbine.

Based on the projected annual operating profile and equipment design specification provided by the project owner, the GHG BACT calculation for the HBEP was determined in pounds of CO_2 per MWh of energy output (on a gross basis). Included in this calculation is the inherent degradation in turbine performance over the lifetime of the HBEP. The HBEP has concluded that the BACT for GHG emissions is an emission rate of 1,082 pounds CO_2/MWhr of gross energy output, and a total annual CO_2 emissions limit of 3,161,785 metric tons per year. Degradation over time and turndowns, startup, and shutdown are incorporated into these limits.

SECTION 4

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Appendix 5.1E
SCAQMD Permit Application Forms

we are the energy
AES Huntington Beach, LLC
21730 Newland Street
Huntington Beach, CA 92646
tel 562 493 7891
fax 562 493 7320

September 4, 2015

Mr. Chris Perri
Air Quality Engineer
South Coast Air Quality Management District
21865 E. Copley Drive
Diamond Bar, California 91765-4178

Subject: AES Huntington Beach, LLC (Facility ID 115389)
Application for South Coast Air Quality Management District Permit to Construct and Modification to the Title V Permit to Operate

Dear Mr. Perri:

AES Huntington Beach, LLC (AES), a wholly-owned subsidiary of the AES Corporation, is submitting two copies of the application materials for a South Coast Air Quality Management District (SCAQMD) Permit to Construct for the Huntington Beach Energy Project (HBEP) and a modification to the existing Title V Permit to Operate for Facility 115389.[1]

HBEP is a natural-gas-fired electrical generating facility with a net generating capacity of 844 megawatts (MW) which will be constructed on the site of the AES Huntington Beach Generating Station located in the City of Huntington Beach, California. HBEP will consist of one two-on-one combined-cycle power block and one simple-cycle power block. The combined-cycle power block will consist of two General Electric (GE) Frame 7FA.05 natural-gas-fired combustion turbine generators with heat recovery steam generators, one steam turbine generator, one air-cooled condenser, and one natural-gas-fired auxiliary boiler. The simple-cycle power block will consist of two GE LMS-100PB natural-gas-fired combustion turbine generators and two closed-loop cooling fin fan coolers. HBEP will also include two oil/water separators, two 19 percent aqueous ammonia storage tanks, and ancillary facilities. The attached application is being submitted in conjunction with a Petition to Amend (PTA) that was submitted to the California Energy Commission on September 4, 2015.

The HBEP application relies on the provisions contained in SCAQMD Rule 1304(a)(2), which allows the replacement of older, less efficient electric utility steam boilers with specific new generation technologies on a MW-to-MW basis. The SCAQMD Rule 1304(b)(2) offset exemption, applicable to the combustion turbine generators only, will be met by permanently retiring AES-owned electric steam utility boilers. Table 1 shows a Rule 1304 schedule for all AES facilities within the SCAQMD's jurisdiction. All units proposed for retirement are owned by wholly-owned subsidiaries of the AES Corporation. The attached organizational chart illustrates the corporate structure of the subject

[1] The SCAQMD issued a Final Determination of Compliance for the construction and operation of the currently licensed HBEP on July 18, 2014. However, AES is modifying HBEP's permit to be consistent with a power purchase agreement awarded in November 2014.

limited liability corporations and demonstrates the common ownership of AES Redondo Beach, LLC; AES Huntington Beach, LLC; and AES Alamitos, LLC, per the requirements of SCAQMD Rule 1304(a)(2).

TABLE 1

AES Rule 1304(a)(2) Schedule

Project	Phase	First Fire or Shutdown Date	MW Gross
HBEP	Combined Cycle Block [a]	10/1/2019	693.822
	HBGS Unit 1 Retired	11/1/2019	215
	RBGS Unit 7 Retired	10/1/2019	480
	Simple Cycle Block [b]	11/1/2023	201.628
	HBGS Unit 2 Retired	12/31/2020	215
	MW Installed		895.45
	MW Retired		910
	Surplus MW		14.55
Redondo Beach Energy Project	Combined Cycle Block	11/1/2019	546.4
	RBGS Unit 5 Retired	12/31/2019	175
	RBGS Unit 8 Retired	12/31/2019	480
	MW Installed		546.4
	MW Retired		655
	Surplus MW (HBEP & RBEP)		123.15
Alamitos Energy Center	Combined Cycle Block [c]	10/1/2019	692.951
	AGS Unit 1 Retired	12/29/2019	175
	AGS Unit 2 Retired	12/29/2019	175
	AGS Unit 5 Retired	12/29/2019	480
	AGS Unit 3 Retired	12/31/2020	320
	Simple Cycle Block [d]	6/1/2021	401.751
	MW Installed		1,094.702
	MW Retired		1,150
Total MWs Installed and Retired	Total MW Installed		2,536.552
	Total MW Retired		2,715.00

[a] Based on 65.8°F with evaporative coolers operating.
[b] Based on 65.8°F with evaporative coolers operating.
[c] Based on 59°F without evaporative coolers operating.
[d] Based on 59°F without evaporative coolers operating.

Unlike the combustion turbine generators, the auxiliary boiler is not eligible for offsets exemption under SCAQMD Rule 1304(a)(2). Therefore, AES will surrender emission reduction credits to sufficiently offset the auxiliary boiler's volatile organic compounds (VOC) and respirable particulate matter (PM_{10}) emissions at a 1.2-to-1 ratio, consistent with SCAQMD Rule 1303(b)(2).

The contents of this application package include the required SCAQMD forms,[2] the manufacturers' emissions guarantees for the proposed oxidation catalyst and selective catalytic reduction systems, and the following sections from the PTA:

- Section 1.0: Executive Summary
- Section 2.0: Project Description
- Section 5.1: Air Quality (includes Appendices 5.1A through 5.1F)
- Section 5.9: Public Health (includes Appendices 5.9A through 5.9B)

As described in Section 5.9 of the PTA, AES conducted a health risk assessment (HRA) consistent with the SCAQMD's current practice of estimating toxic emissions from gas turbines using emission factors listed in Table 3.1-3 of the U.S. Environmental Protection Agency's (EPA) AP-42, Compilation of Air Pollutant Emission Factors. However, formaldehyde emissions were estimated using the SCAQMD formaldehyde emission factor of 3.6 x 10-4 pound(s) per million British thermal units previously provided by the SCAQMD. Toxic emissions from the auxiliary boiler were similarly estimated using emission factors listed in Tables 1.4-3 and 1.4-4 of EPA's AP-42. Summaries of the air toxics emissions included in the HRA are provided in Tables 5.1B.6, 5.1B.10, and 5.1B.13 of the attached PTA Appendix 5.1B for the combined-cycle turbines, simple-cycle turbines, and auxiliary boiler, respectively.

A summary of the maximum incremental cancer risk (MICR), chronic hazard index, and acute hazard index at the point of maximum impact (PMI) locations have been included in Table 2. In accordance with SCAQMD Rule 1401, the results represent the predicted risk for each individual emission unit. Overall, the predicted MICR at the PMI is above the individual source significance threshold of 1 in 1 million for the GE 7FA.05 turbines, but below the significance threshold for the remaining combustion units. The facility cancer burden is 8.8 x 10-8, which is below the SCAQMD Rule 1401 threshold of 0.5. Additionally, the predicted chronic and acute hazard indices are below the SCAQMD individual source significance threshold of 1.0 for all proposed combustion units. Although the MICR for the GE 7FA.05 turbines exceeds the individual source significance threshold of 1 in 1 million, it is below the significance threshold with Best Available Control Technology for Toxics (T-BACT) of 10 in 1 million. The HBEP design includes the use of an oxidation catalyst to reduce carbon monoxide (CO) and VOC emissions from the GE 7FA.05 turbines to the best available control levels of 2 parts per million (ppm) and 2 ppm, respectively. The oxidation catalyst has the added benefit of reducing hazardous air pollutant (HAP) emissions and is, therefore, considered T-BACT.[3]

---

[2] Per discussion with SCAQMD staff (Andrew Lee and John Yee) during the pre-application meeting for the Redondo Beach Energy Project on April 19, 2012, Form 500-C1 has not been included in the application package.

[3] AP-42, Section 3.1, Stationary Internal Combustion Processes Guidance Document, updated in 2000, page 3.1-7— "The performance of these oxidation catalyst systems on combustion turbines results in 90-plus percent control of CO and about 85 to 90 percent control of formaldehyde. Similar emission reductions are expected on other HAP pollutants."

TABLE 2

HBEP Health Risk Assessment Summary: Individual Units (BASIS: AP-42 Emission Factors) [a, b]

Risk	GE 7FA.05-01	GE 7FA.05-02	GE LMS 100PB-01	GE LMS 100PB-02	Auxiliary Boiler
MICR at the PMI [c] (per million)	2.29	4.62	0.069	0.069	0.88
Facility Cancer Burden	$8.8x10^{-8}$	--	--	--	--
Chronic Hazard Index at the PMI	0.0056	0.011	0.00017	0.00017	0.020
Acute Hazard Index at the PMI	0.033	0.048	0.0019	0.0019	0.0029

[a] The results represent the predicted risk for each individual emission unit in accordance with SCAQMD Rule 1401.
[b] A source with a MICR less than 1 in 1 million individuals is considered to be less than significant. A source with a MICR less than 10 in 1 million individuals is considered less than significant if T-BACT is installed. A chronic or acute hazard index less than 1.0 for each source is considered to be a less-than-significant health risk.
[c] Cancer risk values are based on the Risk Management Policy (RMP) Derived Methodology.

Attached to this application are the dispersion modeling files, which includes files from the California Air Resources Board's Hotspots Analysis Reporting Program 2 used to conduct the HRA, and a check in the amount of $105,244.91 for the requisite permit application filing fee. Please note that this fee includes payment for expedited permit processing.

AES looks forward to working with the SCAQMD during the review of the HBEP application materials and the issuance of the SCAQMD Permit to Construct and modified Title V operating permit.

Sincerely,

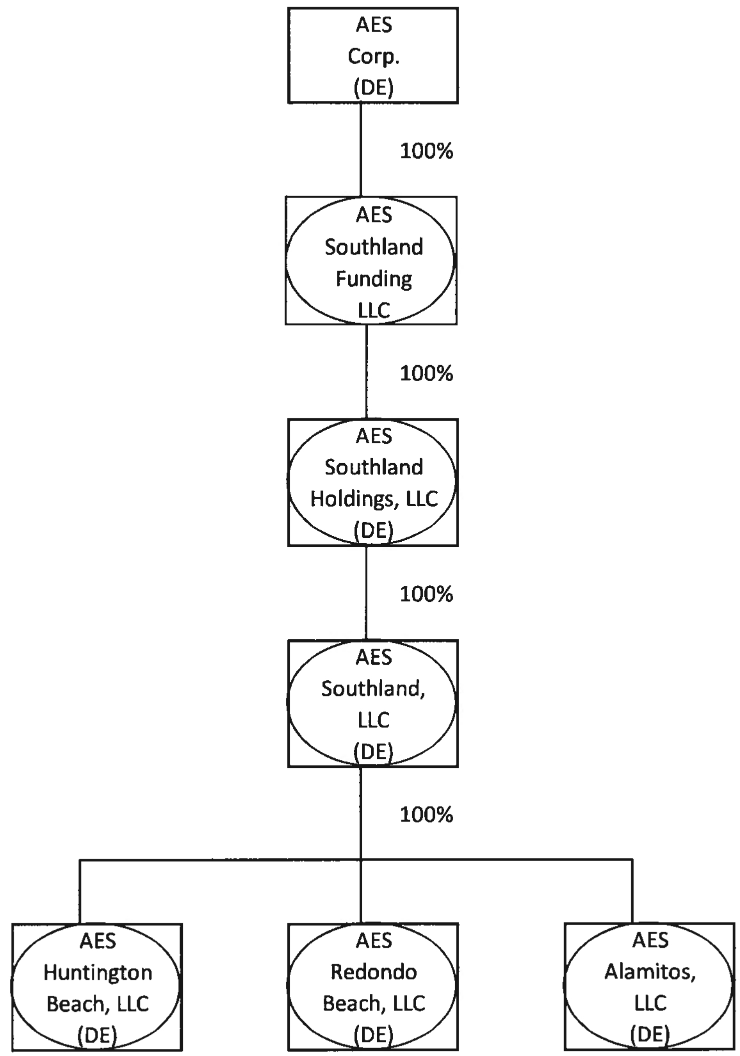
S O'Kane

Stephen O'Kane
Manager
AES Huntington Beach, LLC

Attachments: Two (2) hard copies of the application materials
Five (5) dispersion modeling file DVDs

cc: Robert Mason/CH2M HILL (cover letter only)
Stephen O'Kane/AES (cover letter only)
Jennifer Didlo/AES (cover letter only)
Melissa Foster/Stoel Rives (cover letter only)
Jerry Salamy/CH2M HILL (cover letter only)
John Heiser/CEC (cover letter only)

AES Southand
Legal Ownership Structure



South Coast Air Quality Management District

Form 400-A

Application Form for Permit or Plan Approval

List only one piece of equipment or process per form.

Mail To:
SCAQMD
P.O. Box 4944
Diamond Bar, CA 91765-0944

Tel: (909) 396-3385
www.aqmd.gov

Section A - Operator Information

1. Facility Name (Business Name of Operator to Appear on the Permit): AES Huntington Beach, LLC

2. Valid AQMD Facility ID (Available On Permit Or Invoice Issued By AQMD): 115389

3. Owner's Business Name (If different from Business Name of Operator):

Section B - Equipment Location Address

4. Equipment Location Is: (●) Fixed Location ( ) Various Location
(For equipment operated at various locations, provide address of initial site.)

21730 Newland Street
Street Address

Huntington Beach, CA 92646
City, Zip

Stephen O'Kane — Manager
Contact Name — Title

5624937840 — Ext. — (562) 493-7320
Phone # — Ext. — Fax #

E-Mail: stephen.okane@AES.com

Section C - Permit Mailing Address

5. Permit and Correspondence Information:
☐ Check here if same as equipment location address

690 N. Studebaker Road
Address

Long Beach, CA 90803
City, State, Zip

Stephen O'Kane — Manager
Contact Name — Title

5624937840 — Ext. — (562) 493-7320
Phone # — Ext. — Fax #

E-Mail: stephen.okane@AES.com

Section D - Application Type

6. The Facility Is: ( ) Not In RECLAIM or Title V ( ) In RECLAIM ( ) In Title V (●) In RECLAIM & Title V Programs

7. Reason for Submitting Application (Select only ONE):

7a. New Equipment or Process Application:
- ( ) New Construction (Permit to Construct)
- ( ) Equipment On-Site But Not Constructed or Operational
- ( ) Equipment Operating Without A Permit *
- ( ) Compliance Plan
- ( ) Registration/Certification
- ( ) Streamlined Standard Permit

7b. Facility Permits:
- (●) Title V Application or Amendment (Refer to Title V Matrix)
- ( ) RECLAIM Facility Permit Amendment

7c. Equipment or Process with an Existing/Previous Application or Permit:
- ( ) Administrative Change
- ( ) Alteration/Modification
- ( ) Alteration/Modification without Prior Approval *
- ( ) Change of Condition
- ( ) Change of Condition without Prior Approval *
- ( ) Change of Location
- ( ) Change of Location without Prior Approval *
- ( ) Equipment Operating with an Expired/Inactive Permit *

Existing or Previous Permit/Application
If you checked any of the items in 7c., you MUST provide an existing Permit or Application Number: ____

* A Higher Permit Processing Fee and additional Annual Operating Fees (up to 3 full years) may apply (Rule 301(c)(1)(D)(i)).

8a. Estimated Start Date of Construction (mm/dd/yyyy): 06/01/2017

8b. Estimated End Date of Construction (mm/dd/yyyy): 12/31/2023

8c. Estimated Start Date of Operation (mm/dd/yyyy): 01/01/2024

9. Description of Equipment or Reason for Compliance Plan (list applicable rule): Title V Permit Revision

10. For identical equipment, how many additional applications are being submitted with this application? (Form 400-A required for each equipment / process) 0

11. Are you a Small Business as per AQMD's Rule 102 definition? (10 employees or less and total gross receipts are $500,000 or less OR a not-for-profit training center) (●) No ( ) Yes

12. Has a Notice of Violation (NOV) or a Notice to Comply (NC) been issued for this equipment? (●) No ( ) Yes
If Yes, provide NOV/NC#:

Section E - Facility Business Information

13. What type of business is being conducted at this equipment location? Electrical Power Generation

14. What is your business primary NAICS Code? (North American Industrial Classification System) 221112

15. Are there other facilities in the SCAQMD jurisdiction operated by the same operator? ( ) No (●) Yes

16. Are there any schools (K-12) within 1000 feet of the facility property line? (●) No ( ) Yes

Section F - Authorization/Signature

I hereby certify that all information contained herein and information submitted with this application are true and correct.

17. Signature of Responsible Official: S O'Kane

18. Title of Responsible Official: Manager

19. I wish to review the permit prior to issuance. (This may cause a delay in the application process.) ( ) No (●) Yes

20. Print Name: Stephen O'Kane

21. Date: 09/04/15

22. Do you claim confidentiality of data? (If Yes, see instructions.) (●) No ( ) Yes

23. Check List: ☒ Authorized Signature/Date ☒ Form 400-CEQA ☒ Supplemental Form(s) (ie., Form 400-E-xx) ☒ Fees Enclosed

AQMD USE ONLY	APPLICATION TRACKING #	CHECK #	AMOUNT RECEIVED $	PAYMENT TRACKING #	VALIDATION

DATE	APP REJ	DATE	APP REJ	CLASS I III	BASIC CONTROL	EQUIPMENT CATEGORY CODE	TEAM	ENGINEER	REASON/ACTION TAKEN

South Coast Air Quality Management District

Form 400-A

Application Form for Permit or Plan Approval

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Mail To:
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P.O. Box 4944
Diamond Bar, CA 91765-0944

Tel: (909) 396-3385
www.aqmd.gov

Section A - Operator Information

1. Facility Name (Business Name of Operator to Appear on the Permit): AES Huntington Beach, LLC

2. Valid AQMD Facility ID (Available On Permit Or Invoice Issued By AQMD): 115389

3. Owner's Business Name (If different from Business Name of Operator):

Section B - Equipment Location Address

4. Equipment Location Is: ⦿ Fixed Location ○ Various Location
(For equipment operated at various locations, provide address of initial site.)

21730 Newland Street
Street Address

Huntington Beach, CA 92646
City, Zip

Stephen O'Kane — Manager
Contact Name — Title

5624937840 — Ext. — (562) 493-7320
Phone # — Ext. — Fax #

E-Mail: stephen.okane@AES.com

Section C - Permit Mailing Address

5. Permit and Correspondence Information:
☐ Check here if same as equipment location address

690 N. Studebaker Road
Address

Long Beach, CA 90803
City, State, Zip

Stephen O'Kane — Manager
Contact Name — Title

5624937840 — Ext. — (562) 493-7320
Phone # — Ext. — Fax #

E-Mail: stephen.okane@AES.com

Section D - Application Type

6. The Facility Is: ○ Not In RECLAIM or Title V ○ In RECLAIM ○ In Title V ⦿ In RECLAIM & Title V Programs

7. Reason for Submitting Application (Select only ONE):

7a. New Equipment or Process Application:
⦿ New Construction (Permit to Construct)
○ Equipment On-Site But Not Constructed or Operational
○ Equipment Operating Without A Permit *
○ Compliance Plan
○ Registration/Certification
○ Streamlined Standard Permit

7b. Facility Permits:
○ Title V Application or Amendment (Refer to Title V Matrix)
○ RECLAIM Facility Permit Amendment

7c. Equipment or Process with an Existing/Previous Application or Permit:
○ Administrative Change
○ Alteration/Modification
○ Alteration/Modification without Prior Approval *
○ Change of Condition
○ Change of Condition without Prior Approval *
○ Change of Location
○ Change of Location without Prior Approval *
○ Equipment Operating with an Expired/Inactive Permit *

Existing or Previous Permit/Application
If you checked any of the items in 7c., you MUST provide an existing Permit or Application Number: ______

* A Higher Permit Processing Fee and additional Annual Operating Fees (up to 3 full years) may apply (Rule 301(c)(1)(D)(i)).

8a. Estimated Start Date of Construction (mm/dd/yyyy): 06/01/2017

8b. Estimated End Date of Construction (mm/dd/yyyy): 04/30/2020

8c. Estimated Start Date of Operation (mm/dd/yyyy): 05/01/2020

9. Description of Equipment or Reason for Compliance Plan (list applicable rule): Combined Cycle Combustion Turbines

10. For Identical equipment, how many additional applications are being submitted with this application? (Form 400-A required for each equipment / process) 1

11. Are you a Small Business as per AQMD's Rule 102 definition? (10 employees or less and total gross receipts are $500,000 or less OR a not-for-profit training center) ⦿ No ○ Yes

12. Has a Notice of Violation (NOV) or a Notice to Comply (NC) been issued for this equipment? ⦿ No ○ Yes
If Yes, provide NOV/NC#:

Section E - Facility Business Information

13. What type of business is being conducted at this equipment location? Electrical Power Generation

14. What is your business primary NAICS Code? (North American Industrial Classification System) 221112

15. Are there other facilities in the SCAQMD jurisdiction operated by the same operator? ○ No ⦿ Yes

16. Are there any schools (K-12) within 1000 feet of the facility property line? ⦿ No ○ Yes

Section F - Authorization/Signature

I hereby certify that all information contained herein and information submitted with this application are true and correct.

17. Signature of Responsible Official: S. O'Kane

18. Title of Responsible Official: Manager

19. I wish to review the permit prior to issuance. (This may cause a delay in the application process.) ○ No ⦿ Yes

20. Print Name: Stephen O'Kane

21. Date: 09/04/15

22. Do you claim confidentiality of data? (If Yes, see instructions.) ⦿ No ○ Yes

23. Check List: ☒ Authorized Signature/Date ☒ Form 400-CEQA ☒ Supplemental Form(s) (ie., Form 400-E-xx) ☒ Fees Enclosed

AQMD USE ONLY	APPLICATION TRACKING #	CHECK #	AMOUNT RECEIVED $	PAYMENT TRACKING #	VALIDATION

DATE	APP REJ	DATE	APP REJ	CLASS I III	BASIC CONTROL	EQUIPMENT CATEGORY CODE	TEAM	ENGINEER	REASON/ACTION TAKEN

South Coast AQMD

South Coast Air Quality Management District

Form 400-A

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Mail To:
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Tel: (909) 396-3385
www.aqmd.gov

Section A - Operator Information

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2. Valid AQMD Facility ID (Available On Permit Or Invoice Issued By AQMD): 115389

3. Owner's Business Name (If different from Business Name of Operator):

Section B - Equipment Location Address

4. Equipment Location Is: (•) Fixed Location ( ) Various Location
(For equipment operated at various locations, provide address of initial site.)

21730 Newland Street
Street Address

Huntington Beach, CA 92646
City, Zip

Stephen O'Kane — Manager
Contact Name — Title

5624937840 Ext. — (562) 493-7320
Phone # — Fax #

E-Mail: stephen.okane@AES.com

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☐ Check here if same as equipment location address

690 N. Studebaker Road
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Long Beach, CA 90803
City, State, Zip

Stephen O'Kane — Manager
Contact Name — Title

5624937840 Ext. — (562) 493-7320
Phone # — Fax #

E-Mail: stephen.okane@AES.com

Section D - Application Type

6. The Facility Is: ( ) Not In RECLAIM or Title V ( ) In RECLAIM ( ) In Title V (•) In RECLAIM & Title V Programs

7. Reason for Submitting Application (Select only ONE):

7a. New Equipment or Process Application:

- (•) New Construction (Permit to Construct)
- ( ) Equipment On-Site But Not Constructed or Operational
- ( ) Equipment Operating Without A Permit *
- ( ) Compliance Plan
- ( ) Registration/Certification
- ( ) Streamlined Standard Permit

7b. Facility Permits:

- ( ) Title V Application or Amendment (Refer to Title V Matrix)
- ( ) RECLAIM Facility Permit Amendment

7c. Equipment or Process with an Existing/Previous Application or Permit:

- ( ) Administrative Change
- ( ) Alteration/Modification
- ( ) Alteration/Modification without Prior Approval *
- ( ) Change of Condition
- ( ) Change of Condition without Prior Approval *
- ( ) Change of Location
- ( ) Change of Location without Prior Approval *
- ( ) Equipment Operating with an Expired/Inactive Permit *

Existing or Previous Permit/Application
If you checked any of the items in 7c., you MUST provide an existing Permit or Application Number:

* A Higher Permit Processing Fee and additional Annual Operating Fees (up to 3 full years) may apply (Rule 301(c)(1)(D)(i)).

8a. Estimated Start Date of Construction (mm/dd/yyyy): 06/01/2017

8b. Estimated End Date of Construction (mm/dd/yyyy): 04/30/2020

8c. Estimated Start Date of Operation (mm/dd/yyyy): 05/01/2020

9. Description of Equipment or Reason for Compliance Plan (list applicable rule):
Combined Cycle Combustion Turbines

10. For Identical equipment, how many additional applications are being submitted with this application? (Form 400-A required for each equipment / process) 1

11. Are you a Small Business as per AQMD's Rule 102 definition? (10 employees or less and total gross receipts are $500,000 or less OR a not-for-profit training center) (•) No ( ) Yes

12. Has a Notice of Violation (NOV) or a Notice to Comply (NC) been issued for this equipment? (•) No ( ) Yes
If Yes, provide NOV/NC#:

Section E - Facility Business Information

13. What type of business is being conducted at this equipment location?
Electrical Power Generation

14. What is your business primary NAICS Code? (North American Industrial Classification System) 221112

15. Are there other facilities in the SCAQMD jurisdiction operated by the same operator? ( ) No (•) Yes

16. Are there any schools (K-12) within 1000 feet of the facility property line? (•) No ( ) Yes

Section F - Authorization/Signature

I hereby certify that all information contained herein and information submitted with this application are true and correct.

17. Signature of Responsible Official: S O'Kane

18. Title of Responsible Official: Manager

19. I wish to review the permit prior to issuance. (This may cause a delay in the application process.) ( ) No (•) Yes

20. Print Name: Stephen O'Kane

21. Date: 09/04/15

22. Do you claim confidentiality of data? (If Yes, see instructions.) (•) No ( ) Yes

23. Check List: ☒ Authorized Signature/Date ☒ Form 400-CEQA ☒ Supplemental Form(s) (ie., Form 400-E-xx) ☒ Fees Enclosed

AQMD USE ONLY	APPLICATION TRACKING #	CHECK #	AMOUNT RECEIVED $	PAYMENT TRACKING #	VALIDATION

DATE	APP REJ	DATE	APP REJ	CLASS I III	BASIC CONTROL	EQUIPMENT CATEGORY CODE	TEAM	ENGINEER	REASON/ACTION TAKEN

South Coast Air Quality Management District

Form 400-A

Application Form for Permit or Plan Approval

List only one piece of equipment or process per form.

South Coast AQMD

Mail To:
SCAQMD
P.O. Box 4944
Diamond Bar, CA 91765-0944

Tel: (909) 396-3385
www.aqmd.gov

Section A - Operator Information

1. Facility Name (Business Name of Operator to Appear on the Permit): AES Huntington Beach, LLC

2. Valid AQMD Facility ID (Available On Permit Or Invoice Issued By AQMD): 115389

3. Owner's Business Name (If different from Business Name of Operator):

Section B - Equipment Location Address

4. Equipment Location Is: (●) Fixed Location ( ) Various Location
(For equipment operated at various locations, provide address of initial site.)

21730 Newland Street
Street Address

Huntington Beach, CA 92646
City, Zip

Stephen O'Kane — Manager
Contact Name, Title

5624937840 — Ext. — (562) 493-7320
Phone #, Ext., Fax #

E-Mail: stephen.okane@AES.com

Section C - Permit Mailing Address

5. Permit and Correspondence Information:
☐ Check here if same as equipment location address

690 N. Studebaker Road
Address

Long Beach, CA 90803
City, State, Zip

Stephen O'Kane — Manager
Contact Name, Title

5624937840 — Ext. — (562) 493-7320
Phone #, Ext., Fax #

E-Mail: stephen.okane@AES.com

Section D - Application Type

6. The Facility Is: ( ) Not In RECLAIM or Title V ( ) In RECLAIM ( ) In Title V (●) In RECLAIM & Title V Programs

7. Reason for Submitting Application (Select only ONE):

7a. New Equipment or Process Application:
- (●) New Construction (Permit to Construct)
- ( ) Equipment On-Site But Not Constructed or Operational
- ( ) Equipment Operating Without A Permit *
- ( ) Compliance Plan
- ( ) Registration/Certification
- ( ) Streamlined Standard Permit

7b. Facility Permits:
- ( ) Title V Application or Amendment (Refer to Title V Matrix)
- ( ) RECLAIM Facility Permit Amendment

7c. Equipment or Process with an Existing/Previous Application or Permit:
- ( ) Administrative Change
- ( ) Alteration/Modification
- ( ) Alteration/Modification without Prior Approval *
- ( ) Change of Condition
- ( ) Change of Condition without Prior Approval *
- ( ) Change of Location
- ( ) Change of Location without Prior Approval *
- ( ) Equipment Operating with an Expired/Inactive Permit *

Existing or Previous Permit/Application
If you checked any of the items in 7c., you MUST provide an existing Permit or Application Number: ____________

* A Higher Permit Processing Fee and additional Annual Operating Fees (up to 3 full years) may apply (Rule 301(c)(1)(D)(i)).

8a. Estimated Start Date of Construction (mm/dd/yyyy):	8b. Estimated End Date of Construction (mm/dd/yyyy):	8c. Estimated Start Date of Operation (mm/dd/yyyy):
05/01/2022	12/31/2023	01/01/2024

9. Description of Equipment or Reason for Compliance Plan (list applicable rule): Simple Cycle Combustion Turbines

10. For identical equipment, how many additional applications are being submitted with this application? (Form 400-A required for each equipment / process) 1

11. Are you a Small Business as per AQMD's Rule 102 definition? (10 employees or less and total gross receipts are $500,000 or less OR a not-for-profit training center) (●) No ( ) Yes

12. Has a Notice of Violation (NOV) or a Notice to Comply (NC) been issued for this equipment? (●) No ( ) Yes
If Yes, provide NOV/NC#:

Section E - Facility Business Information

13. What type of business is being conducted at this equipment location? Electrical Power Generation

14. What is your business primary NAICS Code? (North American Industrial Classification System) 221112

15. Are there other facilities in the SCAQMD jurisdiction operated by the same operator? ( ) No (●) Yes

16. Are there any schools (K-12) within 1000 feet of the facility property line? (●) No ( ) Yes

Section F - Authorization/Signature

I hereby certify that all information contained herein and information submitted with this application are true and correct.

17. Signature of Responsible Official: SOKane

18. Title of Responsible Official: Manager

19. I wish to review the permit prior to issuance. (This may cause a delay in the application process.) ( ) No (●) Yes

20. Print Name: Stephen O'Kane

21. Date: 09/04/15

22. Do you claim confidentiality of data? (If Yes, see instructions.) (●) No ( ) Yes

23. Check List: ☒ Authorized Signature/Date ☒ Form 400-CEQA ☒ Supplemental Form(s) (ie., Form 400-E-xx) ☒ Fees Enclosed

AQMD USE ONLY	APPLICATION TRACKING #		CHECK #		AMOUNT RECEIVED $	PAYMENT TRACKING #			VALIDATION
DATE	APP REJ	DATE	APP REJ	CLASS I III	BASIC CONTROL	EQUIPMENT CATEGORY CODE	TEAM	ENGINEER	REASON/ACTION TAKEN

South Coast Air Quality Management District

Form 400-A

Application Form for Permit or Plan Approval

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South Coast AQMD

Mail To:
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Diamond Bar, CA 91765-0944

Tel: (909) 396-3385
www.aqmd.gov

Section A - Operator Information

1. Facility Name (Business Name of Operator to Appear on the Permit): AES Huntington Beach, LLC

2. Valid AQMD Facility ID (Available On Permit Or Invoice Issued By AQMD): 115389

3. Owner's Business Name (If different from Business Name of Operator):

Section B - Equipment Location Address

4. Equipment Location Is: (●) Fixed Location ( ) Various Location
(For equipment operated at various locations, provide address of initial site.)

21730 Newland Street
Street Address

Huntington Beach, CA 92646
City, Zip

Stephen O'Kane — Manager
Contact Name — Title

5624937840 — Ext. — (562) 493-7320
Phone # — Ext. — Fax #

E-Mail: stephen.okane@AES.com

Section C - Permit Mailing Address

5. Permit and Correspondence Information:
☐ Check here if same as equipment location address

690 N. Studebaker Road
Address

Long Beach, CA 90803
City, State, Zip

Stephen O'Kane — Manager
Contact Name — Title

5624937840 — Ext. — (562) 493-7320
Phone # — Ext. — Fax #

E-Mail: stephen.okane@AES.com

Section D - Application Type

6. The Facility Is: ( ) Not In RECLAIM or Title V ( ) In RECLAIM ( ) In Title V (●) In RECLAIM & Title V Programs

7. Reason for Submitting Application (Select only ONE):

7a. New Equipment or Process Application:
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- ( ) Equipment On-Site But Not Constructed or Operational
- ( ) Equipment Operating Without A Permit *
- ( ) Compliance Plan
- ( ) Registration/Certification
- ( ) Streamlined Standard Permit

7b. Facility Permits:
- ( ) Title V Application or Amendment (Refer to Title V Matrix)
- ( ) RECLAIM Facility Permit Amendment

7c. Equipment or Process with an Existing/Previous Application or Permit:
- ( ) Administrative Change
- ( ) Alteration/Modification
- ( ) Alteration/Modification without Prior Approval *
- ( ) Change of Condition
- ( ) Change of Condition without Prior Approval *
- ( ) Change of Location
- ( ) Change of Location without Prior Approval *
- ( ) Equipment Operating with an Expired/Inactive Permit *

Existing or Previous Permit/Application
If you checked any of the items in 7c., you MUST provide an existing Permit or Application Number: ____________

* A Higher Permit Processing Fee and additional Annual Operating Fees (up to 3 full years) may apply (Rule 301(c)(1)(D)(i)).

8a. Estimated Start Date of Construction (mm/dd/yyyy): 05/01/2022

8b. Estimated End Date of Construction (mm/dd/yyyy): 12/31/2023

8c. Estimated Start Date of Operation (mm/dd/yyyy): 01/01/2024

9. Description of Equipment or Reason for Compliance Plan (list applicable rule):
Simple Cycle Combustion Turbines

10. For identical equipment, how many additional applications are being submitted with this application? (Form 400-A required for each equipment / process) 1

11. Are you a Small Business as per AQMD's Rule 102 definition? (10 employees or less and total gross receipts are $500,000 or less OR a not-for-profit training center) (●) No ( ) Yes

12. Has a Notice of Violation (NOV) or a Notice to Comply (NC) been issued for this equipment? (●) No ( ) Yes
If Yes, provide NOV/NC#:

Section E - Facility Business Information

13. What type of business is being conducted at this equipment location?
Electrical Power Generation

14. What is your business primary NAICS Code? (North American Industrial Classification System) 221112

15. Are there other facilities in the SCAQMD jurisdiction operated by the same operator? ( ) No (●) Yes

16. Are there any schools (K-12) within 1000 feet of the facility property line? (●) No ( ) Yes

Section F - Authorization/Signature

I hereby certify that all information contained herein and information submitted with this application are true and correct.

17. Signature of Responsible Official: S O'Kane

18. Title of Responsible Official: Manager

19. I wish to review the permit prior to issuance. (This may cause a delay in the application process.) ( ) No (●) Yes

20. Print Name: Stephen O'Kane

21. Date: 09/04/15

22. Do you claim confidentiality of data? (If Yes, see instructions.) (●) No ( ) Yes

23. Check List: ☒ Authorized Signature/Date ☒ Form 400-CEQA ☒ Supplemental Form(s) (ie., Form 400-E-xx) ☒ Fees Enclosed

AQMD USE ONLY	APPLICATION TRACKING #	CHECK #	AMOUNT RECEIVED $	PAYMENT TRACKING #	VALIDATION

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South Coast Air Quality Management District

Form 400-A

Application Form for Permit or Plan Approval

List only one piece of equipment or process per form.

South Coast AQMD

Mail To:
SCAQMD
P.O. Box 4944
Diamond Bar, CA 91765-0944

Tel: (909) 396-3385
www.aqmd.gov

Section A - Operator Information

1. Facility Name (Business Name of Operator to Appear on the Permit): AES Huntington Beach, LLC

2. Valid AQMD Facility ID (Available On Permit Or Invoice Issued By AQMD): 115389

3. Owner's Business Name (If different from Business Name of Operator):

Section B - Equipment Location Address

4. Equipment Location Is: (●) Fixed Location ( ) Various Location
(For equipment operated at various locations, provide address of initial site.)

21730 Newland Street
Street Address

Huntington Beach, CA 92646
City, Zip

Stephen O'Kane — Manager
Contact Name — Title

5624937840 Ext. — (562) 493-7320
Phone # — Fax #

E-Mail: stephen.okane@AES.com

Section C - Permit Mailing Address

5. Permit and Correspondence Information:
☐ Check here if same as equipment location address

690 N. Studebaker Road
Address

Long Beach, CA 90803
City, State, Zip

Stephen O'Kane — Manager
Contact Name — Title

5624937840 Ext. — (562) 493-7320
Phone # — Fax #

E-Mail: stephen.okane@AES.com

Section D - Application Type

6. The Facility Is: ( ) Not In RECLAIM or Title V ( ) In RECLAIM ( ) In Title V (●) In RECLAIM & Title V Programs

7. Reason for Submitting Application (Select only ONE):

7a. New Equipment or Process Application:
- (●) New Construction (Permit to Construct)
- ( ) Equipment On-Site But Not Constructed or Operational
- ( ) Equipment Operating Without A Permit *
- ( ) Compliance Plan
- ( ) Registration/Certification
- ( ) Streamlined Standard Permit

7b. Facility Permits:
- ( ) Title V Application or Amendment (Refer to Title V Matrix)
- ( ) RECLAIM Facility Permit Amendment

7c. Equipment or Process with an Existing/Previous Application or Permit:
- ( ) Administrative Change
- ( ) Alteration/Modification
- ( ) Alteration/Modification without Prior Approval *
- ( ) Change of Condition
- ( ) Change of Condition without Prior Approval *
- ( ) Change of Location
- ( ) Change of Location without Prior Approval *
- ( ) Equipment Operating with an Expired/Inactive Permit *

Existing or Previous Permit/Application
If you checked any of the items in 7c., you MUST provide an existing Permit or Application Number: ______

* A Higher Permit Processing Fee and additional Annual Operating Fees (up to 3 full years) may apply (Rule 301(c)(1)(D)(i)).

8a. Estimated Start Date of Construction (mm/dd/yyyy): 06/01/2017

8b. Estimated End Date of Construction (mm/dd/yyyy): 04/30/2020

8c. Estimated Start Date of Operation (mm/dd/yyyy): 05/01/2020

9. Description of Equipment or Reason for Compliance Plan (list applicable rule): SCR/Oxidation Catalyst for Combined Cycle Combustion Turbines

10. For identical equipment, how many additional applications are being submitted with this application? (Form 400-A required for each equipment / process) 1

11. Are you a Small Business as per AQMD's Rule 102 definition? (10 employees or less and total gross receipts are $500,000 or less OR a not-for-profit training center) (●) No ( ) Yes

12. Has a Notice of Violation (NOV) or a Notice to Comply (NC) been issued for this equipment? (●) No ( ) Yes
If Yes, provide NOV/NC#:

Section E - Facility Business Information

13. What type of business is being conducted at this equipment location? Electrical Power Generation

14. What is your business primary NAICS Code? (North American Industrial Classification System) 221112

15. Are there other facilities in the SCAQMD jurisdiction operated by the same operator? ( ) No (●) Yes

16. Are there any schools (K-12) within 1000 feet of the facility property line? (●) No ( ) Yes

Section F - Authorization/Signature

I hereby certify that all information contained herein and information submitted with this application are true and correct.

17. Signature of Responsible Official: SKane

18. Title of Responsible Official: Manager

19. I wish to review the permit prior to issuance. (This may cause a delay in the application process.) ( ) No (●) Yes

20. Print Name: Stephen O'Kane

21. Date: 09/04/15

22. Do you claim confidentiality of data? (If Yes, see instructions.) (●) No ( ) Yes

23. Check List: ☒ Authorized Signature/Date ☒ Form 400-CEQA ☒ Supplemental Form(s) (ie., Form 400-E-xx) ☒ Fees Enclosed

AQMD USE ONLY	APPLICATION TRACKING #	CHECK #	AMOUNT RECEIVED $	PAYMENT TRACKING #	VALIDATION

DATE	APP REJ	DATE	APP REJ	CLASS I III	BASIC CONTROL	EQUIPMENT CATEGORY CODE	TEAM	ENGINEER	REASON/ACTION TAKEN

South Coast AQMD

South Coast Air Quality Management District

Form 400-A

Application Form for Permit or Plan Approval

List only one piece of equipment or process per form.

Mail To:
SCAQMD
P.O. Box 4944
Diamond Bar, CA 91765-0944

Tel: (909) 396-3385
www.aqmd.gov

Section A - Operator Information

1. Facility Name (Business Name of Operator to Appear on the Permit): AES Huntington Beach, LLC

2. Valid AQMD Facility ID (Available On Permit Or Invoice Issued By AQMD): 115389

3. Owner's Business Name (If different from Business Name of Operator):

Section B - Equipment Location Address

4. Equipment Location Is: (●) Fixed Location ( ) Various Location
(For equipment operated at various locations, provide address of initial site.)

21730 Newland Street
Street Address

Huntington Beach, CA 92646
City, Zip

Stephen O'Kane — Manager
Contact Name — Title

5624937840 Ext. — (562) 493-7320
Phone # — Fax #

E-Mail: stephen.okane@AES.com

Section C - Permit Mailing Address

5. Permit and Correspondence Information:
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690 N. Studebaker Road
Address

Long Beach, CA 90803
City, State, Zip

Stephen O'Kane — Manager
Contact Name — Title

5624937840 Ext. — (562) 493-7320
Phone # — Fax #

E-Mail: stephen.okane@AES.com

Section D - Application Type

6. The Facility Is: ( ) Not In RECLAIM or Title V ( ) In RECLAIM ( ) In Title V (●) In RECLAIM & Title V Programs

7. Reason for Submitting Application (Select only ONE):

7a. New Equipment or Process Application:
- (●) New Construction (Permit to Construct)
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- ( ) Equipment Operating Without A Permit *
- ( ) Compliance Plan
- ( ) Registration/Certification
- ( ) Streamlined Standard Permit

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- ( ) Title V Application or Amendment (Refer to Title V Matrix)
- ( ) RECLAIM Facility Permit Amendment

7c. Equipment or Process with an Existing/Previous Application or Permit:
- ( ) Administrative Change
- ( ) Alteration/Modification
- ( ) Alteration/Modification without Prior Approval *
- ( ) Change of Condition
- ( ) Change of Condition without Prior Approval *
- ( ) Change of Location
- ( ) Change of Location without Prior Approval *
- ( ) Equipment Operating with an Expired/Inactive Permit *

Existing or Previous Permit/Application
If you checked any of the items in 7c., you MUST provide an existing Permit or Application Number: ______

* A Higher Permit Processing Fee and additional Annual Operating Fees (up to 3 full years) may apply (Rule 301(c)(1)(D)(i)).

8a. Estimated Start Date of Construction (mm/dd/yyyy): 06/01/2017

8b. Estimated End Date of Construction (mm/dd/yyyy): 04/30/2020

8c. Estimated Start Date of Operation (mm/dd/yyyy): 05/01/2020

9. Description of Equipment or Reason for Compliance Plan (list applicable rule): SCR/Oxidation Catalyst for Combined Cycle Combustion Turbines

10. For Identical equipment, how many additional applications are being submitted with this application? (Form 400-A required for each equipment / process) 1

11. Are you a Small Business as per AQMD's Rule 102 definition? (10 employees or less and total gross receipts are $500,000 or less OR a not-for-profit training center) (●) No ( ) Yes

12. Has a Notice of Violation (NOV) or a Notice to Comply (NC) been issued for this equipment? (●) No ( ) Yes
If Yes, provide NOV/NC#:

Section E - Facility Business Information

13. What type of business is being conducted at this equipment location? Electrical Power Generation

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15. Are there other facilities in the SCAQMD jurisdiction operated by the same operator? ( ) No (●) Yes

16. Are there any schools (K-12) within 1000 feet of the facility property line? (●) No ( ) Yes

Section F - Authorization/Signature

I hereby certify that all information contained herein and information submitted with this application are true and correct.

17. Signature of Responsible Official: SOKane

18. Title of Responsible Official: Manager

19. I wish to review the permit prior to issuance. (This may cause a delay in the application process.) ( ) No (●) Yes

20. Print Name: Stephen O'Kane

21. Date: 09/04/15

22. Do you claim confidentiality of data? (If Yes, see instructions.) (●) No ( ) Yes

23. Check List: ☒ Authorized Signature/Date ☒ Form 400-CEQA ☒ Supplemental Form(s) (ie., Form 400-E-xx) ☒ Fees Enclosed

AQMD USE ONLY	APPLICATION TRACKING #	CHECK #	AMOUNT RECEIVED $	PAYMENT TRACKING #	VALIDATION

DATE	APP REJ	DATE	APP REJ	CLASS I III	BASIC CONTROL	EQUIPMENT CATEGORY CODE	TEAM	ENGINEER	REASON/ACTION TAKEN

South Coast Air Quality Management District

Form 400-A

Application Form for Permit or Plan Approval

List only one piece of equipment or process per form.

Mail To:
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Tel: (909) 396-3385
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Section A - Operator Information

1. Facility Name (Business Name of Operator to Appear on the Permit): AES Huntington Beach, LLC

2. Valid AQMD Facility ID (Available On Permit Or Invoice Issued By AQMD): 115389

3. Owner's Business Name (If different from Business Name of Operator):

Section B - Equipment Location Address

4. Equipment Location Is: (●) Fixed Location ( ) Various Location
(For equipment operated at various locations, provide address of initial site.)

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Stephen O'Kane — Manager
Contact Name — Title

5624937840 Ext. — (562) 493-7320
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E-Mail: stephen.okane@AES.com

Section C - Permit Mailing Address

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Section D - Application Type

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7. Reason for Submitting Application (Select only ONE):

7a. New Equipment or Process Application:
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7b. Facility Permits:
- ( ) Title V Application or Amendment (Refer to Title V Matrix)
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8a. Estimated Start Date of Construction (mm/dd/yyyy): 05/01/2022

8b. Estimated End Date of Construction (mm/dd/yyyy): 12/31/2023

8c. Estimated Start Date of Operation (mm/dd/yyyy): 01/01/2024

9. Description of Equipment or Reason for Compliance Plan (list applicable rule):
SCR/Oxidation Catalyst for Simple Cycle Combustion Turbines

10. For Identical equipment, how many additional applications are being submitted with this application? (Form 400-A required for each equipment / process) 1

11. Are you a Small Business as per AQMD's Rule 102 definition? (10 employees or less and total gross receipts are $500,000 or less OR a not-for-profit training center) (●) No ( ) Yes

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Section F - Authorization/Signature

I hereby certify that all information contained herein and information submitted with this application are true and correct.

17. Signature of Responsible Official: SOKane

18. Title of Responsible Official: Manager

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20. Print Name: Stephen O'Kane

21. Date: 09/04/15

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AQMD USE ONLY	APPLICATION TRACKING #	CHECK #	AMOUNT RECEIVED $	PAYMENT TRACKING #	VALIDATION

DATE	APP REJ	DATE	APP REJ	CLASS I III	BASIC CONTROL	EQUIPMENT CATEGORY CODE	TEAM	ENGINEER	REASON/ACTION TAKEN

South Coast Air Quality Management District

Form 400-A

Application Form for Permit or Plan Approval

List only one piece of equipment or process per form.

Mail To:
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Section A - Operator Information

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3. Owner's Business Name (If different from Business Name of Operator):

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4. Equipment Location Is: (●) Fixed Location ( ) Various Location
(For equipment operated at various locations, provide address of initial site.)

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City, Zip

Stephen O'Kane — Manager
Contact Name — Title

5624937840 — Ext. — (562) 493-7320
Phone # — Ext. — Fax #

E-Mail: stephen.okane@AES.com

Section C - Permit Mailing Address

5. Permit and Correspondence Information:
☐ Check here if same as equipment location address

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Stephen O'Kane — Manager
Contact Name — Title

5624937840 — Ext. — (562) 493-7320
Phone # — Ext. — Fax #

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Section D - Application Type

6. The Facility Is: ( ) Not In RECLAIM or Title V ( ) In RECLAIM ( ) In Title V (●) In RECLAIM & Title V Programs

7. Reason for Submitting Application (Select only ONE):

7a. New Equipment or Process Application:
- (●) New Construction (Permit to Construct)
- ( ) Equipment On-Site But Not Constructed or Operational
- ( ) Equipment Operating Without A Permit *
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- ( ) Title V Application or Amendment (Refer to Title V Matrix)
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7c. Equipment or Process with an Existing/Previous Application or Permit:
- ( ) Administrative Change
- ( ) Alteration/Modification
- ( ) Alteration/Modification without Prior Approval *
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If you checked any of the items in 7c., you MUST provide an existing Permit or Application Number: ______

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8b. Estimated End Date of Construction (mm/dd/yyyy): 12/31/2023

8c. Estimated Start Date of Operation (mm/dd/yyyy): 01/01/2024

9. Description of Equipment or Reason for Compliance Plan (list applicable rule): SCR/Oxidation Catalyst for Simple Cycle Combustion Turbines

10. For Identical equipment, how many additional applications are being submitted with this application? (Form 400-A required for each equipment / process) 1

11. Are you a Small Business as per AQMD's Rule 102 definition? (10 employees or less and total gross receipts are $500,000 or less OR a not-for-profit training center) (●) No ( ) Yes

12. Has a Notice of Violation (NOV) or a Notice to Comply (NC) been issued for this equipment? (●) No ( ) Yes
If Yes, provide NOV/NC#:

Section E - Facility Business Information

13. What type of business is being conducted at this equipment location? Electrical Power Generation

14. What is your business primary NAICS Code? (North American Industrial Classification System) 221112

15. Are there other facilities in the SCAQMD jurisdiction operated by the same operator? ( ) No (●) Yes

16. Are there any schools (K-12) within 1000 feet of the facility property line? (●) No ( ) Yes

Section F - Authorization/Signature

I hereby certify that all information contained herein and information submitted with this application are true and correct.

17. Signature of Responsible Official: SOKane

18. Title of Responsible Official: Manager

19. I wish to review the permit prior to issuance. (This may cause a delay in the application process.) ( ) No (●) Yes

20. Print Name: Stephen O'Kane

21. Date: 09/04/15

22. Do you claim confidentiality of data? (If Yes, see instructions.) (●) No ( ) Yes

23. Check List: ☒ Authorized Signature/Date ☒ Form 400-CEQA ☒ Supplemental Form(s) (ie., Form 400-E-xx) ☒ Fees Enclosed

AQMD USE ONLY	APPLICATION TRACKING #	CHECK #	AMOUNT RECEIVED $	PAYMENT TRACKING #	VALIDATION

DATE	APP REJ	DATE	APP REJ	CLASS I III	BASIC CONTROL	EQUIPMENT CATEGORY CODE	TEAM	ENGINEER	REASON/ACTION TAKEN

South Coast Air Quality Management District

Form 400-A

Application Form for Permit or Plan Approval

List only one piece of equipment or process per form.

South Coast AQMD

Mail To:
SCAQMD
P.O. Box 4944
Diamond Bar, CA 91765-0944

Tel: (909) 396-3385
www.aqmd.gov

Section A - Operator Information

1. Facility Name (Business Name of Operator to Appear on the Permit): AES Huntington Beach, LLC

2. Valid AQMD Facility ID (Available On Permit Or Invoice Issued By AQMD): 115389

3. Owner's Business Name (If different from Business Name of Operator):

Section B - Equipment Location Address

4. Equipment Location Is: ◉ Fixed Location ○ Various Location
(For equipment operated at various locations, provide address of initial site.)

21730 Newland Street
Street Address

Huntington Beach, CA 92646
City, Zip

Stephen O'Kane — Manager
Contact Name — Title

5624937840 — Ext. — (562) 493-7320
Phone # — Ext. — Fax #

E-Mail: stephen.okane@AES.com

Section C - Permit Mailing Address

5. Permit and Correspondence Information:
☐ Check here if same as equipment location address

690 N. Studebaker Road
Address

Long Beach, CA 90803
City, State, Zip

Stephen O'Kane — Manager
Contact Name — Title

5624937840 — Ext. — (562) 493-7320
Phone # — Ext. — Fax #

E-Mail: stephen.okane@AES.com

Section D - Application Type

6. The Facility Is: ○ Not In RECLAIM or Title V ○ In RECLAIM ○ In Title V ◉ In RECLAIM & Title V Programs

7. Reason for Submitting Application (Select only ONE):

7a. New Equipment or Process Application:
- ◉ New Construction (Permit to Construct)
- ○ Equipment On-Site But Not Constructed or Operational
- ○ Equipment Operating Without A Permit *
- ○ Compliance Plan
- ○ Registration/Certification
- ○ Streamlined Standard Permit

7b. Facility Permits:
- ○ Title V Application or Amendment (Refer to Title V Matrix)
- ○ RECLAIM Facility Permit Amendment

7c. Equipment or Process with an Existing/Previous Application or Permit:
- ○ Administrative Change
- ○ Alteration/Modification
- ○ Alteration/Modification without Prior Approval *
- ○ Change of Condition
- ○ Change of Condition without Prior Approval *
- ○ Change of Location
- ○ Change of Location without Prior Approval *
- ○ Equipment Operating with an Expired/Inactive Permit *

Existing or Previous Permit/Application
If you checked any of the items in 7c., you MUST provide an existing Permit or Application Number: ____________

* A Higher Permit Processing Fee and additional Annual Operating Fees (up to 3 full years) may apply (Rule 301(c)(1)(D)(i)).

8a. Estimated Start Date of Construction (mm/dd/yyyy): 06/01/2017

8b. Estimated End Date of Construction (mm/dd/yyyy): 04/30/2020

8c. Estimated Start Date of Operation (mm/dd/yyyy): 05/01/2020

9. Description of Equipment or Reason for Compliance Plan (list applicable rule):
Auxiliary Boiler

10. For Identical equipment, how many additional applications are being submitted with this application? (Form 400-A required for each equipment / process) 0

11. Are you a Small Business as per AQMD's Rule 102 definition? (10 employees or less and total gross receipts are $500,000 or less OR a not-for-profit training center) ◉ No ○ Yes

12. Has a Notice of Violation (NOV) or a Notice to Comply (NC) been issued for this equipment? ◉ No ○ Yes
If Yes, provide NOV/NC#:

Section E - Facility Business Information

13. What type of business is being conducted at this equipment location?
Electrical Power Generation

14. What is your business primary NAICS Code? (North American Industrial Classification System) 221112

15. Are there other facilities in the SCAQMD jurisdiction operated by the same operator? ○ No ◉ Yes

16. Are there any schools (K-12) within 1000 feet of the facility property line? ◉ No ○ Yes

Section F - Authorization/Signature

I hereby certify that all information contained herein and information submitted with this application are true and correct.

17. Signature of Responsible Official: S. O'Kane

18. Title of Responsible Official: Manager

19. I wish to review the permit prior to issuance. (This may cause a delay in the application process.) ○ No ◉ Yes

20. Print Name: Stephen O'Kane

21. Date: 09/04/15

22. Do you claim confidentiality of data? (If Yes, see instructions.) ◉ No ○ Yes

23. Check List: ☒ Authorized Signature/Date ☒ Form 400-CEQA ☒ Supplemental Form(s) (ie., Form 400-E-xx) ☒ Fees Enclosed

AQMD USE ONLY	APPLICATION TRACKING #		CHECK #		AMOUNT RECEIVED $	PAYMENT TRACKING #		VALIDATION
DATE	APP REJ	DATE	APP REJ	CLASS I III	BASIC CONTROL	EQUIPMENT CATEGORY CODE	TEAM	ENGINEER	REASON/ACTION TAKEN

South Coast AQMD

South Coast Air Quality Management District

Form 400-A

Application Form for Permit or Plan Approval

List only one piece of equipment or process per form.

Mail To:
SCAQMD
P.O. Box 4944
Diamond Bar, CA 91765-0944

Tel: (909) 396-3385
www.aqmd.gov

Section A - Operator Information

1. Facility Name (Business Name of Operator to Appear on the Permit): AES Huntington Beach, LLC

2. Valid AQMD Facility ID (Available On Permit Or Invoice Issued By AQMD): 115389

3. Owner's Business Name (If different from Business Name of Operator):

Section B - Equipment Location Address

4. Equipment Location Is: (●) Fixed Location ( ) Various Location
(For equipment operated at various locations, provide address of initial site.)

21730 Newland Street
Street Address

Huntington Beach, CA 92646
City, Zip

Stephen O'Kane — Manager
Contact Name — Title

5624937840 — Ext. — 5624937737
Phone # — Ext. — Fax #

E-Mail: stephen.okane@AES.com

Section C - Permit Mailing Address

5. Permit and Correspondence Information:
☐ Check here if same as equipment location address

690 N. Studebaker Road
Address

Long Beach, CA 90803
City, State, Zip

Stephen O'Kane — Manager
Contact Name — Title

5624937840 — Ext. — 5624937320
Phone # — Ext. — Fax #

E-Mail: stephen.okane@AES.com

Section D - Application Type

6. The Facility Is: ( ) Not In RECLAIM or Title V ( ) In RECLAIM ( ) In Title V (●) In RECLAIM & Title V Programs

7. Reason for Submitting Application (Select only ONE):

7a. New Equipment or Process Application:
- (●) New Construction (Permit to Construct)
- ( ) Equipment On-Site But Not Constructed or Operational
- ( ) Equipment Operating Without A Permit *
- ( ) Compliance Plan
- ( ) Registration/Certification
- ( ) Streamlined Standard Permit

7b. Facility Permits:
- ( ) Title V Application or Amendment (Refer to Title V Matrix)
- ( ) RECLAIM Facility Permit Amendment

7c. Equipment or Process with an Existing/Previous Application or Permit:
- ( ) Administrative Change
- ( ) Alteration/Modification
- ( ) Alteration/Modification without Prior Approval *
- ( ) Change of Condition
- ( ) Change of Condition without Prior Approval *
- ( ) Change of Location
- ( ) Change of Location without Prior Approval *
- ( ) Equipment Operating with an Expired/Inactive Permit *

Existing or Previous Permit/Application
If you checked any of the items in 7c., you MUST provide an existing Permit or Application Number: ____

* A Higher Permit Processing Fee and additional Annual Operating Fees (up to 3 full years) may apply (Rule 301(c)(1)(D)(i)).

8a. Estimated Start Date of Construction (mm/dd/yyyy): 06/01/2017

8b. Estimated End Date of Construction (mm/dd/yyyy): 04/30/2020

8c. Estimated Start Date of Operation (mm/dd/yyyy): 05/01/2020

9. Description of Equipment or Reason for Compliance Plan (list applicable rule): TBD for the Auxiliary Boiler SCR

10. For Identical equipment, how many additional applications are being submitted with this application? (Form 400-A required for each equipment / process) 0

11. Are you a Small Business as per AQMD's Rule 102 definition? (10 employees or less and total gross receipts are $500,000 or less OR a not-for-profit training center) (●) No ( ) Yes

12. Has a Notice of Violation (NOV) or a Notice to Comply (NC) been issued for this equipment? (●) No ( ) Yes
If Yes, provide NOV/NC#:

Section E - Facility Business Information

13. What type of business is being conducted at this equipment location? Electrical Power Generation

14. What is your business primary NAICS Code? (North American Industrial Classification System) 221112

15. Are there other facilities in the SCAQMD jurisdiction operated by the same operator? ( ) No (●) Yes

16. Are there any schools (K-12) within 1000 feet of the facility property line? (●) No ( ) Yes

Section F - Authorization/Signature

I hereby certify that all information contained herein and information submitted with this application are true and correct.

17. Signature of Responsible Official: SOKane

18. Title of Responsible Official: Manager

19. I wish to review the permit prior to issuance. (This may cause a delay in the application process.) ( ) No (●) Yes

20. Print Name: Stephen O'Kane

21. Date: 09/04/15

22. Do you claim confidentiality of data? (If Yes, see instructions.) (●) No ( ) Yes

23. Check List: ☒ Authorized Signature/Date ☒ Form 400-CEQA ☒ Supplemental Form(s) (ie., Form 400-E-xx) ☒ Fees Enclosed

AQMD USE ONLY	APPLICATION TRACKING #	CHECK #	AMOUNT RECEIVED	PAYMENT TRACKING #	VALIDATION
			$		

DATE	APP REJ	DATE	APP REJ	CLASS I III	BASIC CONTROL	EQUIPMENT CATEGORY CODE	TEAM	ENGINEER	REASON/ACTION TAKEN

South Coast Air Quality Management District

Form 400-A

Application Form for Permit or Plan Approval

List only one piece of equipment or process per form.

South Coast AQMD

Mail To:
SCAQMD
P.O. Box 4944
Diamond Bar, CA 91765-0944

Tel: (909) 396-3385
www.aqmd.gov

Section A - Operator Information

1. Facility Name (Business Name of Operator to Appear on the Permit): AES Huntington Beach, LLC

2. Valid AQMD Facility ID (Available On Permit Or Invoice Issued By AQMD): 115389

3. Owner's Business Name (If different from Business Name of Operator):

Section B - Equipment Location Address

4. Equipment Location Is: (●) Fixed Location ( ) Various Location
(For equipment operated at various locations, provide address of initial site.)

21730 Newland Street
Street Address

Huntington Beach, CA 92646
City, Zip

Stephen O'Kane — Manager
Contact Name — Title

5624937840 Ext. — (562) 493-7320
Phone # — Fax #

E-Mail: stephen.okane@AES.com

Section C - Permit Mailing Address

5. Permit and Correspondence Information:
☐ Check here if same as equipment location address

690 N. Studebaker Road
Address

Long Beach, CA 90803
City, State, Zip

Stephen O'Kane — Manager
Contact Name — Title

5624937840 Ext. — (562) 493-7320
Phone # — Fax #

E-Mail: stephen.okane@AES.com

Section D - Application Type

6. The Facility Is: ( ) Not In RECLAIM or Title V ( ) In RECLAIM ( ) In Title V (●) In RECLAIM & Title V Programs

7. Reason for Submitting Application (Select only ONE):

7a. New Equipment or Process Application:
- (●) New Construction (Permit to Construct)
- ( ) Equipment On-Site But Not Constructed or Operational
- ( ) Equipment Operating Without A Permit *
- ( ) Compliance Plan
- ( ) Registration/Certification
- ( ) Streamlined Standard Permit

7b. Facility Permits:
- ( ) Title V Application or Amendment (Refer to Title V Matrix)
- ( ) RECLAIM Facility Permit Amendment

7c. Equipment or Process with an Existing/Previous Application or Permit:
- ( ) Administrative Change
- ( ) Alteration/Modification
- ( ) Alteration/Modification without Prior Approval *
- ( ) Change of Condition
- ( ) Change of Condition without Prior Approval *
- ( ) Change of Location
- ( ) Change of Location without Prior Approval *
- ( ) Equipment Operating with an Expired/Inactive Permit *

Existing or Previous Permit/Application
If you checked any of the items in 7c., you MUST provide an existing Permit or Application Number: ________

* A Higher Permit Processing Fee and additional Annual Operating Fees (up to 3 full years) may apply (Rule 301(c)(1)(D)(i)).

8a. Estimated Start Date of Construction (mm/dd/yyyy): 06/01/2017
8b. Estimated End Date of Construction (mm/dd/yyyy): 04/30/2020
8c. Estimated Start Date of Operation (mm/dd/yyyy): 05/01/2020

9. Description of Equipment or Reason for Compliance Plan (list applicable rule):
19% Aqueous Ammonia Tank for Combined Cycle Combustion Turbines

10. For Identical equipment, how many additional applications are being submitted with this application? (Form 400-A required for each equipment / process) 0

11. Are you a Small Business as per AQMD's Rule 102 definition? (10 employees or less and total gross receipts are $500,000 or less OR a not-for-profit training center) (●) No ( ) Yes

12. Has a Notice of Violation (NOV) or a Notice to Comply (NC) been issued for this equipment? (●) No ( ) Yes
If Yes, provide NOV/NC#:

Section E - Facility Business Information

13. What type of business is being conducted at this equipment location? Electrical Power Generation

14. What is your business primary NAICS Code? (North American Industrial Classification System) 221112

15. Are there other facilities in the SCAQMD jurisdiction operated by the same operator? ( ) No (●) Yes

16. Are there any schools (K-12) within 1000 feet of the facility property line? (●) No ( ) Yes

Section F - Authorization/Signature

I hereby certify that all information contained herein and information submitted with this application are true and correct.

17. Signature of Responsible Official: SOKane

18. Title of Responsible Official: Manager

19. I wish to review the permit prior to issuance. (This may cause a delay in the application process.) ( ) No (●) Yes

20. Print Name: Stephen O'Kane

21. Date: 09/04/15

22. Do you claim confidentiality of data? (If Yes, see instructions.) (●) No ( ) Yes

23. Check List: ☒ Authorized Signature/Date ☒ Form 400-CEQA ☒ Supplemental Form(s) (ie., Form 400-E-xx) ☒ Fees Enclosed

AQMD USE ONLY	APPLICATION TRACKING #	CHECK #	AMOUNT RECEIVED $	PAYMENT TRACKING #	VALIDATION

DATE	APP REJ	DATE	APP REJ	CLASS I III	BASIC CONTROL	EQUIPMENT CATEGORY CODE	TEAM	ENGINEER	REASON/ACTION TAKEN

South Coast Air Quality Management District

Form 400-A

Application Form for Permit or Plan Approval

List only one piece of equipment or process per form.

Mail To:
SCAQMD
P.O. Box 4944
Diamond Bar, CA 91765-0944

Tel: (909) 396-3385
www.aqmd.gov

Section A - Operator Information

1. Facility Name (Business Name of Operator to Appear on the Permit): AES Huntington Beach, LLC

2. Valid AQMD Facility ID (Available On Permit Or Invoice Issued By AQMD): 115389

3. Owner's Business Name (If different from Business Name of Operator):

Section B - Equipment Location Address

4. Equipment Location Is: (●) Fixed Location ( ) Various Location
(For equipment operated at various locations, provide address of initial site.)

21730 Newland Street
Street Address

Huntington Beach, CA 92646
City, Zip

Stephen O'Kane — Manager
Contact Name — Title

5624937840 Ext. — (562) 493-7320
Phone # — Fax #

E-Mail: stephen.okane@AES.com

Section C - Permit Mailing Address

5. Permit and Correspondence Information:
☐ Check here if same as equipment location address

690 N. Studebaker Road
Address

Long Beach, CA 90803
City, State, Zip

Stephen O'Kane — Manager
Contact Name — Title

5624937840 Ext. — (562) 493-7320
Phone # — Fax #

E-Mail: stephen.okane@AES.com

Section D - Application Type

6. The Facility Is: ( ) Not In RECLAIM or Title V ( ) In RECLAIM ( ) In Title V (●) In RECLAIM & Title V Programs

7. Reason for Submitting Application (Select only ONE):

7a. New Equipment or Process Application:
- (●) New Construction (Permit to Construct)
- ( ) Equipment On-Site But Not Constructed or Operational
- ( ) Equipment Operating Without A Permit *
- ( ) Compliance Plan
- ( ) Registration/Certification
- ( ) Streamlined Standard Permit

7b. Facility Permits:
- ( ) Title V Application or Amendment (Refer to Title V Matrix)
- ( ) RECLAIM Facility Permit Amendment

7c. Equipment or Process with an Existing/Previous Application or Permit:
- ( ) Administrative Change
- ( ) Alteration/Modification
- ( ) Alteration/Modification without Prior Approval *
- ( ) Change of Condition
- ( ) Change of Condition without Prior Approval *
- ( ) Change of Location
- ( ) Change of Location without Prior Approval *
- ( ) Equipment Operating with an Expired/Inactive Permit *

Existing or Previous Permit/Application
If you checked any of the items in 7c., you MUST provide an existing Permit or Application Number:

* A Higher Permit Processing Fee and additional Annual Operating Fees (up to 3 full years) may apply (Rule 301(c)(1)(D)(i)).

8a. Estimated Start Date of Construction (mm/dd/yyyy): 05/01/2022

8b. Estimated End Date of Construction (mm/dd/yyyy): 12/31/2023

8c. Estimated Start Date of Operation (mm/dd/yyyy): 01/01/2024

9. Description of Equipment or Reason for Compliance Plan (list applicable rule):
19% Aqueous Ammonia Tank for Simple Cycle Combustion Turbines

10. For identical equipment, how many additional applications are being submitted with this application? (Form 400-A required for each equipment / process) 0

11. Are you a Small Business as per AQMD's Rule 102 definition? (10 employees or less and total gross receipts are $500,000 or less OR a not-for-profit training center) (●) No ( ) Yes

12. Has a Notice of Violation (NOV) or a Notice to Comply (NC) been issued for this equipment? If Yes, provide NOV/NC#: (●) No ( ) Yes

Section E - Facility Business Information

13. What type of business is being conducted at this equipment location? Electrical Power Generation

14. What is your business primary NAICS Code? (North American Industrial Classification System) 221112

15. Are there other facilities in the SCAQMD jurisdiction operated by the same operator? ( ) No (●) Yes

16. Are there any schools (K-12) within 1000 feet of the facility property line? (●) No ( ) Yes

Section F - Authorization/Signature

I hereby certify that all information contained herein and information submitted with this application are true and correct.

17. Signature of Responsible Official: S O'Kane

18. Title of Responsible Official: Manager

19. I wish to review the permit prior to issuance. (This may cause a delay in the application process.) ( ) No (●) Yes

20. Print Name: Stephen O'Kane

21. Date: 09/04/15

22. Do you claim confidentiality of data? (If Yes, see instructions.) (●) No ( ) Yes

23. Check List: ☒ Authorized Signature/Date ☒ Form 400-CEQA ☒ Supplemental Form(s) (ie., Form 400-E-xx) ☒ Fees Enclosed

AQMD USE ONLY	APPLICATION TRACKING #	CHECK #	AMOUNT RECEIVED $	PAYMENT TRACKING #	VALIDATION

DATE	APP REJ	DATE	APP REJ	CLASS I III	BASIC CONTROL	EQUIPMENT CATEGORY CODE	TEAM	ENGINEER	REASON/ACTION TAKEN

South Coast Air Quality Management District

Form 400-A

Application Form for Permit or Plan Approval

List only one piece of equipment or process per form.

Mail To:
SCAQMD
P.O. Box 4944
Diamond Bar, CA 91765-0944
Tel: (909) 396-3385
www.aqmd.gov

Section A - Operator Information

1. Facility Name (Business Name of Operator to Appear on the Permit): AES Huntington Beach, LLC

2. Valid AQMD Facility ID (Available On Permit Or Invoice Issued By AQMD): 115389

3. Owner's Business Name (If different from Business Name of Operator):

Section B - Equipment Location Address

4. Equipment Location Is: (•) Fixed Location ( ) Various Location
(For equipment operated at various locations, provide address of initial site.)

Street Address: 21730 Newland Street
City: Huntington Beach, CA Zip: 92646
Contact Name: Stephen O'Kane Title: Manager
Phone #: 5624937840 Ext. Fax #: (562) 493-7320
E-Mail: stephen.okane@AES.com

Section C - Permit Mailing Address

5. Permit and Correspondence Information:
☐ Check here if same as equipment location address

Address: 690 N. Studebaker Road
City: Long Beach, State: CA Zip: 90803
Contact Name: Stephen O'Kane Title: Manager
Phone #: 5624937840 Ext. Fax #: (562) 493-7320
E-Mail: stephen.okane@AES.com

Section D - Application Type

6. The Facility Is: ( ) Not In RECLAIM or Title V ( ) In RECLAIM ( ) In Title V (•) In RECLAIM & Title V Programs

7. Reason for Submitting Application (Select only ONE):

7a. New Equipment or Process Application:
- (•) New Construction (Permit to Construct)
- ( ) Equipment On-Site But Not Constructed or Operational
- ( ) Equipment Operating Without A Permit *
- ( ) Compliance Plan
- ( ) Registration/Certification
- ( ) Streamlined Standard Permit

7b. Facility Permits:
- ( ) Title V Application or Amendment (Refer to Title V Matrix)
- ( ) RECLAIM Facility Permit Amendment

7c. Equipment or Process with an Existing/Previous Application or Permit:
- ( ) Administrative Change
- ( ) Alteration/Modification
- ( ) Alteration/Modification without Prior Approval *
- ( ) Change of Condition
- ( ) Change of Condition without Prior Approval *
- ( ) Change of Location
- ( ) Change of Location without Prior Approval *
- ( ) Equipment Operating with an Expired/Inactive Permit *

Existing or Previous Permit/Application
If you checked any of the items in 7c., you MUST provide an existing Permit or Application Number: ________

* A Higher Permit Processing Fee and additional Annual Operating Fees (up to 3 full years) may apply (Rule 301(c)(1)(D)(i)).

8a. Estimated Start Date of Construction (mm/dd/yyyy): 06/01/2017
8b. Estimated End Date of Construction (mm/dd/yyyy): 04/30/2020
8c. Estimated Start Date of Operation (mm/dd/yyyy): 05/01/2020

9. Description of Equipment or Reason for Compliance Plan (list applicable rule): Oil/Water Separator System for Combined Cycle Combustion Turbines

10. For Identical equipment, how many additional applications are being submitted with this application? (Form 400-A required for each equipment / process): 0

11. Are you a Small Business as per AQMD's Rule 102 definition? (10 employees or less and total gross receipts are $500,000 or less OR a not-for-profit training center) (•) No ( ) Yes

12. Has a Notice of Violation (NOV) or a Notice to Comply (NC) been issued for this equipment? (•) No ( ) Yes
If Yes, provide NOV/NC#:

Section E - Facility Business Information

13. What type of business is being conducted at this equipment location? Electrical Power Generation

14. What is your business primary NAICS Code? (North American Industrial Classification System): 221112

15. Are there other facilities in the SCAQMD jurisdiction operated by the same operator? ( ) No (•) Yes

16. Are there any schools (K-12) within 1000 feet of the facility property line? (•) No ( ) Yes

Section F - Authorization/Signature

I hereby certify that all information contained herein and information submitted with this application are true and correct.

17. Signature of Responsible Official: S. O'Kane

18. Title of Responsible Official: Manager

19. I wish to review the permit prior to issuance. (This may cause a delay in the application process.) ( ) No (•) Yes

20. Print Name: Stephen O'Kane

21. Date: 09/04/15

22. Do you claim confidentiality of data? (If Yes, see instructions.) (•) No ( ) Yes

23. Check List: ☒ Authorized Signature/Date ☒ Form 400-CEQA ☒ Supplemental Form(s) (ie., Form 400-E-xx) ☒ Fees Enclosed

AQMD USE ONLY	APPLICATION TRACKING #	CHECK #	AMOUNT RECEIVED $	PAYMENT TRACKING #	VALIDATION

DATE	APP REJ	DATE	APP REJ	CLASS I III	BASIC CONTROL	EQUIPMENT CATEGORY CODE	TEAM	ENGINEER	REASON/ACTION TAKEN

South Coast Air Quality Management District

Form 400-A

Application Form for Permit or Plan Approval

List only one piece of equipment or process per form.

Mail To:
SCAQMD
P.O. Box 4944
Diamond Bar, CA 91765-0944
Tel: (909) 396-3385
www.aqmd.gov

Section A - Operator Information

1. Facility Name (Business Name of Operator to Appear on the Permit): AES Huntington Beach, LLC

2. Valid AQMD Facility ID (Available On Permit Or Invoice Issued By AQMD): 115389

3. Owner's Business Name (If different from Business Name of Operator):

Section B - Equipment Location Address

4. Equipment Location Is: (◉) Fixed Location ( ) Various Location
(For equipment operated at various locations, provide address of initial site.)

Street Address: 21730 Newland Street
City: Huntington Beach, CA Zip: 92646
Contact Name: Stephen O'Kane Title: Manager
Phone #: 5624937840 Ext. Fax #: (562) 493-7320
E-Mail: stephen.okane@AES.com

Section C - Permit Mailing Address

5. Permit and Correspondence Information:
☐ Check here if same as equipment location address

Address: 690 N. Studebaker Road
City: Long Beach, State: CA Zip: 90803
Contact Name: Stephen O'Kane Title: Manager
Phone #: 5624937840 Ext. Fax #: (562) 493-7320
E-Mail: stephen.okane@AES.com

Section D - Application Type

6. The Facility Is: ( ) Not In RECLAIM or Title V ( ) In RECLAIM ( ) In Title V (◉) In RECLAIM & Title V Programs

7. Reason for Submitting Application (Select only ONE):

7a. New Equipment or Process Application:
- (◉) New Construction (Permit to Construct)
- ( ) Equipment On-Site But Not Constructed or Operational
- ( ) Equipment Operating Without A Permit *
- ( ) Compliance Plan
- ( ) Registration/Certification
- ( ) Streamlined Standard Permit

7b. Facility Permits:
- ( ) Title V Application or Amendment (Refer to Title V Matrix)
- ( ) RECLAIM Facility Permit Amendment

7c. Equipment or Process with an Existing/Previous Application or Permit:
- ( ) Administrative Change
- ( ) Alteration/Modification
- ( ) Alteration/Modification without Prior Approval *
- ( ) Change of Condition
- ( ) Change of Condition without Prior Approval *
- ( ) Change of Location
- ( ) Change of Location without Prior Approval *
- ( ) Equipment Operating with an Expired/Inactive Permit *

Existing or Previous Permit/Application
If you checked any of the items in 7c., you MUST provide an existing Permit or Application Number: ______

* A Higher Permit Processing Fee and additional Annual Operating Fees (up to 3 full years) may apply (Rule 301(c)(1)(D)(i)).

8a. Estimated Start Date of Construction (mm/dd/yyyy): 05/01/2022
8b. Estimated End Date of Construction (mm/dd/yyyy): 12/31/2023
8c. Estimated Start Date of Operation (mm/dd/yyyy): 01/01/2024

9. Description of Equipment or Reason for Compliance Plan (list applicable rule): Oil/Water Separator System for Simple Cycle Combustion Turbines

10. For Identical equipment, how many additional applications are being submitted with this application? (Form 400-A required for each equipment / process) 0

11. Are you a Small Business as per AQMD's Rule 102 definition? (10 employees or less and total gross receipts are $500,000 or less OR a not-for-profit training center) (◉) No ( ) Yes

12. Has a Notice of Violation (NOV) or a Notice to Comply (NC) been issued for this equipment? (◉) No ( ) Yes
If Yes, provide NOV/NC#:

Section E - Facility Business Information

13. What type of business is being conducted at this equipment location? Electrical Power Generation

14. What is your business primary NAICS Code? (North American Industrial Classification System) 221112

15. Are there other facilities in the SCAQMD jurisdiction operated by the same operator? ( ) No (◉) Yes

16. Are there any schools (K-12) within 1000 feet of the facility property line? (◉) No ( ) Yes

Section F - Authorization/Signature

I hereby certify that all information contained herein and information submitted with this application are true and correct.

17. Signature of Responsible Official: SOKane
18. Title of Responsible Official: Manager
19. I wish to review the permit prior to issuance. (This may cause a delay in the application process.) ( ) No (◉) Yes
20. Print Name: Stephen O'Kane
21. Date: 09/04/15
22. Do you claim confidentiality of data? (If Yes, see instructions.) (◉) No ( ) Yes

23. Check List: ☒ Authorized Signature/Date ☒ Form 400-CEQA ☒ Supplemental Form(s) (ie., Form 400-E-xx) ☒ Fees Enclosed

AQMD USE ONLY	APPLICATION TRACKING #	CHECK #	AMOUNT RECEIVED $	PAYMENT TRACKING #	VALIDATION

DATE	APP REJ	DATE	APP REJ	CLASS I III	BASIC CONTROL	EQUIPMENT CATEGORY CODE	TEAM	ENGINEER	REASON/ACTION TAKEN

South Coast Air Quality Management District

Form 400-CEQA

California Environmental Quality Act (CEQA) Applicability

Mail To:
SCAQMD
P.O. Box 4944
Diamond Bar, CA 91765-0944

Tel: (909) 396-3385
www.aqmd.gov

The SCAQMD is required by state law, the California Environmental Quality Act (CEQA), to review discretionary permit project applications for potential air quality and other environmental impacts. This form is a screening tool to assist the SCAQMD in clarifying whether or not the project[1] has the potential to generate significant adverse environmental impacts that might require preparation of a CEQA document [CEQA Guidelines §15060(a)].[2] Refer to the attached instructions for guidance in completing this form.[3] For each Form 400-A application, also complete and submit one Form 400-CEQA. If submitting multiple Form 400-A applications for the same project at the same time, only one 400-CEQA form is necessary for the entire project. If you need assistance completing this form, contact Permit Services at (909) 396-3385 or (909) 396-2668.

Section A - Facility Information

1. Facility Name (Business Name of Operator To Appear On The Permit): AES Huntington Beach, LLC

2. Valid AQMD Facility ID (Available On Permit Or Invoice Issued By AQMD): 115389

3. Project Description: 844 MW (net) Natural Gas-Fired Combined Cycle Facility

Section B - Review For Exemption From Further CEQA Action

Check "Yes" or "No" as applicable

	Yes	No	Is this application for:
1.	◉	○	**A CEQA and/or NEPA document previously or currently prepared that specifically evaluates this project?** If yes, attach a copy of the signed Notice of Determination to this form.
2.	○	◉	**A request for a change of permittee only (without equipment modifications)?**
3.	○	◉	**A functionally identical permit unit replacement with no increase in rating or emissions?**
4.	○	◉	**A change of daily VOC permit limit to a monthly VOC permit limit?**
5.	○	◉	**Equipment damaged as a result of a disaster during state of emergency?**
6.	○	◉	**A Title V** (i.e., Regulation XXX) **permit renewal (without equipment modifications)?**
7.	◉	○	**A Title V administrative permit revision?**
8.	○	◉	**The conversion of an existing permit into an initial Title V permit?**

If "Yes" is checked for any question in Section B, your application does not require additional evaluation for CEQA applicability. Skip to Section D - Signatures on page 2 and sign and date this form.

Section C - Review of Impacts Which May Trigger CEQA

Complete Parts I-VI by checking "Yes" or "No" as applicable. To avoid delays in processing your application(s), explain all "Yes" responses on a separate sheet and attach it to this form.

	Yes	No	Part I - General
1.	○	○	**Has this project generated any known public controversy regarding potential adverse impacts that may be generated by the project?** Controversy may be construed as concerns raised by local groups at public meetings; adverse media attention such as negative articles in newspapers or other periodical publications, local news programs, environmental justice issues, etc.
2.	○	○	**Is this project part of a larger project?** If yes, attach a separate sheet to briefly describe the larger project.
			Part II - Air Quality
3.	○	○	**Will there be any demolition, excavating, and/or grading construction activities that encompass an area exceeding 20,000 square feet?**
4.	○	○	**Does this project include the open outdoor storage of dry bulk solid materials that could generate dust?** If Yes, include a plot plan with the application package.

[1] A "project" means the whole of an action which has a potential for resulting in physical change to the environment, including construction activities, clearing or grading of land, improvements to existing structures, and activities or equipment involving the issuance of a permit. For example, a project might include installation of a new, or modification of an existing internal combustion engine, dry-cleaning facility, boiler, gas turbine, spray coating booth, solvent cleaning tank, etc.

[2] To download the CEQA guidelines, visit http://ceres.ca.gov/env_law/state.html.

[3] To download this form and the instructions, visit http://www.aqmd.gov/ceqa or http://www.aqmd.gov/permit

Section C - Review of Impacts Which May Trigger CEQA (cont.)			
	Yes	No	Part II - Air Quality (cont.)
5.	○	○	**Would this project result in noticeable off-site odors from activities that may not be subject to SCAQMD permit requirements?** For example, compost materials or other types of greenwaste (i.e., lawn clippings, tree trimmings, etc.) have the potential to generate odor complaints subject to Rule 402 – Nuisance.
6.	○	○	**Does this project cause an increase of emissions from marine vessels, trains and/or airplanes?**
7.	○	○	**Will the proposed project increase the QUANTITY of hazardous materials stored aboveground onsite or transported by mobile vehicle to or from the site by greater than or equal to the amounts associated with each compound on the attached Table 1?**[4]
			Part III – Water Resources
8.	○	○	**Will the project increase demand for water at the facility by more than 5,000,000 gallons per day?** The following examples identify some, but not all, types of projects that may result in a "yes" answer to this question: 1) projects that generate steam; 2) projects that use water as part of the air pollution control equipment; 3) projects that require water as part of the production process; 4) projects that require new or expansion of existing sewage treatment facilities; 5) projects where water demand exceeds the capacity of the local water purveyor to supply sufficient water for the project; and 6) projects that require new or expansion of existing water supply facilities.
9.	○	○	**Will the project require construction of new water conveyance infrastructure?** Examples of such projects are when water demands exceed the capacity of the local water purveyor to supply sufficient water for the project, or require new or modified sewage treatment facilities such that the project requires new water lines, sewage lines, sewage hook-ups, etc.
			Part IV – Transportation/Circulation
10.			**Will the project result in** (Check all that apply):
	○	○	**a. the need for more than 350 new employees?**
	○	○	**b. an increase in heavy-duty transport truck traffic to and/or from the facility by more than 350 truck round-trips per day?**
	○	○	**c. increase customer traffic by more than 700 visits per day?**
			Part V – Noise
11.	○	○	**Will the project include equipment that will generate noise GREATER THAN 90 decibels (dB) at the property line?**
			Part VI – Public Services
12.			**Will the project create a permanent need for new or additional public services in any of the following areas** (Check all that apply):
	○	○	**a. Solid waste disposal?** Check "No" if the projected potential amount of wastes generated by the project is less than five tons per day.
	○	○	**b. Hazardous waste disposal?** Check "No" if the projected potential amount of hazardous wastes generated by the project is less than 42 cubic yards per day (or equivalent in pounds).

****REMINDER**: *For each "Yes" response in Section C, attach all pertinent information including but not limited to estimated quantities, volumes, weights, etc.***

Section D - Signatures

I HEREBY CERTIFY THAT ALL INFORMATION CONTAINED HEREIN AND INFORMATION SUBMITTED WITH THIS APPLICATION IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE. I UNDERSTAND THAT THIS FORM IS A SCREENING TOOL AND THAT THE SCAQMD RESERVES THE RIGHT TO CONSIDER OTHER PERTINENT INFORMATION IN DETERMINING CEQA APPLICABILITY.

1. Signature of Responsible Official of Firm: S O'Kane		**2. Title of Responsible Official of Firm:** Manager
3. Print Name of Responsible Official of Firm: Stephen O'Kane		**4. Date Signed:** 09/04/15
5. Phone # of Responsible Official of Firm: 5624937840	**6. Fax # of Responsible Official of Firm:** (562) 493-7320	**7. Email of Responsible Official of Firm:** stephen.okane@AES.com
8. Signature of Preparer, (If prepared by person other than responsible official of firm):		**9. Title of Preparer:**
10. Print Name of Preparer: Same as above.		**11. Date Signed:**
12. Phone # of Preparer:	**13. Fax # of Preparer:**	**14. Email of Preparer:**

THIS CONCLUDES FORM 400-CEQA. INCLUDE THIS FORM AND ANY ATTACHMENTS WITH FORM 400-A.

[4] Table 1 – Regulated Substances List and Threshold Quantities for Accidental Release Prevention can be found in the Instructions for Form 400-CEQA.

South Coast Air Quality Management District

Form 400-E-5
Selective Catalytic Reduction (SCR) System, Oxidation Catalyst, and Ammonia Catalyst

This form must be accompanied by a completed Application for a Permit to Construct/Operate - Forms 400-A, Form 400-CEQA, and Form 400-PS.

Mail To:
SCAQMD
P.O. Box 4944
Diamond Bar, CA 91765-0944

Tel: (909) 396-3385
www.aqmd.gov

Section A - Operator Information

Facility Name (Business Name of Operator That Appears On Permit): AES Huntington Beach, LLC

Valid AQMD Facility ID (Available On Permit Or Invoice Issued By AQMD): 115389

Address where the equipment will be operated (for equipment which will be moved to various location in AQMD's jurisdiction, please list the initial location site): 21730 Newland Street, Huntington Beach, CA 92646

(●) Fixed Location ( ) Various Locations

Section B - Equipment Description

Selective Catalytic Reduction (SCR)

SCR Catalyst	Manufacturer: Cormetech; Catalyst Active Material: Titanium/Vanadium/Tungsten Model Number: TBD; Type: Ceramic Honeycomb Size of Each Layer or Module: L: 1 ft. 6 in. W: 25 ft. 8.5 in. H: 71 ft. 7.2 in. No. of Layers or Modules: 1; Total Volume: 1289.00 cu. ft.; Total Weight: ____ lbs.
Reducing Agent	( ) Urea ( ) Anhydrous Ammonia (●) Aqueous Ammonia 19 %; Injection Rate: 242.0 lb/hr
Reducing Agent Storage*	Diameter: 13 ft. ____ in. Height: 45 ft. ____ in. Capacity: 40000 gal Pressure Setting: 50 psia * A separate permit may be needed for the storage equipment.
Space Velocity	Gas Flow Rate/Catalyst Volume: 96352.10 per hour
Area Velocity	Gas Flow Rate/Wetted Catalyst Surface Area: 67462.17 ft/hr
Manufacturer's Guarantee	NOx: 2 ppm %O_2: 15; NOx: ____ gm/bhp-hr; Ammonia Slip: 5 ppm @ 15 %O_2
Catalyst Life	3 years (expected)
Cost	Capital Cost: 452109; Installation Cost: 40188; Catalyst Replacement Cost: 512390

Oxidation Catalyst

Oxidation Catalyst	Manufacturer: BASF Corp.; Catalyst Active Material: Platinum Group Metals Model Number: TBD; Type: Corrugated SS Foil w/ Catalytic Washcoat Size of Each Layer or Module: L: ____ ft. 2.1 in. W: 26 ft. 2 in. H: 71 ft. 9.6 in. No. of Layers or Modules: 1; Total Volume: 265.8 cu. ft.; Total Weight: ____ lbs.
Space Velocity	Gas Flow Rate/Catalyst Volume: 467260.55 per hour
Manufacturer's Guarantee	VOC: 2 ppm VOC: ____ gm/bhp-hr %O_2: 15 CO: 2 ppm CO: ____ gm/bhp-hr %O_2: 15
Catalyst Life	3 years (expected)
Cost	Capital Cost: 532484; Installation Cost: 40188; Catalyst Replacement Cost: 432015

South Coast Air Quality Management District

Form 400-E-5
Selective Catalytic Reduction (SCR) System, Oxidation Catalyst, and Ammonia Catalyst

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Section B - Equipment Description (cont.)

Ammonia Catalyst	
Ammonia Catalyst	Manufacturer:______ Catalyst Active Material:______ Model Number:______ Type:______ Size of Each Layer or Module: L:____ ft.____ in. W:____ ft.____ in. H:____ ft.____ in. No. of Layers or Modules:______ Total Volume:______ cu. ft. Total Weight:______ lbs.
Space Velocity	Gas Flow Rate/Catalyst Volume:______ per hour
Manufacturer's Guarantee	NH_3:______ ppm %O_2:______
Catalyst Life	______ years (expected)
Cost	Capital Cost:______ Installation Cost:______ Catalyst Replacement Cost:______

Section C - Operation Information

Operating Temperature	Minimum Inlet Temperature: 570 °F (from cold start) Maximum Temperature: 692 °F Warm-up Time: 1 hr. ______ min. (maximum)
Operating Schedule	Normal: 24 hours/day 7 days/week 52 weeks/yr Maximum: 24 hours/day 7 days/week 52 weeks/yr

Section D - Authorization/Signature

I hereby certify that all information contained herein and information submitted with this application is true and correct.

Preparer Info	Signature: S O'Kane Date: 09/04/15 Title: Manager Company Name: AES Huntington Beach	Name: Stephen O'Kane Phone #: 5624937840 Fax #: 5624937320 Email: stephen.okane@AES.com
Contact Info	Name: Same as above. Title: Company Name:	Phone #: Fax #: Email:

THIS IS A PUBLIC DOCUMENT

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Check here if you claim that this form or its attachments contain confidential trade secret information. ☐

South Coast Air Quality Management District

Form 400-E-5
Selective Catalytic Reduction (SCR) System, Oxidation Catalyst, and Ammonia Catalyst

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Mail To:
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P.O. Box 4944
Diamond Bar, CA 91765-0944
Tel: (909) 396-3385
www.aqmd.gov

Section A - Operator Information

Facility Name (Business Name of Operator That Appears On Permit): AES Huntington Beach, LLC

Valid AQMD Facility ID (Available On Permit Or Invoice Issued By AQMD): 115389

Address where the equipment will be operated (for equipment which will be moved to various location in AQMD's jurisdiction, please list the initial location site): 21730 Newland Street, Huntington Beach, CA 92646

(●) Fixed Location ( ) Various Locations

Section B - Equipment Description

Selective Catalytic Reduction (SCR)

SCR Catalyst	Manufacturer: Cormetech; Catalyst Active Material: Titanium/Vanadium/Tungsten Model Number: TBD; Type: Ceramic Honeycomb Size of Each Layer or Module: L: 1 ft. 6 in. W: 25 ft. 8.5 in. H: 71 ft. 7.2 in. No. of Layers or Modules: 1; Total Volume: 1289.00 cu. ft.; Total Weight: ____ lbs.
Reducing Agent	( ) Urea ( ) Anhydrous Ammonia (●) Aqueous Ammonia 19 %; Injection Rate: 242.0 lb/hr
Reducing Agent Storage*	Diameter: 13 ft. ____ in. Height: 45 ft. ____ in. Capacity: 40000 gal Pressure Setting: 50 psia * A separate permit may be needed for the storage equipment.
Space Velocity	Gas Flow Rate/Catalyst Volume: 96352.10 per hour
Area Velocity	Gas Flow Rate/Wetted Catalyst Surface Area: 67462.17 ft/hr
Manufacturer's Guarantee	NOx: 2 ppm $\%O_2$: 15; NOx: ____ gm/bhp-hr; Ammonia Slip: 5 ppm @ 15 $\%O_2$
Catalyst Life	3 years (expected)
Cost	Capital Cost: 452109; Installation Cost: 40188; Catalyst Replacement Cost: 512390

Oxidation Catalyst

Oxidation Catalyst	Manufacturer: BASF Corp.; Catalyst Active Material: Platinum Group Metals Model Number: TBD; Type: Corrugated SS Foil w/ Catalytic Washcoat Size of Each Layer or Module: L: ____ ft. 2.1 in. W: 26 ft. 2 in. H: 71 ft. 9.6 in. No. of Layers or Modules: 1; Total Volume: 265.8 cu. ft.; Total Weight: ____ lbs.
Space Velocity	Gas Flow Rate/Catalyst Volume: 467260.55 per hour
Manufacturer's Guarantee	VOC: 2 ppm; VOC: ____ gm/bhp-hr; $\%O_2$: 15 CO: 2 ppm; CO: ____ gm/bhp-hr; $\%O_2$: 15
Catalyst Life	3 years (expected)
Cost	Capital Cost: 532484; Installation Cost: 40188; Catalyst Replacement Cost: 432015

South Coast Air Quality Management District

Form 400-E-5

Selective Catalytic Reduction (SCR) System, Oxidation Catalyst, and Ammonia Catalyst

This form must be accompanied by a completed Application for a Permit to Construct/Operate - Forms 400-A, Form 400-CEQA, and Form 400-PS.

Section B - Equipment Description (cont.)

Ammonia Catalyst	
Ammonia Catalyst	Manufacturer:____ Catalyst Active Material:____ Model Number:____ Type:____ Size of Each Layer or Module: L:____ ft.____ in. W:____ ft.____ in. H:____ ft.____ in. No. of Layers or Modules:____ Total Volume:____ cu. ft. Total Weight:____ lbs.
Space Velocity	Gas Flow Rate/Catalyst Volume:____ per hour
Manufacturer's Guarantee	NH_3:____ ppm %O_2:____
Catalyst Life	____ years (expected)
Cost	Capital Cost:____ Installation Cost:____ Catalyst Replacement Cost:____

Section C - Operation Information

Operating Temperature	Minimum Inlet Temperature: 570 °F (from cold start) Maximum Temperature: 692 °F Warm-up Time: 1 hr. ____ min. (maximum)
Operating Schedule	Normal: 24 hours/day 7 days/week 52 weeks/yr Maximum: 24 hours/day 7 days/week 52 weeks/yr

Section D - Authorization/Signature

I hereby certify that all information contained herein and information submitted with this application is true and correct.

Preparer Info	Signature: S O'Kane Date: 09/04/15 Title: Manager Company Name: AES Huntington Beach	Name: Stephen O'Kane Phone #: 5624937840 Fax #: 5624937320 Email: stephen.okane@AES.com
Contact Info	Name: Same as above. Title: Company Name:	Phone #: Fax #: Email:

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South Coast Air Quality Management District

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Selective Catalytic Reduction (SCR) System, Oxidation Catalyst, and Ammonia Catalyst

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Mail To:
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Section A - Operator Information

Facility Name (Business Name of Operator That Appears On Permit): AES Huntington Beach, LLC

Valid AQMD Facility ID (Available On Permit Or Invoice Issued By AQMD): 115389

Address where the equipment will be operated (for equipment which will be moved to various location in AQMD's jurisdiction, please list the initial location site): 21730 Newland Street, Huntington Beach, CA 92646

(◉) Fixed Location ( ) Various Locations

Section B - Equipment Description

Selective Catalytic Reduction (SCR)

SCR Catalyst	Manufacturer: Cormetech; Catalyst Active Material: Titanium/Vanadium/Tungsten Model Number: CMHT; Type: Ceramic Honeycomb Size of Each Layer or Module: L: 11 ft. 6 in. W: 10 ft. 10 in. H: 11 ft. ___ in. No. of Layers or Modules: 1; Total Volume: 1370.42 cu. ft.; Total Weight: 78000 lbs.
Reducing Agent	( ) Urea ( ) Anhydrous Ammonia (◉) Aqueous Ammonia 19 % Injection Rate: 180 lb/hr
Reducing Agent Storage*	Diameter: 6 ft. ___ in. Height: 18 ft. ___ in. Capacity: 15000 gal Pressure Setting: 50 psia * A separate permit may be needed for the storage equipment.
Space Velocity	Gas Flow Rate/Catalyst Volume: 16859 per hour
Area Velocity	Gas Flow Rate/Wetted Catalyst Surface Area: 182639 ft/hr
Manufacturer's Guarantee	NOx: 2.5 ppm %O_2: 15 NOx: ___ gm/bhp-hr Ammonia Slip: 5 ppm @ 15 %O_2
Catalyst Life	3 years (expected)
Cost	Capital Cost: 526442 Installation Cost: 52020 Catalyst Replacement Cost: 592664

Oxidation Catalyst

Oxidation Catalyst	Manufacturer: BASF Corp.; Catalyst Active Material: Platinum Group Metals Model Number: Camet; Type: Corrugated SS Foil w/ Catalytic Washcoat Size of Each Layer or Module: L: 2 ft. 1.5 in. W: ___ ft. 2.5 in. H: 2 ft. ___ in. No. of Layers or Modules: 187; Total Volume: 165.57 cu. ft.; Total Weight: ___ lbs.
Space Velocity	Gas Flow Rate/Catalyst Volume: 139539 per hour
Manufacturer's Guarantee	VOC: 2 ppm VOC: ___ gm/bhp-hr %O_2: 15 CO: 4 ppm CO: ___ gm/bhp-hr %O_2: 15
Catalyst Life	3 years (expected)
Cost	Capital Cost: 619038 Installation Cost: 46818 Catalyst Replacement Cost: 504844

South Coast Air Quality Management District

Form 400-E-5
Selective Catalytic Reduction (SCR) System, Oxidation Catalyst, and Ammonia Catalyst

This form must be accompanied by a completed Application for a Permit to Construct/Operate - Forms 400-A, Form 400-CEQA, and Form 400-PS.

Section B - Equipment Description (cont.)

Ammonia Catalyst

Ammonia Catalyst	Manufacturer: ______ Catalyst Active Material: ______ Model Number: ______ Type: ______ Size of Each Layer or Module: L: ____ ft. ____ in. W: ____ ft. ____ in. H: ____ ft. ____ in. No. of Layers or Modules: ______ Total Volume: ______ cu. ft. Total Weight: ______ lbs.
Space Velocity	Gas Flow Rate/Catalyst Volume: ______ per hour
Manufacturer's Guarantee	NH_3: ______ ppm %O_2: ______
Catalyst Life	______ years (expected)
Cost	Capital Cost: ______ Installation Cost: ______ Catalyst Replacement Cost: ______

Section C - Operation Information

Operating Temperature	Minimum Inlet Temperature: 500 °F (from cold start) Maximum Temperature: 870 °F (SCR) Warm-up Time: ______ hr. 30 min. (maximum) (500-1250F for OxCat)
Operating Schedule	Normal: 24 hours/day 7 days/week 52 weeks/yr Maximum: 24 hours/day 7 days/week 52 weeks/yr

Section D - Authorization/Signature

I hereby certify that all information contained herein and information submitted with this application is true and correct.

Preparer Info	Signature: S O'Kane	Date: 09/04/15	Name: Stephen O'Kane	
	Title: Manager	Company Name: AES Huntington Beach	Phone #: 5624937840	Fax #: 5624937320
			Email: stephen.okane@AES.com	
Contact Info	Name: Same as above.		Phone #:	Fax #:
	Title:	Company Name:	Email:	

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South Coast Air Quality Management District
Form 400-E-5
Selective Catalytic Reduction (SCR) System, Oxidation Catalyst, and Ammonia Catalyst

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Section B - Equipment Description

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Reducing Agent	( ) Urea ( ) Anhydrous Ammonia (●) Aqueous Ammonia 19 %; Injection Rate: 180 lb/hr
Reducing Agent Storage*	Diameter: 6 ft. ___ in. Height: 18 ft. ___ in. Capacity: 15000 gal Pressure Setting: 50 psia; * A separate permit may be needed for the storage equipment.
Space Velocity	Gas Flow Rate/Catalyst Volume: 16859 per hour
Area Velocity	Gas Flow Rate/Wetted Catalyst Surface Area: 182639 ft/hr
Manufacturer's Guarantee	NOx: 2.5 ppm %O_2: 15; NOx: ___ gm/bhp-hr; Ammonia Slip: 5 ppm @ 15 %O_2
Catalyst Life	3 years (expected)
Cost	Capital Cost: 526442; Installation Cost: 52020; Catalyst Replacement Cost: 592664

Oxidation Catalyst

Oxidation Catalyst	Manufacturer: BASF Corp.; Catalyst Active Material: Platinum Group Metals Model Number: Camet; Type: Corrugated SS Foil w/ Catalytic Washcoat Size of Each Layer or Module: L: 2 ft. 1.5 in. W: ___ ft. 2.5 in. H: 2 ft. ___ in. No. of Layers or Modules: 187; Total Volume: 165.57 cu. ft.; Total Weight: ___ lbs.
Space Velocity	Gas Flow Rate/Catalyst Volume: 139539 per hour
Manufacturer's Guarantee	VOC: 2 ppm; VOC: ___ gm/bhp-hr; %O_2: 15 CO: 4 ppm; CO: ___ gm/bhp-hr; %O_2: 15
Catalyst Life	3 years (expected)
Cost	Capital Cost: 619038; Installation Cost: 46818; Catalyst Replacement Cost: 504844

South Coast Air Quality Management District

Form 400-E-5
Selective Catalytic Reduction (SCR) System, Oxidation Catalyst, and Ammonia Catalyst

This form must be accompanied by a completed Application for a Permit to Construct/Operate - Forms 400-A, Form 400-CEQA, and Form 400-PS.

Section B - Equipment Description (cont.)	
	Ammonia Catalyst
Ammonia Catalyst	Manufacturer:___ Catalyst Active Material:___ Model Number:___ Type:___ Size of Each Layer or Module: L:___ ft.___ in. W:___ ft.___ in. H:___ ft.___ in. No. of Layers or Modules:___ Total Volume:___ cu. ft. Total Weight:___ lbs.
Space Velocity	Gas Flow Rate/Catalyst Volume:___ per hour
Manufacturer's Guarantee	NH_3:___ ppm %O_2:___
Catalyst Life	___ years (expected)
Cost	Capital Cost:___ Installation Cost:___ Catalyst Replacement Cost:___
Section C - Operation Information	
Operating Temperature	Minimum Inlet Temperature: 500 °F (from cold start) Maximum Temperature: 870 °F (SCR) (500-1250F for OxCat) Warm-up Time:___ hr. 30 min. (maximum)
Operating Schedule	Normal: 24 hours/day 7 days/week 52 weeks/yr Maximum: 24 hours/day 7 days/week 52 weeks/yr

Section D - Authorization/Signature

I hereby certify that all information contained herein and information submitted with this application is true and correct.

Preparer Info	Signature: SOKane	Date: 09/04/15	Name: Stephen O'Kane	
	Title: Manager	Company Name: AES Huntington Beach	Phone #: 5624937840	Fax #: 5624937320
			Email: stephen.okane@AES.com	
Contact Info	Name: Same as above.		Phone #:	Fax #:
	Title:	Company Name:	Email:	

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Check here if you claim that this form or its attachments contain confidential trade secret information. ☐

South Coast Air Quality Management District
Form 400-E-5
Selective Catalytic Reduction (SCR) System, Oxidation Catalyst, and Ammonia Catalyst

This form must be accompanied by a completed Application for a Permit to Construct/Operate - Forms 400-A, Form 400-CEQA, and Form 400-PS.

Mail To:
SCAQMD
P.O. Box 4944
Diamond Bar, CA 91765-0944

Tel: (909) 396-3385
www.aqmd.gov

Section A - Operator Information

Facility Name (Business Name of Operator That Appears On Permit): AES Huntington Beach, LLC

Valid AQMD Facility ID (Available On Permit Or Invoice Issued By AQMD): 115389

Address where the equipment will be operated (for equipment which will be moved to various location in AQMD's jurisdiction, please list the initial location site): 21730 Newland Street, Huntington Beach, CA 92646

(●) Fixed Location ( ) Various Locations

Section B - Equipment Description

Selective Catalytic Reduction (SCR)

SCR Catalyst	Manufacturer: TBD; Catalyst Active Material: TBD Model Number: TBD; Type: TBD Size of Each Layer or Module: L: TBD ft. ___ in. W: TBD ft. ___ in. H: TBD ft. ___ in. No. of Layers or Modules: TBD; Total Volume: TBD cu. ft.; Total Weight: TBD lbs.
Reducing Agent	( ) Urea ( ) Anhydrous Ammonia (●) Aqueous Ammonia 19 %; Injection Rate: TBD lb/hr
Reducing Agent Storage*	Diameter: 13 ft. ___ in. Height: 45 ft. ___ in. Capacity: 40000 gal Pressure Setting: 50 psia * A separate permit may be needed for the storage equipment.
Space Velocity	Gas Flow Rate/Catalyst Volume: TBD per hour
Area Velocity	Gas Flow Rate/Wetted Catalyst Surface Area: TBD ft/hr
Manufacturer's Guarantee	NOx: 5 ppm %O_2: 3; NOx: ___ gm/bhp-hr; Ammonia Slip: 5 ppm @ 3 %O_2
Catalyst Life	TBD years (expected)
Cost	Capital Cost: TBD; Installation Cost: TBD; Catalyst Replacement Cost: TBD

Oxidation Catalyst

Oxidation Catalyst	Manufacturer: ___; Catalyst Active Material: ___ Model Number: ___; Type: ___ Size of Each Layer or Module: L: ___ ft. ___ in. W: ___ ft. ___ in. H: ___ ft. ___ in. No. of Layers or Modules: ___; Total Volume: ___ cu. ft.; Total Weight: ___ lbs.
Space Velocity	Gas Flow Rate/Catalyst Volume: ___ per hour
Manufacturer's Guarantee	VOC: ___ ppm VOC: ___ gm/bhp-hr %O_2: ___ CO: ___ ppm CO: ___ gm/bhp-hr %O_2: ___
Catalyst Life	___ years (expected)
Cost	Capital Cost: ___; Installation Cost: ___; Catalyst Replacement Cost: ___

South Coast Air Quality Management District

Form 400-E-5
Selective Catalytic Reduction (SCR) System, Oxidation Catalyst, and Ammonia Catalyst

This form must be accompanied by a completed Application for a Permit to Construct/Operate - Forms 400-A, Form 400-CEQA, and Form 400-PS.

Section B - Equipment Description (cont.)

Ammonia Catalyst

Ammonia Catalyst	Manufacturer: ______ Catalyst Active Material: ______ Model Number: ______ Type: ______ Size of Each Layer or Module: L: ____ ft. ____ in. W: ____ ft. ____ in. H: ____ ft. ____ in. No. of Layers or Modules: ______ Total Volume: ______ cu. ft. Total Weight: ______ lbs.
Space Velocity	Gas Flow Rate/Catalyst Volume: ______ per hour
Manufacturer's Guarantee	NH_3: ______ ppm %O_2: ______
Catalyst Life	______ years (expected)
Cost	Capital Cost: ______ Installation Cost: ______ Catalyst Replacement Cost: ______

Section C - Operation Information

Operating Temperature	Minimum Inlet Temperature: TBD °F (from cold start) Maximum Temperature: TBD °F Warm-up Time: 2 hr. 50 min. (maximum)
Operating Schedule	Normal: 12 hours/day 7 days/week 52 weeks/yr Maximum: 12 hours/day 7 days/week 52 weeks/yr

Section D - Authorization/Signature

I hereby certify that all information contained herein and information submitted with this application is true and correct.

Preparer Info	Signature: SOKane Date: 09/04/15 Title: Manager Company Name: AES Huntington Beach	Name: Stephen O'Kane Phone #: 5624937840 Fax #: 5624937320 Email: stephen.okane@AES.com
Contact Info	Name: Same as above. Title: Company Name:	Phone #: Fax #: Email:

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South Coast Air Quality Management District

Form 400-E-9a
External Combustion: Boiler/Heater

South Coast AQMD

This form must be accompanied by a completed Application for a Permit to Construct/Operate - Forms 400-A, Form 400-CEQA, and Form 400-PS.

Mail To:
SCAQMD
P.O. Box 4944
Diamond Bar, CA 91765-0944

Tel: (909) 396-3385
www.aqmd.gov

Section A - Operator Information

Facility Name (Business Name of Operator That Appears On Permit): AES Huntington Beach, LLC

Valid AQMD Facility ID (Available On Permit Or Invoice Issued By AQMD): 115389

Address where the equipment will be operated (for equipment which will be moved to various location in AQMD's jurisdiction, please list the initial location site): 21730 Newland Street, Huntington Beach, CA 92646

◉ Fixed Location ○ Various Locations

Section B - Equipment Description

Boiler/Heater	Manufacturer: Rentech; Model: D-Type; Serial No.: TBD Max. Heat Input Rating (Higher Heating Value - HHV): 71000000 BTU per hour Boiler Type: ◉ Water-Tube ○ Fire-Tube
Burner	Manufacturer: JZHC/Coen; Model: RMB Number of burners: 1; Rating of each burner (HHV): 63 Type: ◉ Low NOx (please attach manufacturer's specifications) ○ Other:
Blower	HP: 75
Fuel Type	Primary Fuel: ◉ Natural Gas ○ LPG ○ Refinery Gas* ○ Digester Gas* ○ Landfill Gas* ○ Other*: ○ Fuel Oil (Specify Grade): If Digester or Landfill Gas, List Higher Heating Value: Secondary or Stand-by Fuel: ○ Natural Gas ○ LPG ○ Refinery Gas* ○ Digester Gas* ○ Landfill Gas* ○ Other*: ○ Fuel Oil (Specify Grade): If Digester or Landfill Gas, List Higher Heating Value: * If Digester Gas, Landfill Gas, Refinery Gas, and/or Other are checked, attach fuel analysis indicating higher heating value and sulfur content.
Type Of Controls (Check All That Apply)	☐ Low NOx Burner ☒ Flue Gas Recirculation ☐ Oxygen Trim ☐ CO Catalyst[1] ☒ Selective Catalytic Reduction (SCR)[1] ☐ Thermal DeNOx (Selective Non-Catalytic Reduction, SNCR)[1] ☐ Other (specify): [1] A separate permit is required, please see Form 400-E-GI for instructions.
Fuel Usage	Average Load ____ % OR Average Firing Rate (HHV): 71 MMBTU/hr

Section C - Process Description

Operating Parameters	Turn Down Ratio: 0.25; Percent Excess Air: 3 %
Operating Schedule	Normal: 12 hours/day, 7 days/week, 52 weeks/yr Maximum: 12 hours/day, 7 days/week, 52 weeks/yr

Section D - Authorization/Signature

I hereby certify that all information contained herein and information submitted with this application is true and correct.

Preparer Info	Signature: SOKane; Date: 09/04/15; Name: Stephen O'Kane Title: Manager; Company Name: AES Huntington Beach; Phone #: 5624937840; Fax #: 5624937320 Email: stephen.okane@AES.com
Contact Info	Name: Same as above.; Phone #: ; Fax #: Title: ; Company Name: ; Email:

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South Coast Air Quality Management District

Form 400-E-9a
Emission Calculations

Given

Rating: 71000000 BTU/hour

HHV: 1020 BTU/ft^3

Operating Schedule:
11.75 hours/day
7 days/week
30 days/month
52 weeks/year
365 days/year

Fuel Usage:
69412 ft^3/hour
860346 ft^3/day
25810373 ft^3/month

Calculations

	EF	EF	HOURLY	DAILY	30 DAY AVE.	30 DAY NSR	ANNUAL
	lbs/mmcf	lb./mmbtu	lbs./day	lbs./day	lbs./day	lbs./day	lbs./yr
ROG	4.08	0.004	3.33	4.16	4.16	4.16	1473
NOx	6.12	0.006	4.99	5.80	5.80	5.80	2054
SOx	0.69	0.00068	0.57	0.60	0.60	0.60	211
CO	40.8	0.04	33.3	35.0	35.0	35.0	12384
PM_{10}	4.39	0.0043	3.58	3.77	3.77	3.77	1333

South Coast Air Quality Management District
Form 400-E-12
Gas Turbine

This form must be accompanied by a completed Application for a Permit to Construct/Operate - Forms 400-A, Form 400-CEQA, and Form 400-PS.

Mail To:
SCAQMD
P.O. Box 4944
Diamond Bar, CA 91765-0944
Tel: (909) 396-3385
www.aqmd.gov

Section A - Operator Information

Facility Name (Business Name of Operator That Appears On Permit): AES Huntington Beach, LLC

Valid AQMD Facility ID (Available On Permit Or Invoice Issued By AQMD): 115389

Address where the equipment will be operated (for equipment which will be moved to various location in AQMD's jurisdiction, please list the initial location site): 21730 Newland Street, Huntington Beach, CA 92646

◉ Fixed Location ○ Various Locations

Section B - Equipment Description

Turbine	Manufacturer: General Electric; Model: 7FA.05; Serial No.: TBD Size (based on Higher Heating Value - HHV): Manufacturer Maximum Input Rating: ______ MMBTU/hr ______ kWh Manufacturer Maximum Output Rating: 2273 MMBTU/hr 235402 kWh
Function (Check all that apply)	☒ Electrical Generation ☐ Driving Pump/Compressor ☐ Emergency Peaking Unit ☒ Steam Generation ☐ Exhaust Gas Recovery ☐ Other (specify): ______
Cycle Type	○ Simply Cycle ○ Regenerative Cycle ◉ Combined Cycle ○ Other (specify): ______
Combustion Type	○ Tubular ◉ Can-Annular ○ Annular
Fuel (Turbine)	☒ Natural Gas ☐ LPG ☐ Digester Gas* ☐ Landfill Gas* ☐ Propane ☐ Refinery Gas* ☐ Other*: ______ * (If Digester Gas, Landfill Gas, Refinery Gas, and/or Other are checked, attach fuel analysis indicating higher heating value and sulfur content).
Heat Recovery Steam Generator (HRSG)	Steam Turbine Capacity: 230 MW Low Pressure Steam Output Capacity: ______ lb/hr @ ______ °F High Pressure Steam Output Capacity: 1077167 lb/hr @ 1044 °F Superheated Steam Output Capacity: ______ lb/hr @ ______ °F
Duct Burner	Manufacturer: ______ Model: ______ Number of burners: ______ Rating of each burner (HHV): ______ Type: ○ Low NOx (please attach manufacturer's specifications) ○ Other: ______ Show all heat transfer surface locations with the HRSG and temperature profile
Fuel (Duct Burner)	○ Natural Gas ○ LPG ○ Digester Gas* ○ Landfill Gas* ○ Propane ○ Refinery Gas* ○ Other*: ______ * (If Digester Gas, Landfill Gas, Refinery Gas, and/or Other are checked, attach fuel analysis indicating higher heating value and sulfur content).

Form 400-E-12
Gas Turbine

This form must be accompanied by a completed Application for a Permit to Construct/Operate - Forms 400-A, Form 400-CEQA, and Form 400-PS.

Section B - Equipment Description (Cont.)

Air Pollution Control

○ Selective Catalytic Reduction (SCR)* ○ Selective Non-Catalytic Reduction (SNCR)*

◉ Oxidation Catalyst* ○ Other (specify)*: ____

○ Steam/Water Injection: Injection Rate: ____ lbs. water/lbs. fuel, or ____ mole water/mole fuel

* Separate application is required.

Capital Cost: 532484 Installation Cost: 40188 Annual Operating Cost: ____

Oxidation Catalyst Data (If Applicable)

Manufacturer: BASF Corp. Model: TBD

Catalyst Dimensions: Length: ____ ft. 2.1 in. Width: 26 ft. 2 in. Height: 71 ft. 9.6 in.

Catalyst Cell Density: ____ cells/sq.in. Pressure Drop Across Catalyst: ____

Manufacturer's Guarantee: CO Control Efficiency: 77.8 % Catalyst Life: 3 yrs

VOC Control Efficiency: 33.3 % Operating Temp. Range: 570 °F

Space Velocity (gas flow rate/catalyst volume): 467260.55 Area Velocity (gas flow/wetted catalyst surface area): 73971.32

VOC Concentration into Catalyst: 1.3 PPMVD@ 15%O_2 CO Concentration inot Catalyst: 8.2 PPMVD@ 15%O_2

Section C - Operation Information

On-line Emissions Data

Pollutants	Maximum Emissions Before Control *		Maximum Emissions After Control	
	PPM@15% O_2, dry	lb/hour	PPM@15% O_2, dry	lb/hour
ROG			1.0	1.58
NOx			2.0	16.5
CO			2.0	10.0
PM_{10}				9.0
SOx				4.86
NH_3			5.0	15.3

* Based on temperature, fuel consumption, and MW output.

Reference (attach data):

☒ Manufacturer Emission Data ☐ EPA Emission Factors ☐ AQMD Emission Factors ☐ Source Test

Stack or Vent Data

Stack Height: 150 ft. ____ in. Stack Diameter: 20 ft. ____ in.

Exhaust Temperature: 223 °F Exhaust Pressure: ____ inches water column

Exhaust Flow Rate: 1261924 CFM Oxygen Level: 14.99 %

South Coast Air Quality Management District

Form 400-E-12

Gas Turbine

This form must be accompanied by a completed Application for a Permit to Construct/Operate - Forms 400-A, Form 400-CEQA, and Form 400-PS.

Section C - Operation Information (cont.)

Startup Data: No. of Startups per day: 2 No. of Startups per year: 500 Duration of each startup: 1 hrs.

Shutdown Data: No. of Shutdowns per day: 2 No. of Shutdowns per year: 500 Duration of each Shutdown: 0.50 hrs.

Startup and Shutdown Emissions Data

Pollutants	Startup Emissions		Shutdown Emissions	
	PPM@15% O_2, dry	lb/hour	PPM@15% O_2, dry	lb/hour
ROG		36.0		32.8
NOx		61.0		18.2
CO		325		138
PM_{10}		9.00		9.00
SOx		4.86		4.86
NH_3				

Monitoring and Reporting

Continuous Emission Monitoring System (CEMS): CEMS Make: TBD

CEMS Model: TBD

Will the CEMS be used to measure both on-line and startup/shutdown emissions? ◉ Yes ○ No

The following parameters will be continuously monitored:

☒ NOx ☒ CO ☒ O_2

☒ Fuel Flow Rate ☒ Ammonia Injection Rate ☐ Other (specify): ____

☒ Ammonia Stack Concentration: Ammonia CEMS Make: TBD

Ammonia CEMS Model: TBD

Operating Schedule

Normal:	24 hours/day	7 days/week	52 weeks/yr
Maximum:	24 hours/day	7 days/week	52 weeks/yr

Section D - Authorization/Signature

I hereby certify that all information contained herein and information submitted with this application is true and correct.

Preparer Info

Signature: S. O'Kane Date: 09/04/15

Title: Manager Company Name: AES Huntington Beach

Name: Stephen O'Kane

Phone #: 5624937840 Fax #: 5624937320

Email: stephen.okane@AES.com

Contact Info

Name: Same as above.

Title: Company Name:

Phone #: Fax #:

Email:

South Coast Air Quality Management District
Form 400-E-12
Gas Turbine

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Tel: (909) 396-3385
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◉ Fixed Location ○ Various Locations

Section B - Equipment Description

Turbine	Manufacturer: General Electric Model: 7FA.05 Serial No.: TBD Size (based on Higher Heating Value - HHV): Manufacturer Maximum Input Rating: ______ MMBTU/hr ______ kWh Manufacturer Maximum Output Rating: 2273 MMBTU/hr 235402 kWh
Function (Check all that apply)	☒ Electrical Generation ☐ Driving Pump/Compressor ☐ Emergency Peaking Unit ☒ Steam Generation ☐ Exhaust Gas Recovery ☐ Other (specify): ______
Cycle Type	○ Simply Cycle ○ Regenerative Cycle ◉ Combined Cycle ○ Other (specify): ______
Combustion Type	○ Tubular ◉ Can-Annular ○ Annular
Fuel (Turbine)	☒ Natural Gas ☐ LPG ☐ Digester Gas* ☐ Landfill Gas* ☐ Propane ☐ Refinery Gas* ☐ Other*: ______ * (If Digester Gas, Landfill Gas, Refinery Gas, and/or Other are checked, attach fuel analysis indicating higher heating value and sulfur content).
Heat Recovery Steam Generator (HRSG)	Steam Turbine Capacity: 230 MW Low Pressure Steam Output Capacity: ______ lb/hr @ ______ °F High Pressure Steam Output Capacity: 1077167 lb/hr @ 1044 °F Superheated Steam Output Capacity: ______ lb/hr @ ______ °F
Duct Burner	Manufacturer: ______ Model: ______ Number of burners: ______ Rating of each burner (HHV): ______ Type: ○ Low NOx (please attach manufacturer's specifications) ○ Other: ______ Show all heat transfer surface locations with the HRSG and temperature profile
Fuel (Duct Burner)	○ Natural Gas ○ LPG ○ Digester Gas* ○ Landfill Gas* ○ Propane ○ Refinery Gas* ○ Other*: ______ * (If Digester Gas, Landfill Gas, Refinery Gas, and/or Other are checked, attach fuel analysis indicating higher heating value and sulfur content).

South Coast Air Quality Management District
Form 400-E-12
Gas Turbine
This form must be accompanied by a completed Application for a Permit to Construct/Operate - Forms 400-A, Form 400-CEQA, and Form 400-PS.

Section B - Equipment Description (Cont.)

Air Pollution Control

○ Selective Catalytic Reduction (SCR)* ○ Selective Non-Catalytic Reduction (SNCR)*

◉ Oxidation Catalyst* ○ Other (specify)*: ______

○ Steam/Water Injection: Injection Rate: ______ lbs. water/lbs. fuel, or ______ mole water/mole fuel

* Separate application is required.

Capital Cost: 532484 Installation Cost: 40188 Annual Operating Cost: ______

Oxidation Catalyst Data (If Applicable)

Manufacturer: BASF Corp. Model: TBD

Catalyst Dimensions: Length: ______ ft. 2.1 in. Width: 26 ft. 2 in. Height: 71 ft. 9.6 in.

Catalyst Cell Density: ______ cells/sq.in. Pressure Drop Across Catalyst: ______

Manufacturer's Guarantee: CO Control Efficiency: 77.8 % Catalyst Life: 3 yrs

VOC Control Efficiency: 33.3 % Operating Temp. Range: 570 °F

Space Velocity (gas flow rate/catalyst volume): 467260.55 Area Velocity (gas flow/wetted catalyst surface area): 73971.32

VOC Concentration into Catalyst: 1.3 PPMVD@ 15%O_2 CO Concentration inot Catalyst: 8.2 PPMVD@ 15%O_2

Section C - Operation Information

On-line Emissions Data

Pollutants	Maximum Emissions Before Control *		Maximum Emissions After Control	
	PPM@15% O_2, dry	lb/hour	PPM@15% O_2, dry	lb/hour
ROG			1.0	1.58
NOx			2.0	16.5
CO			2.0	10.0
PM_{10}				9.0
SOx				4.86
NH_3			5.0	15.3

* Based on temperature, fuel consumption, and MW output.

Reference (attach data):

☒ Manufacturer Emission Data ☐ EPA Emission Factors ☐ AQMD Emission Factors ☐ Source Test

Stack or Vent Data

Stack Height: 150 ft. ______ in. Stack Diameter: 20 ft. ______ in.

Exhaust Temperature: 223 °F Exhaust Pressure: ______ inches water column

Exhaust Flow Rate: 1261924 CFM Oxygen Level: 14.99 %

South Coast Air Quality Management District
Form 400-E-12
Gas Turbine
This form must be accompanied by a completed Application for a Permit to Construct/Operate - Forms 400-A, Form 400-CEQA, and Form 400-PS.

Section C - Operation Information (cont.)

Startup Data	No. of Startups per day: 2 No. of Startups per year: 500 Duration of each startup: 1 hrs.
Shutdown Data	No. of Shutdowns per day: 2 No. of Shutdowns per year: 500 Duration of each Shutdown: 0.50 hrs.

Startup and Shutdown Emissions Data

Pollutants	Startup Emissions		Shutdown Emissions	
	PPM@15% O_2, dry	lb/hour	PPM@15% O_2, dry	lb/hour
ROG		36.0		32.8
NOx		61.0		18.2
CO		325		138
PM_{10}		9.00		9.00
SOx		4.86		4.86
NH_3				

Monitoring and Reporting

Continuous Emission Monitoring System (CEMS): CEMS Make: TBD

CEMS Model: TBD

Will the CEMS be used to measure both on-line and startup/shutdown emissions? (•) Yes ( ) No

The following parameters will be continuously monitored:

☒ NOx ☒ CO ☒ O_2

☒ Fuel Flow Rate ☒ Ammonia Injection Rate ☐ Other (specify): ______

☒ Ammonia Stack Concentration: Ammonia CEMS Make: TBD

Ammonia CEMS Model: TBD

Operating Schedule

Normal:	24 hours/day	7 days/week	52 weeks/yr
Maximum:	24 hours/day	7 days/week	52 weeks/yr

Section D - Authorization/Signature

I hereby certify that all information contained herein and information submitted with this application is true and correct.

Preparer Info	Signature: S. O'Kane Date: 09/04/15	Name: Stephen O'Kane
		Phone #: 5624937840 Fax #: 5624937320
	Title: Manager Company Name: AES Huntington Beach	Email: stephen.okane@AES.com
Contact Info	Name: Same as above.	Phone #: Fax #:
	Title: Company Name:	Email:

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South Coast Air Quality Management District
Form 400-E-12
Gas Turbine

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Valid AQMD Facility ID (Available On Permit Or Invoice Issued By AQMD): 115389

Address where the equipment will be operated (for equipment which will be moved to various location in AQMD's jurisdiction, please list the initial location site): 21730 Newland Street, Huntington Beach, CA 92646

◉ Fixed Location ○ Various Locations

Section B - Equipment Description

Turbine	Manufacturer: General Electric Model: LMS 100PB Serial No.: TBD Size (based on Higher Heating Value - HHV): Manufacturer Maximum Input Rating: ______ MMBTU/hr ______ kWh Manufacturer Maximum Output Rating: 885 MMBTU/hr 99355 kWh
Function (Check all that apply)	☒ Electrical Generation ☐ Driving Pump/Compressor ☐ Emergency Peaking Unit ☒ Steam Generation ☐ Exhaust Gas Recovery ☐ Other (specify): ______
Cycle Type	◉ Simply Cycle ○ Regenerative Cycle ○ Combined Cycle ○ Other (specify): ______
Combustion Type	○ Tubular ◉ Can-Annular ○ Annular
Fuel (Turbine)	☒ Natural Gas ☐ LPG ☐ Digester Gas* ☐ Landfill Gas* ☐ Propane ☐ Refinery Gas* ☐ Other*: ______ * (If Digester Gas, Landfill Gas, Refinery Gas, and/or Other are checked, attach fuel analysis indicating higher heating value and sulfur content).
Heat Recovery Steam Generator (HRSG)	Steam Turbine Capacity: ______ MW Low Pressure Steam Output Capacity: ______ lb/hr @ ______ °F High Pressure Steam Output Capacity: ______ lb/hr @ ______ °F Superheated Steam Output Capacity: ______ lb/hr @ ______ °F
Duct Burner	Manufacturer: ______ Model: ______ Number of burners: ______ Rating of each burner (HHV): ______ Type: ○ Low NOx (please attach manufacturer's specifications) ○ Other: ______ Show all heat transfer surface locations with the HRSG and temperature profile
Fuel (Duct Burner)	○ Natural Gas ○ LPG ○ Digester Gas* ○ Landfill Gas* ○ Propane ○ Refinery Gas* ○ Other*: ______ * (If Digester Gas, Landfill Gas, Refinery Gas, and/or Other are checked, attach fuel analysis indicating higher heating value and sulfur content).

South Coast Air Quality Management District

Form 400-E-12
Gas Turbine

This form must be accompanied by a completed Application for a Permit to Construct/Operate - Forms 400-A, Form 400-CEQA, and Form 400-PS.

Section B - Equipment Description (Cont.)

Air Pollution Control

- ○ Selective Catalytic Reduction (SCR)*
- ○ Selective Non-Catalytic Reduction (SNCR)*
- ◉ Oxidation Catalyst*
- ○ Other (specify)*: ________
- ○ Steam/Water Injection: Injection Rate: ________ lbs. water/lbs. fuel, or ________ mole water/mole fuel

* Separate application is required.

Capital Cost: 619038   Installation Cost: 46818   Annual Operating Cost: ________

Oxidation Catalyst Data (If Applicable)

Manufacturer: BASF Corp.   Model: Camet

Catalyst Dimensions: Length: 2 ft. 1.5 in. Width: ____ ft. 2.5 in. Height: 2 ft. ____ in.

Catalyst Cell Density: ________ cells/sq.in.   Pressure Drop Across Catalyst: 2

Manufacturer's Guarantee: CO Control Efficiency: ________ %   Catalyst Life: 3 yrs

VOC Control Efficiency: ________ %   Operating Temp. Range: 500 °F

Space Velocity (gas flow rate/catalyst volume): 139539   Area Velocity (gas flow/wetted catalyst surface area): 29071

VOC Concentration into Catalyst: 4 PPMVD@ 15%O_2 CO Concentration inot Catalyst: 125 PPMVD@ 15%O_2

Section C - Operation Information

On-line Emissions Data

Pollutants	Maximum Emissions Before Control *		Maximum Emissions After Control	
	PPM@15% O_2, dry	lb/hour	PPM@15% O_2, dry	lb/hour
ROG			2.0	2.31
NOx			2.5	8.29
CO			4.0	8.07
PM_{10}				6.24
SOx				1.64
NH_3			5.0	6.14

* Based on temperature, fuel consumption, and MW output.

Reference (attach data):

- ☒ Manufacturer Emission Data
- ☐ EPA Emission Factors
- ☐ AQMD Emission Factors
- ☐ Source Test

Stack or Vent Data

Stack Height: 80 ft. ____ in.   Stack Diameter: 13 ft. 6 in.

Exhaust Temperature: 997 °F   Exhaust Pressure: ________ inches water column

Exhaust Flow Rate: 941438 CFM   Oxygen Level: 14.68 %

South Coast Air Quality Management District
Form 400-E-12
Gas Turbine
This form must be accompanied by a completed Application for a Permit to Construct/Operate - Forms 400-A, Form 400-CEQA, and Form 400-PS.

Section C - Operation Information (cont.)

Startup Data	No. of Startups per day: 2 No. of Startups per year: 350 Duration of each startup: 0.5 hrs.
Shutdown Data	No. of Shutdowns per day: 2 No. of Shutdowns per year: 350 Duration of each Shutdown: 0.22 hrs.

Startup and Shutdown Emissions Data

Pollutants	Startup Emissions		Shutdown Emissions	
	PPM@15% O_2, dry	lb/hour	PPM@15% O_2, dry	lb/hour
ROG		3.96		4.87
NOx		20.7		9.61
CO		19.4		34.4
PM_{10}		6.24		6.24
SOx		1.64		1.64
NH_3				

Monitoring and Reporting

Continuous Emission Monitoring System (CEMS): CEMS Make: TBD
CEMS Model: TBD

Will the CEMS be used to measure both on-line and startup/shutdown emissions? ◉ Yes ○ No

The following parameters will be continuously monitored:

- ☒ NOx
- ☒ CO
- ☒ O_2
- ☒ Fuel Flow Rate
- ☒ Ammonia Injection Rate
- ☐ Other (specify):
- ☒ Ammonia Stack Concentration: Ammonia CEMS Make: TBD
  Ammonia CEMS Model: TBD

Operating Schedule

Normal:	24 hours/day	7 days/week	52 weeks/yr
Maximum:	24 hours/day	7 days/week	52 weeks/yr

Section D - Authorization/Signature

I hereby certify that all information contained herein and information submitted with this application is true and correct.

Preparer Info

Signature: S O'Kane Date: 09/04/05
Title: Manager Company Name: AES Huntington Beach
Name: Stephen O'Kane
Phone #: 5624937840 Fax #: 5624937320
Email: stephen.okane@AES.com

Contact Info

Name: Same as above.
Title: Company Name:
Phone #: Fax #:
Email:

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South Coast Air Quality Management District

Form 400-E-12
Gas Turbine

Mail To:
SCAQMD
P.O. Box 4944
Diamond Bar, CA 91765-0944

Tel: (909) 396-3385
www.aqmd.gov

This form must be accompanied by a completed Application for a Permit to Construct/Operate - Forms 400-A, Form 400-CEQA, and Form 400-PS.

Section A - Operator Information

Facility Name (Business Name of Operator That Appears On Permit): AES Huntington Beach, LLC

Valid AQMD Facility ID (Available On Permit Or Invoice Issued By AQMD): 115389

Address where the equipment will be operated (for equipment which will be moved to various location in AQMD's jurisdiction, please list the initial location site): 21730 Newland Street, Huntington Beach, CA 92646

(●) Fixed Location ( ) Various Locations

Section B - Equipment Description

Turbine	Manufacturer: General Electric Model: LMS 100PB Serial No.: TBD Size (based on Higher Heating Value - HHV): Manufacturer Maximum Input Rating: ______ MMBTU/hr ______ kWh Manufacturer Maximum Output Rating: 885 MMBTU/hr 99355 kWh
Function (Check all that apply)	☒ Electrical Generation ☐ Driving Pump/Compressor ☐ Emergency Peaking Unit ☒ Steam Generation ☐ Exhaust Gas Recovery ☐ Other (specify): ______
Cycle Type	(●) Simply Cycle ( ) Regenerative Cycle ( ) Combined Cycle ( ) Other (specify): ______
Combustion Type	( ) Tubular (●) Can-Annular ( ) Annular
Fuel (Turbine)	☒ Natural Gas ☐ LPG ☐ Digester Gas* ☐ Landfill Gas* ☐ Propane ☐ Refinery Gas* ☐ Other*: ______ * (If Digester Gas, Landfill Gas, Refinery Gas, and/or Other are checked, attach fuel analysis indicating higher heating value and sulfur content).
Heat Recovery Steam Generator (HRSG)	Steam Turbine Capacity: ______ MW Low Pressure Steam Output Capacity: ______ lb/hr @ ______ °F High Pressure Steam Output Capacity: ______ lb/hr @ ______ °F Superheated Steam Output Capacity: ______ lb/hr @ ______ °F
Duct Burner	Manufacturer: ______ Model: ______ Number of burners: ______ Rating of each burner (HHV): ______ Type: ( ) Low NOx (please attach manufacturer's specifications) ( ) Other: ______ Show all heat transfer surface locations with the HRSG and temperature profile
Fuel (Duct Burner)	( ) Natural Gas ( ) LPG ( ) Digester Gas* ( ) Landfill Gas* ( ) Propane ( ) Refinery Gas* ( ) Other*: ______ * (If Digester Gas, Landfill Gas, Refinery Gas, and/or Other are checked, attach fuel analysis indicating higher heating value and sulfur content).

South Coast Air Quality Management District
Form 400-E-12
Gas Turbine
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Section B - Equipment Description (Cont.)

Air Pollution Control

○ Selective Catalytic Reduction (SCR)* ○ Selective Non-Catalytic Reduction (SNCR)*
◉ Oxidation Catalyst* ○ Other (specify)*: ______
○ Steam/Water Injection: Injection Rate: ______ lbs. water/lbs. fuel, or ______ mole water/mole fuel
* Separate application is required.
Capital Cost: 619038 Installation Cost: 46818 Annual Operating Cost: ______

Oxidation Catalyst Data (If Applicable)

Manufacturer: BASF Corp. Model: Camet
Catalyst Dimensions: Length: 2 ft. 1.5 in. Width: ______ ft. 2.5 in. Height: 2 ft. ______ in.
Catalyst Cell Density: ______ cells/sq.in. Pressure Drop Across Catalyst: 2
Manufacturer's Guarantee: CO Control Efficiency: ______ % Catalyst Life: 3 yrs
VOC Control Efficiency: ______ % Operating Temp. Range: 500 °F
Space Velocity (gas flow rate/catalyst volume): 139539 Area Velocity (gas flow/wetted catalyst surface area): 29071
VOC Concentration into Catalyst: 4 PPMVD@ 15%O_2 CO Concentration inot Catalyst: 125 PPMVD@ 15%O_2

Section C - Operation Information

On-line Emissions Data

Pollutants	Maximum Emissions Before Control*		Maximum Emissions After Control	
	PPM@15% O_2, dry	lb/hour	PPM@15% O_2, dry	lb/hour
ROG			2.0	2.31
NOx			2.5	8.29
CO			4.0	8.07
PM_{10}				6.24
SOx				1.64
NH_3			5.0	6.14

* Based on temperature, fuel consumption, and MW output.

Reference (attach data):
☒ Manufacturer Emission Data ☐ EPA Emission Factors ☐ AQMD Emission Factors ☐ Source Test

Stack or Vent Data

Stack Height: 80 ft. ______ in. Stack Diameter: 13 ft. 6 in.
Exhaust Temperature: 997 °F Exhaust Pressure: ______ inches water column
Exhaust Flow Rate: 941438 CFM Oxygen Level: 14.68 %

South Coast Air Quality Management District

Form 400-E-12
Gas Turbine

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Section C - Operation Information (cont.)

Startup Data: No. of Startups per day: 2 No. of Startups per year: 350 Duration of each startup: 0.5 hrs.

Shutdown Data: No. of Shutdowns per day: 2 No. of Shutdowns per year: 350 Duration of each Shutdown: 0.22 hrs.

Startup and Shutdown Emissions Data

Pollutants	Startup Emissions		Shutdown Emissions	
	PPM@15% O_2, dry	lb/hour	PPM@15% O_2, dry	lb/hour
ROG		3.96		4.87
NOx		20.7		9.61
CO		19.4		34.4
PM_{10}		6.24		6.24
SOx		1.64		1.64
NH_3				

Monitoring and Reporting

Continuous Emission Monitoring System (CEMS): CEMS Make: TBD

CEMS Model: TBD

Will the CEMS be used to measure both on-line and startup/shutdown emissions? ◉ Yes ○ No

The following parameters will be continuously monitored:

☒ NOx ☒ CO ☒ O_2

☒ Fuel Flow Rate ☒ Ammonia Injection Rate ☐ Other (specify):

☒ Ammonia Stack Concentration: Ammonia CEMS Make: TBD

Ammonia CEMS Model: TBD

Operating Schedule

	hours/day	days/week	weeks/yr
Normal:	24	7	52
Maximum:	24	7	52

Section D - Authorization/Signature

I hereby certify that all information contained herein and information submitted with this application is true and correct.

Preparer Info

Signature: S O'Kane Date: 09/04/15

Title: Manager Company Name: AES Huntington Beach

Name: Stephen O'Kane
Phone #: 5624937840 Fax #: 5624937320
Email: stephen.okane@AES.com

Contact Info

Name: Same as above.

Title: Company Name:

Phone #: Fax #:

Email:

South Coast Air Quality Management District
Form 400-E-12
Gas Turbine

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Section A - Operator Information

Facility Name (Business Name of Operator That Appears On Permit): AES Huntington Beach, LLC

Valid AQMD Facility ID (Available On Permit Or Invoice Issued By AQMD): 115389

Address where the equipment will be operated (for equipment which will be moved to various location in AQMD's jurisdiction, please list the initial location site): 21730 Newland Street, Huntington Beach, CA 92646

◉ Fixed Location ○ Various Locations

Section B - Equipment Description

Turbine	Manufacturer: General Electric Model: 7FA.05 Serial No.: TBD Size (based on Higher Heating Value - HHV): Manufacturer Maximum Input Rating: ______ MMBTU/hr ______ kWh Manufacturer Maximum Output Rating: 2273 MMBTU/hr 235402 kWh
Function (Check all that apply)	☒ Electrical Generation ☐ Driving Pump/Compressor ☐ Emergency Peaking Unit ☒ Steam Generation ☐ Exhaust Gas Recovery ☐ Other (specify): ______
Cycle Type	○ Simply Cycle ○ Regenerative Cycle ◉ Combined Cycle ○ Other (specify): ______
Combustion Type	○ Tubular ◉ Can-Annular ○ Annular
Fuel (Turbine)	☒ Natural Gas ☐ LPG ☐ Digester Gas* ☐ Landfill Gas* ☐ Propane ☐ Refinery Gas* ☐ Other*: ______ * (If Digester Gas, Landfill Gas, Refinery Gas, and/or Other are checked, attach fuel analysis indicating higher heating value and sulfur content).
Heat Recovery Steam Generator (HRSG)	Steam Turbine Capacity: 230 MW Low Pressure Steam Output Capacity: ______ lb/hr @ ______ °F High Pressure Steam Output Capacity: 1077167 lb/hr @ 1044 °F Superheated Steam Output Capacity: ______ lb/hr @ ______ °F
Duct Burner	Manufacturer: ______ Model: ______ Number of burners: ______ Rating of each burner (HHV): ______ Type: ○ Low NOx (please attach manufacturer's specifications) ○ Other: ______ Show all heat transfer surface locations with the HRSG and temperature profile
Fuel (Duct Burner)	○ Natural Gas ○ LPG ○ Digester Gas* ○ Landfill Gas* ○ Propane ○ Refinery Gas* ○ Other*: ______ * (If Digester Gas, Landfill Gas, Refinery Gas, and/or Other are checked, attach fuel analysis indicating higher heating value and sulfur content).

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Section B - Equipment Description (Cont.)

Air Pollution Control

- (◉) Selective Catalytic Reduction (SCR)*
- ( ) Selective Non-Catalytic Reduction (SNCR)*
- ( ) Oxidation Catalyst*
- ( ) Other (specify)*: ____
- ( ) Steam/Water Injection: Injection Rate: ____ lbs. water/lbs. fuel, or ____ mole water/mole fuel

* Separate application is required.

Capital Cost: 452109 Installation Cost: 40188 Annual Operating Cost: ____

Oxidation Catalyst Data (If Applicable)

Manufacturer: ____ Model: ____

Catalyst Dimensions: Length: ____ ft. ____ in. Width: ____ ft. ____ in. Height: ____ ft. ____ in.

Catalyst Cell Density: ____ cells/sq.in. Pressure Drop Across Catalyst: ____

Manufacturer's Guarantee: CO Control Efficiency: ____ % Catalyst Life: ____ yrs

VOC Control Efficiency: ____ % Operating Temp. Range: ____ °F

Space Velocity (gas flow rate/catalyst volume): ____ Area Velocity (gas flow/wetted catalyst surface area): ____

VOC Concentration into Catalyst: ____ PPMVD@ 15%O_2 CO Concentration inot Catalyst: ____ PPMVD@ 15%O_2

Section C - Operation Information

On-line Emissions Data

Pollutants	Maximum Emissions Before Control*		Maximum Emissions After Control	
	PPM@15% O_2, dry	lb/hour	PPM@15% O_2, dry	lb/hour
ROG			1.0	1.58
NOx			2.0	16.5
CO			2.0	10.0
PM_{10}				9.0
SOx				4.86
NH_3			5.0	15.3

* Based on temperature, fuel consumption, and MW output.

Reference (attach data):

- [x] Manufacturer Emission Data
- [ ] EPA Emission Factors
- [ ] AQMD Emission Factors
- [ ] Source Test

Stack or Vent Data

Stack Height: 150 ft. ____ in. Stack Diameter: 20 ft. ____ in.

Exhaust Temperature: 223 °F Exhaust Pressure: ____ inches water column

Exhaust Flow Rate: 1261924 CFM Oxygen Level: 14.99 %

South Coast Air Quality Management District

Form 400-E-12
Gas Turbine

This form must be accompanied by a completed Application for a Permit to Construct/Operate - Forms 400-A, Form 400-CEQA, and Form 400-PS.

Section C - Operation Information (cont.)

Startup Data: No. of Startups per day: 2 No. of Startups per year: 500 Duration of each startup: 1 hrs.

Shutdown Data: No. of Shutdowns per day: 2 No. of Shutdowns per year: 500 Duration of each Shutdown: 0.50 hrs.

Startup and Shutdown Emissions Data

Pollutants	Startup Emissions		Shutdown Emissions	
	PPM@15% O_2, dry	lb/hour	PPM@15% O_2, dry	lb/hour
ROG		36.0		32.8
NOx		61.0		18.2
CO		325		138
PM_{10}		9.00		9.00
SOx		4.86		4.86
NH_3				

Monitoring and Reporting

Continuous Emission Monitoring System (CEMS): CEMS Make: TBD

CEMS Model: TBD

Will the CEMS be used to measure both on-line and startup/shutdown emissions? ◉ Yes ○ No

The following parameters will be continuously monitored:

☒ NOx ☒ CO ☒ O_2

☒ Fuel Flow Rate ☒ Ammonia Injection Rate ☐ Other (specify): ____

☒ Ammonia Stack Concentration: Ammonia CEMS Make: TBD

Ammonia CEMS Model: TBD

Operating Schedule

Normal:	24 hours/day	7 days/week	52 weeks/yr
Maximum:	24 hours/day	7 days/week	52 weeks/yr

Section D - Authorization/Signature

I hereby certify that all information contained herein and information submitted with this application is true and correct.

Preparer Info

Signature: S O'Kane Date: 09/04/15

Title: Manager Company Name: AES Huntington Beach

Name: Stephen O'Kane

Phone #: 5624937840 Fax #: 5624937320

Email: stephen.okane@AES.com

Contact Info

Name: Same as above.

Title: Company Name:

Phone #: Fax #:

Email:

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South Coast Air Quality Management District

Form 400-E-12
Gas Turbine

South Coast AQMD

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Mail To:
SCAQMD
P.O. Box 4944
Diamond Bar, CA 91765-0944

Tel: (909) 396-3385
www.aqmd.gov

Section A - Operator Information

Facility Name (Business Name of Operator That Appears On Permit): AES Huntington Beach, LLC

Valid AQMD Facility ID (Available On Permit Or Invoice Issued By AQMD): 115389

Address where the equipment will be operated (for equipment which will be moved to various location in AQMD's jurisdiction, please list the initial location site): 21730 Newland Street, Huntington Beach, CA 92646

◉ Fixed Location ○ Various Locations

Section B - Equipment Description

Turbine	Manufacturer: General Electric; Model: 7FA.05; Serial No.: TBD Size (based on Higher Heating Value - HHV): Manufacturer Maximum Input Rating: ______ MMBTU/hr ______ kWh Manufacturer Maximum Output Rating: 2273 MMBTU/hr 235402 kWh
Function (Check all that apply)	☒ Electrical Generation ☐ Driving Pump/Compressor ☐ Emergency Peaking Unit ☒ Steam Generation ☐ Exhaust Gas Recovery ☐ Other (specify): ______
Cycle Type	○ Simply Cycle ○ Regenerative Cycle ◉ Combined Cycle ○ Other (specify): ______
Combustion Type	○ Tubular ◉ Can-Annular ○ Annular
Fuel (Turbine)	☒ Natural Gas ☐ LPG ☐ Digester Gas* ☐ Landfill Gas* ☐ Propane ☐ Refinery Gas* ☐ Other*: ______ * (If Digester Gas, Landfill Gas, Refinery Gas, and/or Other are checked, attach fuel analysis indicating higher heating value and sulfur content).
Heat Recovery Steam Generator (HRSG)	Steam Turbine Capacity: 230 MW Low Pressure Steam Output Capacity: ______ lb/hr @ ______ °F High Pressure Steam Output Capacity: 1077167 lb/hr @ 1044 °F Superheated Steam Output Capacity: ______ lb/hr @ ______ °F
Duct Burner	Manufacturer: ______ Model: ______ Number of burners: ______ Rating of each burner (HHV): ______ Type: ○ Low NOx (please attach manufacturer's specifications) ○ Other: ______ Show all heat transfer surface locations with the HRSG and temperature profile
Fuel (Duct Burner)	○ Natural Gas ○ LPG ○ Digester Gas* ○ Landfill Gas* ○ Propane ○ Refinery Gas* ○ Other*: ______ * (If Digester Gas, Landfill Gas, Refinery Gas, and/or Other are checked, attach fuel analysis indicating higher heating value and sulfur content).

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Form 400-E-12
Gas Turbine
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Section B - Equipment Description (Cont.)

Air Pollution Control

(●) Selective Catalytic Reduction (SCR)* ( ) Selective Non-Catalytic Reduction (SNCR)*

( ) Oxidation Catalyst* ( ) Other (specify)*: ____

( ) Steam/Water Injection: Injection Rate: ____ lbs. water/lbs. fuel, or ____ mole water/mole fuel

* Separate application is required.

Capital Cost: 452109 Installation Cost: 40188 Annual Operating Cost: ____

Oxidation Catalyst Data (If Applicable)

Manufacturer: ____ Model: ____

Catalyst Dimensions: Length: ____ ft. ____ in. Width: ____ ft. ____ in. Height: ____ ft. ____ in.

Catalyst Cell Density: ____ cells/sq.in. Pressure Drop Across Catalyst: ____

Manufacturer's Guarantee: CO Control Efficiency: ____ % Catalyst Life: ____ yrs

VOC Control Efficiency: ____ % Operating Temp. Range: ____ °F

Space Velocity (gas flow rate/catalyst volume): ____ Area Velocity (gas flow/wetted catalyst surface area): ____

VOC Concentration into Catalyst: ____ PPMVD@ 15%O_2 CO Concentration inot Catalyst: ____ PPMVD@ 15%O_2

Section C - Operation Information

On-line Emissions Data

Pollutants	Maximum Emissions Before Control*		Maximum Emissions After Control	
	PPM@15% O_2, dry	lb/hour	PPM@15% O_2, dry	lb/hour
ROG			1.0	1.58
NOx			2.0	16.5
CO			2.0	10.0
PM_{10}				9.0
SOx				4.86
NH_3			5.0	15.3

* Based on temperature, fuel consumption, and MW output.

Reference (attach data):

[X] Manufacturer Emission Data [ ] EPA Emission Factors [ ] AQMD Emission Factors [ ] Source Test

Stack or Vent Data

Stack Height: 150 ft. ____ in. Stack Diameter: 20 ft. ____ in.

Exhaust Temperature: 223 °F Exhaust Pressure: ____ inches water column

Exhaust Flow Rate: 1261924 CFM Oxygen Level: 14.99 %

South Coast Air Quality Management District

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Gas Turbine

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Section C - Operation Information (cont.)

Startup Data: No. of Startups per day: 2 No. of Startups per year: 500 Duration of each startup: 1 hrs.

Shutdown Data: No. of Shutdowns per day: 2 No. of Shutdowns per year: 500 Duration of each Shutdown: 0.50 hrs.

Startup and Shutdown Emissions Data

Pollutants	Startup Emissions		Shutdown Emissions	
	PPM@15% O_2, dry	lb/hour	PPM@15% O_2, dry	lb/hour
ROG		36.0		32.8
NOx		61.0		18.2
CO		325		138
PM_{10}		9.00		9.00
SOx		4.86		4.86
NH_3				

Monitoring and Reporting

Continuous Emission Monitoring System (CEMS): CEMS Make: TBD

CEMS Model: TBD

Will the CEMS be used to measure both on-line and startup/shutdown emissions? (●) Yes ( ) No

The following parameters will be continuously monitored:

☒ NOx ☒ CO ☒ O_2

☒ Fuel Flow Rate ☒ Ammonia Injection Rate ☐ Other (specify):

☒ Ammonia Stack Concentration: Ammonia CEMS Make: TBD

Ammonia CEMS Model: TBD

Operating Schedule

Normal:	24 hours/day	7 days/week	52 weeks/yr
Maximum:	24 hours/day	7 days/week	52 weeks/yr

Section D - Authorization/Signature

I hereby certify that all information contained herein and information submitted with this application is true and correct.

Preparer Info

Signature: S O'Kane Date: 09/04/15

Title: Manager Company Name: AES Huntington Beach

Name: Stephen O'Kane

Phone #: 5624937840 Fax #: 5624937320

Email: stephen.okane@AES.com

Contact Info

Name: Same as above.

Title: Company Name:

Phone #: Fax #:

Email:

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Form 400-E-12
Gas Turbine

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Facility Name (Business Name of Operator That Appears On Permit): AES Huntington Beach, LLC

Valid AQMD Facility ID (Available On Permit Or Invoice Issued By AQMD): 115389

Address where the equipment will be operated (for equipment which will be moved to various location in AQMD's jurisdiction, please list the initial location site): 21730 Newland Street, Huntington Beach, CA 92646

(●) Fixed Location ( ) Various Locations

Section B - Equipment Description

Turbine	Manufacturer: General Electric Model: LMS 100PB Serial No.: TBD Size (based on Higher Heating Value - HHV): Manufacturer Maximum Input Rating: ______ MMBTU/hr ______ kWh Manufacturer Maximum Output Rating: 885 MMBTU/hr 99355 kWh
Function (Check all that apply)	[X] Electrical Generation [ ] Driving Pump/Compressor [ ] Emergency Peaking Unit [X] Steam Generation [ ] Exhaust Gas Recovery [ ] Other (specify): ______
Cycle Type	(●) Simply Cycle ( ) Regenerative Cycle ( ) Combined Cycle ( ) Other (specify): ______
Combustion Type	( ) Tubular (●) Can-Annular ( ) Annular
Fuel (Turbine)	[X] Natural Gas [ ] LPG [ ] Digester Gas* [ ] Landfill Gas* [ ] Propane [ ] Refinery Gas* [ ] Other*: ______ * (If Digester Gas, Landfill Gas, Refinery Gas, and/or Other are checked, attach fuel analysis indicating higher heating value and sulfur content).
Heat Recovery Steam Generator (HRSG)	Steam Turbine Capacity: ______ MW Low Pressure Steam Output Capacity: ______ lb/hr @ ______ °F High Pressure Steam Output Capacity: ______ lb/hr @ ______ °F Superheated Steam Output Capacity: ______ lb/hr @ ______ °F
Duct Burner	Manufacturer: ______ Model: ______ Number of burners: ______ Rating of each burner (HHV): ______ Type: ( ) Low NOx (please attach manufacturer's specifications) ( ) Other: ______ Show all heat transfer surface locations with the HRSG and temperature profile
Fuel (Duct Burner)	( ) Natural Gas ( ) LPG ( ) Digester Gas* ( ) Landfill Gas* ( ) Propane ( ) Refinery Gas* ( ) Other*: ______ * (If Digester Gas, Landfill Gas, Refinery Gas, and/or Other are checked, attach fuel analysis indicating higher heating value and sulfur content).

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Gas Turbine

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Section B - Equipment Description (Cont.)

Air Pollution Control

(●) Selective Catalytic Reduction (SCR)* ( ) Selective Non-Catalytic Reduction (SNCR)*

( ) Oxidation Catalyst* ( ) Other (specify)*: ______

( ) Steam/Water Injection: Injection Rate: ______ lbs. water/lbs. fuel, or ______ mole water/mole fuel

* Separate application is required.

Capital Cost: 526442 Installation Cost: 52020 Annual Operating Cost: ______

Oxidation Catalyst Data (If Applicable)

Manufacturer: ______ Model: ______

Catalyst Dimensions: Length: ______ ft. ______ in. Width: ______ ft. ______ in. Height: ______ ft. ______ in.

Catalyst Cell Density: ______ cells/sq.in. Pressure Drop Across Catalyst: ______

Manufacturer's Guarantee: CO Control Efficiency: ______ % Catalyst Life: ______ yrs

VOC Control Efficiency: ______ % Operating Temp. Range: ______ °F

Space Velocity (gas flow rate/catalyst volume): ______ Area Velocity (gas flow/wetted catalyst surface area): ______

VOC Concentration into Catalyst: ______ PPMVD@ 15%O_2 CO Concentration inot Catalyst: ______ PPMVD@ 15%O_2

Section C - Operation Information

On-line Emissions Data

Pollutants	Maximum Emissions Before Control *		Maximum Emissions After Control	
	PPM@15% O_2, dry	lb/hour	PPM@15% O_2, dry	lb/hour
ROG			2.0	2.31
NOx			2.5	8.29
CO			4.0	8.07
PM_{10}				6.24
SOx				1.64
NH_3			5.0	6.14

* Based on temperature, fuel consumption, and MW output.

Reference (attach data):

[X] Manufacturer Emission Data [ ] EPA Emission Factors [ ] AQMD Emission Factors [ ] Source Test

Stack or Vent Data

Stack Height: 80 ft. ______ in. Stack Diameter: 13 ft. 6 in.

Exhaust Temperature: 997 °F Exhaust Pressure: ______ inches water column

Exhaust Flow Rate: 941438 CFM Oxygen Level: 14.68 %

South Coast Air Quality Management District

Form 400-E-12
Gas Turbine

This form must be accompanied by a completed Application for a Permit to Construct/Operate - Forms 400-A, Form 400-CEQA, and Form 400-PS.

Section C - Operation Information (cont.)

Startup Data	No. of Startups per day: 2 No. of Startups per year: 350 Duration of each startup: 0.5 hrs.
Shutdown Data	No. of Shutdowns per day: 2 No. of Shutdowns per year: 350 Duration of each Shutdown: 0.22 hrs.

Startup and Shutdown Emissions Data

Pollutants	Startup Emissions		Shutdown Emissions	
	PPM@15% O_2, dry	lb/hour	PPM@15% O_2, dry	lb/hour
ROG		3.96		4.87
NOx		20.7		9.61
CO		19.4		34.4
PM_{10}		6.24		6.24
SOx		1.64		1.64
NH_3				

Monitoring and Reporting

Continuous Emission Monitoring System (CEMS): CEMS Make: TBD

CEMS Model: TBD

Will the CEMS be used to measure both on-line and startup/shutdown emissions? ◉ Yes ○ No

The following parameters will be continuously monitored:

☒ NOx ☒ CO ☒ O_2

☒ Fuel Flow Rate ☒ Ammonia Injection Rate ☐ Other (specify):

☒ Ammonia Stack Concentration: Ammonia CEMS Make: TBD

Ammonia CEMS Model: TBD

Operating Schedule

	hours/day	days/week	weeks/yr
Normal:	24	7	52
Maximum:	24	7	52

Section D - Authorization/Signature

I hereby certify that all information contained herein and information submitted with this application is true and correct.

Preparer Info

Signature: S O'Kane Date: 09/04/15

Name: Stephen O'Kane

Phone #: 5624937840 Fax #: 5624937320

Title: Manager Company Name: AES Huntington Beach

Email: stephen.okane@AES.com

Contact Info

Name: Same as above.

Phone #: Fax #:

Title: Company Name:

Email:

THIS IS A PUBLIC DOCUMENT

Pursuant to the California Public Records Act, your permit application and any supplemental documentation are public records and may be disclosed to a third party. If you wish to claim certain limited information as exempt from disclosure because it qualifies as a trade secret, as defined in the District's Guidelines for Implementing the California Public Records Act, you must make such claim at the time of submittal to the District.

Check here if you claim that this form or its attachments contain confidential trade secret information. ☐

South Coast Air Quality Management District
Form 400-E-12
Gas Turbine

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Mail To:
SCAQMD
P.O. Box 4944
Diamond Bar, CA 91765-0944
Tel: (909) 396-3385
www.aqmd.gov

Section A - Operator Information

Facility Name (Business Name of Operator That Appears On Permit): AES Huntington Beach, LLC

Valid AQMD Facility ID (Available On Permit Or Invoice Issued By AQMD): 115389

Address where the equipment will be operated (for equipment which will be moved to various location in AQMD's jurisdiction, please list the initial location site): 21730 Newland Street, Huntington Beach, CA 92646

◉ Fixed Location ○ Various Locations

Section B - Equipment Description

Turbine	Manufacturer: General Electric Model: LMS 100PB Serial No.: TBD Size (based on Higher Heating Value - HHV): Manufacturer Maximum Input Rating: ______ MMBTU/hr ______ kWh Manufacturer Maximum Output Rating: 885 MMBTU/hr 99355 kWh
Function (Check all that apply)	☒ Electrical Generation ☐ Driving Pump/Compressor ☐ Emergency Peaking Unit ☒ Steam Generation ☐ Exhaust Gas Recovery ☐ Other (specify): ______
Cycle Type	◉ Simply Cycle ○ Regenerative Cycle ○ Combined Cycle ○ Other (specify): ______
Combustion Type	○ Tubular ◉ Can-Annular ○ Annular
Fuel (Turbine)	☒ Natural Gas ☐ LPG ☐ Digester Gas* ☐ Landfill Gas* ☐ Propane ☐ Refinery Gas* ☐ Other*: ______ * (If Digester Gas, Landfill Gas, Refinery Gas, and/or Other are checked, attach fuel analysis indicating higher heating value and sulfur content).
Heat Recovery Steam Generator (HRSG)	Steam Turbine Capacity: ______ MW Low Pressure Steam Output Capacity: ______ lb/hr @ ______ °F High Pressure Steam Output Capacity: ______ lb/hr @ ______ °F Superheated Steam Output Capacity: ______ lb/hr @ ______ °F
Duct Burner	Manufacturer: ______ Model: ______ Number of burners: ______ Rating of each burner (HHV): ______ Type: ○ Low NOx (please attach manufacturer's specifications) ○ Other: ______ Show all heat transfer surface locations with the HRSG and temperature profile
Fuel (Duct Burner)	○ Natural Gas ○ LPG ○ Digester Gas* ○ Landfill Gas* ○ Propane ○ Refinery Gas* ○ Other*: ______ * (If Digester Gas, Landfill Gas, Refinery Gas, and/or Other are checked, attach fuel analysis indicating higher heating value and sulfur content).

South Coast Air Quality Management District

Form 400-E-12
Gas Turbine

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Section B - Equipment Description (Cont.)

Air Pollution Control

(●) Selective Catalytic Reduction (SCR)* ( ) Selective Non-Catalytic Reduction (SNCR)*

( ) Oxidation Catalyst* ( ) Other (specify)*: ____

( ) Steam/Water Injection: Injection Rate: ____ lbs. water/lbs. fuel, or ____ mole water/mole fuel

* Separate application is required.

Capital Cost: 526442 Installation Cost: 52020 Annual Operating Cost: ____

Oxidation Catalyst Data (If Applicable)

Manufacturer: ____ Model: ____

Catalyst Dimensions: Length: ____ ft. ____ in. Width: ____ ft. ____ in. Height: ____ ft. ____ in.

Catalyst Cell Density: ____ cells/sq.in. Pressure Drop Across Catalyst: ____

Manufacturer's Guarantee: CO Control Efficiency: ____ % Catalyst Life: ____ yrs

VOC Control Efficiency: ____ % Operating Temp. Range: ____ °F

Space Velocity (gas flow rate/catalyst volume): ____ Area Velocity (gas flow/wetted catalyst surface area): ____

VOC Concentration into Catalyst: ____ PPMVD@ 15%O_2 CO Concentration inot Catalyst: ____ PPMVD@ 15%O_2

Section C - Operation Information

On-line Emissions Data

Pollutants	Maximum Emissions Before Control *		Maximum Emissions After Control	
	PPM@15% O_2, dry	lb/hour	PPM@15% O_2, dry	lb/hour
ROG			2.0	2.31
NOx			2.5	8.29
CO			4.0	8.07
PM_{10}				6.24
SOx				1.64
NH_3			5.0	6.14

* Based on temperature, fuel consumption, and MW output.

Reference (attach data):

[X] Manufacturer Emission Data [ ] EPA Emission Factors [ ] AQMD Emission Factors [ ] Source Test

Stack or Vent Data

Stack Height: 80 ft. ____ in. Stack Diameter: 13 ft. 6 in.

Exhaust Temperature: 997 °F Exhaust Pressure: ____ inches water column

Exhaust Flow Rate: 941438 CFM Oxygen Level: 14.68 %

South Coast Air Quality Management District

Form 400-E-12
Gas Turbine

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Section C - Operation Information (cont.)

Startup Data: No. of Startups per day: 2 No. of Startups per year: 350 Duration of each startup: 0.5 hrs.

Shutdown Data: No. of Shutdowns per day: 2 No. of Shutdowns per year: 350 Duration of each Shutdown: 0.22 hrs.

Startup and Shutdown Emissions Data

Pollutants	Startup Emissions		Shutdown Emissions	
	PPM@15% O_2, dry	lb/hour	PPM@15% O_2, dry	lb/hour
ROG		3.96		4.87
NOx		20.7		9.61
CO		19.4		34.4
PM_{10}		6.24		6.24
SOx		1.64		1.64
NH_3				

Monitoring and Reporting

Continuous Emission Monitoring System (CEMS): CEMS Make: TBD

CEMS Model: TBD

Will the CEMS be used to measure both on-line and startup/shutdown emissions? ◉ Yes ○ No

The following parameters will be continuously monitored:

☒ NOx ☒ CO ☒ O_2

☒ Fuel Flow Rate ☒ Ammonia Injection Rate ☐ Other (specify):

☒ Ammonia Stack Concentration: Ammonia CEMS Make: TBD

Ammonia CEMS Model: TBD

Operating Schedule

Normal:	24 hours/day	7 days/week	52 weeks/yr
Maximum:	24 hours/day	7 days/week	52 weeks/yr

Section D - Authorization/Signature

I hereby certify that all information contained herein and information submitted with this application is true and correct.

Preparer Info

Signature: S O'Kane Date: 09/04/15

Title: Manager Company Name: AES Huntington Beach

Name: Stephen O'Kane

Phone #: 5624937840 Fax #: 5624937320

Email: stephen.okane@AES.com

Contact Info

Name: Same as above.

Title: Company Name:

Phone #: Fax #:

Email:

South Coast Air Quality Management District

Form 400-E-18
Storage Tank

This form must be accompanied by a completed Application for a Permit to Construct/Operate - Forms 400-A, Form 400-CEQA, and Form 400-PS.

Mail To:
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P.O. Box 4944
Diamond Bar, CA 91765-0944

Tel: (909) 396-3385
www.aqmd.gov

Section A - Operator Information

Facility Name (Business Name of Operator That Appears On Permit): AES Huntington Beach, LLC

Valid AQMD Facility ID (Available On Permit Or Invoice Issued By AQMD): 115389

Address where the equipment will be operated (for equipment which will be moved to various locations in AQMD's jurisdiction, please list the initial location site): 21730 Newland Street, Huntington Beach, CA 92646

(●) Fixed Location ( ) Various Locations

Tank Type (Select ONE)	( ) External Floating Roof Tank (EFRT) ( ) Internal Floating Roof Tank (IFRT) (●) Horizontal Tank (HT) ( ) Vertical Fixed Roof Tank (VFRT) ( ) Domed External Roof Tank (DEFRT)
Identification	Tank Identification Number: TBD; Tank Contents/Product (include MSDS): 19% Aqueous Ammonia

Section B - Tank Information

Tank Characteristics

- Shell Diameter (ft.): 13
- Shell Length (ft.): 45
- Shell Height (ft.):
- Turnovers Per Year: 18
- Is Tank Heated? ( ) Yes (●) No
- Is Tank Underground? ( ) Yes (●) No
- Net Throughput (gal/year): 722700
- Self Support Roof: (●) Yes ( ) No
- Number of Columns?
- Effective Column Diameter: ( ) 9" by 7" Built Up Column - 1.1 ( ) 8" Diameter Pipe - 0.7 ( ) Unknown - 1
- External Shell Condition: (●) Good ( ) Poor
- Internal Shell Color: ( ) Light Rust ( ) Dense Rust ( ) Gunite Lining
- External Shell Color: (●) White/White ( ) Aluminum/Specular ( ) Aluminum/Diffuse ( ) Gray/Light ( ) Gray/Medium ( ) Red/Primer
- Average Liquid Height (ft.) (Vertical Only):
- Maximum Liquid Height (ft.) (Vertical Only):
- Working Volume (gal.) (Vertical Only):
- Actual Volume (gal.) (Vertical Only):
- Paint Condition: (●) Good ( ) Poor
- Paint Color/Shade: (●) White/White ( ) Aluminum/Diffuse ( ) Gray/Light ( ) Aluminum/Specular ( ) Gray/Medium ( ) Red/Primer

Roof Characteristics (Floating Roof Tank)

- Roof Type: ( ) Pontoon ( ) Double Deck ( ) Dome Roof (Height______ ft.) ( ) Cone Roof (Height______ ft.)
- Roof Fitting Category: ( ) Typical ( ) Detail
- Roof Height (ft.):
- Roof Paint Condition: ( ) Good ( ) Poor
- Roof Color/Shade: ( ) White/White ( ) Aluminum/Diffuse ( ) Gray/Light ( ) Aluminum/Specular ( ) Gray/Medium ( ) Red/Primer

Deck Characteristics (Floating Roof Tank)

- Deck Type: ( ) Welded ( ) Bolted
- Deck Fitting Characteristics: ( ) Typical ( ) Detailed (Complete Deck Seam)

Construction:	Deck Seam Length (ft.):	Deck Seam:
( ) Sheet		( ) 5 ft. wide ( ) 6 ft. wide ( ) 7 ft. wide
( ) Panel		( ) 5 x 7.5 ft. ( ) 5 x 12 ft.

Tank Construction and Rim-Seal System (Floating Roof Tank)

- Tank Construction: ( ) Welded ( ) Riveted
- Primary Seal: ( ) Mechanical Shoe ( ) Liquid Mounted ( ) Vapor Mounted
- Secondary Seal: ( ) Rim Mounted ( ) None ( ) Shoe Mounted

Breather Vent Setting

- Vacuum Setting (psig): -1.25
- Pressure Setting (psig): 50

* Section D of the application MUST be completed.

South Coast Air Quality Management District
Form 400-E-18
Storage Tank

South Coast AQMD

This form must be accompanied by a completed Application for a Permit to Construct/Operate - Forms 400-A, Form 400-CEQA, and Form 400-PS.

Mail To:
SCAQMD
P.O. Box 4944
Diamond Bar, CA 91765-0944

Tel: (909) 396-3385
www.aqmd.gov

Section B - Tank Information (cont.)

Site Selection

Nearest Major City: Huntington Beach, CA

Daily Average Ambient Temperature (°F): 66 Annual Average Minimum Temperature (°F): 55

Annual Average Maximum Temperature (°F): 68 Average Wind Speed (mph): 5.5

Annual Average Solar Insulation Factor (Btu / (ft^3 * ft * day)): ____

Tank Contents

Chemical Category: ○ Organic Liquids ○ Crude Oil ○ Petroleum Distillates

Liquid: ◉ Single ○ Multiple

If Multiple, Select Speciation Option: ○ Full Speciation ○ Partial Speciation ○ Various Weight Speciation ○ None

Section C - Operation Information

Vapor Control

Vapor Control During Loading or Unloading: ☐ Sparger ☒ Vapor Balance System ☐ Vapor Return Line ☐ Vented to Air Pollution Control Equipment [1]

[1] A separate permit is required. If APC equipment is already permitted, provide Permit or Device Number: ____

Vent Valve Data

Indicate Type of Setting and Vapor Disposal

	Number	Pressure Setting	Vaccum Setting	Discharging to (Check Appropriate Box)		
				Atmosphere	Vapor Control	Flare
Combination				☐	☐	☐
Pressure	1	50	-1.25	☒	☐	☐
Vaccum				☐	☐	☐
Open				☐	☐	☐

Materials

Name all liquids, vapors, gases, or mixtures of such material to be stored in this tank:
19% Aqueous Ammonia

If material is stored in a solution, supply the following information:

Name of Solvent: Water Name of Materials Dissolved: Ammonia

Concentration of Materials Dissolved: 19.00 % by Weight OR ____ % by Volume OR ____ lbs/gal

Section D - Roof/Deck Fitting

Section D is required for the following tanks: External Floating Roof Tank, Internal Floating Roof Tanks, or Domed External Floating Roof Tanks.

Select the number of fittings for each applicable question. Examples: __3__ Unbolted Cover, Ungasketed
____ Unbolted Cover, Gasketed

Roof/Deck Fitting Details

1. Access Hatch (24" diameter well)
   - ____ Bolted Cover, Gasketed
   - ____ Unbolted Cover, UnGasketed
   - ____ Unbolted Cover, Gasketed
2. Automatic Gauge Float Well (20" diameter well)
   - ____ Bolted Cover, Gasketed
   - ____ Unbolted Cover, Ungasketed
   - ____ Unbolted Cover, Gasketed
3. Column Well (24" diameter well)
   - ____ Built-Up Col - Sliding Cover, Gasketed
   - ____ Built-Up Col - Sliding Cover, Ungasketed
   - ____ Pipe Col - Flex, Fabric Sleeve Seal
   - ____ Pipe Col - Sliding Cover, Gasketed
   - ____ Pipe Col - Sliding Cover, Ungasketed

South Coast Air Quality Management District

Form 400-E-18
Storage Tank

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Section D - Roof/Deck Fitting (cont.)

Roof/Deck Fitting Details (cont.)

4. Gauge Hatch/Sample Well (8" diameter well)
- ____________ Weighted Mechanical Actuation, Gasketed
- ____________ Weighted Mechanical Actuation, Ungasketed

5. Ladder Well (36" diameter)
- ____________ Sliding Cover, Gasketed
- ____________ Sliding Cover, Ungasketed

6. Rim Vent (6" diameter)
- ____________ Weighted Mechanical Actuation, Gasketed
- ____________ Weighted Mechanical Actuation, Ungasketed

7. Roof Drain (3" diameter)
- ____________ Open
- ____________ 90% Close

8. Roof Leg (3" diameter leg)
- ____________ Adjustable, Pontoon Area, Ungasketed
- ____________ Adjustable, Center Area, Ungasketed
- ____________ Adjustable, Double-Deck Roofs
- ____________ Fixed
- ____________ Adjustable, Pontoon Area, Gasketed
- ____________ Adjustable, Pontoon Area, Sock
- ____________ Adjustable, Center Area, Gasketed
- ____________ Adjustable, Center Area, Sock

9. Roof Leg or Hang Well
- ____________ Adjustable
- ____________ Fixed

10. Sample Pipe (24" diameter)
- ____________ Slotted Pipe – Sliding Cover, Gasketed
- ____________ Slotted Pipe – Sliding Cover, Ungasketed
- ____________ Slit Fabric Seal, 10% Open

11. Guided Pole/Sample Well
- ____________ Ungasketed, Sliding Cover, Without Float
- ____________ Ungasketed Sliding Cover, With Float
- ____________ Gasketed Sliding Cover, Without Float
- ____________ Gasketed Sliding Cover, With Float
- ____________ Gasketed Sliding Cover, With Pole Sleeve
- ____________ Gasketed Sliding Cover, With Pole Wiper
- ____________ Gasketed Sliding Cover, With Float, Wiper
- ____________ Gasketed Sliding Cover, With Float, Sleeve, Wiper
- ____________ Gasketed Sliding Cover, With Pole Sleeve, Wiper

12. ____________ **Stub Drain (1" diameter)**

13. Unslotted Guide – Pole Well
- ____________ Ungasketed, Sliding Cover
- ____________ Gasketed Sliding Cover
- ____________ Ungasketed Sliding Cover with Sleeve
- ____________ Gasketed Sliding Cover with Sleeve
- ____________ Gasketed Sliding Cover with Wiper

14. Vacuum Breaker (10" diameter well)
- ____________ Weighted Mechanical Actuation, Gasketed
- ____________ Weighted Mechanical Actuation, Ungasketed

Section D - Authorization/Signature

I hereby certify that all information contained herein and information submitted with this application is true and correct.

Preparer Info	**Signature:** SOKane	**Date:** 09/04/15	**Name:** Stephen O'Kane	
	Title: Manager	**Company Name:** AES Huntington Beach	**Phone #:** 5624937840	**Fax #:** (562) 493-7320
			Email: stephen.okane@AES.com	
Contact Info	**Name:** Same as above.		**Phone #:**	**Fax #:**
	Title:	**Company Name:**	**Email:**	

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South Coast Air Quality Management District

Form 400-E-18
Storage Tank

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Tel: (909) 396-3385
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Section A - Operator Information

Facility Name (Business Name of Operator That Appears On Permit): AES Huntington Beach, LLC

Valid AQMD Facility ID (Available On Permit Or Invoice Issued By AQMD): 115389

Address where the equipment will be operated (for equipment which will be moved to various locations in AQMD's jurisdiction, please list the initial location site): 21730 Newland Street, Huntington Beach, CA 92646

(●) Fixed Location ( ) Various Locations

Tank Type (Select ONE)	( ) External Floating Roof Tank (EFRT) ( ) Internal Floating Roof Tank (IFRT) (●) Horizontal Tank (HT) ( ) Vertical Fixed Roof Tank (VFRT) ( ) Domed External Roof Tank (DEFRT)
Identification	Tank Identification Number: TBD — Tank Contents/Product (include MSDS): 19% Aqueous Ammonia

Section B - Tank Information

Tank Characteristics

Shell Diameter (ft.): 6 — Shell Length (ft.): 18 — Shell Height (ft.): ______ — Turnovers Per Year: 4

Is Tank Heated? ( ) Yes (●) No — Is Tank Underground? ( ) Yes (●) No — Net Throughput (gal/year): 64205 — Self Support Roof: (●) Yes ( ) No

Number of Columns? ______

Effective Column Diameter: ( ) 9" by 7" Built Up Column - 1.1 ( ) 8" Diameter Pipe - 0.7 ( ) Unknown - 1

External Shell Condition: (●) Good ( ) Poor

Internal Shell Color: ( ) Light Rust ( ) Dense Rust ( ) Gunite Lining

External Shell Color: (●) White/White ( ) Aluminum/Specular ( ) Aluminum/Diffuse ( ) Gray/Light ( ) Gray/Medium ( ) Red/Primer

Average Liquid Height (ft.) (Vertical Only): ______ — Maximum Liquid Height (ft.) (Vertical Only): ______ — Working Volume (gal.) (Vertical Only): ______ — Actual Volume (gal.) (Vertical Only): ______

Paint Condition: (●) Good ( ) Poor

Paint Color/Shade: (●) White/White ( ) Aluminum/Diffuse ( ) Gray/Light ( ) Aluminum/Specular ( ) Gray/Medium ( ) Red/Primer

Roof Characteristics (Floating Roof Tank)

Roof Type: ( ) Pontoon ( ) Double Deck ( ) Dome Roof (Height______ ft.) ( ) Cone Roof (Height______ ft.)

Roof Fitting Category: ( ) Typical ( ) Detail

Roof Height (ft.): ______

Roof Paint Condition: ( ) Good ( ) Poor

Roof Color/Shade: ( ) White/White ( ) Aluminum/Diffuse ( ) Gray/Light ( ) Aluminum/Specular ( ) Gray/Medium ( ) Red/Primer

Deck Characteristics (Floating Roof Tank)

Deck Type: ( ) Welded ( ) Bolted

Deck Fitting Characteristics: ( ) Typical ( ) Detailed (Complete Deck Seam)

Construction:	Deck Seam Length (ft.):	Deck Seam:
( ) Sheet	______	( ) 5 ft. wide ( ) 6 ft. wide ( ) 7 ft. wide
( ) Panel	______	( ) 5 x 7.5 ft. ( ) 5 x 12 ft.

Tank Construction and Rim-Seal System (Floating Roof Tank)

Tank Construction: ( ) Welded ( ) Riveted

Primary Seal: ( ) Mechanical Shoe ( ) Liquid Mounted ( ) Vapor Mounted

Secondary Seal: ( ) Rim Mounted ( ) None ( ) Shoe Mounted

Breather Vent Setting

Vacuum Setting (psig): -1.25 — Pressure Setting (psig): 50

* Section D of the application MUST be completed.

South Coast Air Quality Management District

Form 400-E-18
Storage Tank

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P.O. Box 4944
Diamond Bar, CA 91765-0944

Tel: (909) 396-3385
www.aqmd.gov

Section B - Tank Information (cont.)

Site Selection

Nearest Major City: Huntington Beach, CA

Daily Average Ambient Temperature (˚F): 66 Annual Average Minimum Temperature (˚F): 55

Annual Average Maximum Temperature (˚F): 68 Average Wind Speed (mph): 5.5

Annual Average Solar Insulation Factor (Btu / (ft^3 • ft • day)): ____

Tank Contents

Chemical Category: ○ Organic Liquids ○ Crude Oil ○ Petroleum Distillates

Liquid: ◉ Single ○ Multiple

If Multiple, Select Speciation Option: ○ Full Speciation ○ Partial Speciation ○ Various Weight Speciation ○ None

Section C - Operation Information

Vapor Control

Vapor Control During Loading or Unloading: ☐ Sparger ☒ Vapor Balance System ☐ Vapor Return Line ☐ Vented to Air Pollution Control Equipment [1]

[1] A separate permit is required. If APC equipment is already permitted, provide Permit or Device Number: ____

Vent Valve Data

Indicate Type of Setting and Vapor Disposal

	Number	Pressure Setting	Vaccum Setting	Discharging to (Check Appropriate Box)		
				Atmosphere	Vapor Control	Flare
Combination				☐	☐	☐
Pressure	1	50	-1.25	☒	☐	☐
Vaccum				☐	☐	☐
Open				☐	☐	☐

Materials

Name all liquids, vapors, gases, or mixtures of such material to be stored in this tank:
19% Aqueous Ammonia

If material is stored in a solution, supply the following information:

Name of Solvent: Water Name of Materials Dissolved: Ammonia

Concentration of Materials Dissolved: 19.00 % by Weight OR ____ % by Volume OR ____ lbs/gal

Section D - Roof/Deck Fitting

Section D is required for the following tanks: External Floating Roof Tank, Internal Floating Roof Tanks, or Domed External Floating Roof Tanks.

Select the number of fittings for each applicable question. Examples: 3 Unbolted Cover, Ungasketed
____ Unbolted Cover, Gasketed

Roof/Deck Fitting Details

1. Access Hatch (24" diameter well)
   - ____ Bolted Cover, Gasketed
   - ____ Unbolted Cover, UnGasketed
   - ____ Unbolted Cover, Gasketed

2. Automatic Gauge Float Well (20" diameter well)
   - ____ Bolted Cover, Gasketed
   - ____ Unbolted Cover, Ungasketed
   - ____ Unbolted Cover, Gasketed

3. Column Well (24" diameter well)
   - ____ Built-Up Col - Sliding Cover, Gasketed
   - ____ Built-Up Col - Sliding Cover, Ungasketed
   - ____ Pipe Col - Flex, Fabric Sleeve Seal
   - ____ Pipe Col - Sliding Cover, Gasketed
   - ____ Pipe Col - Sliding Cover, Ungasketed

South Coast Air Quality Management District

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Storage Tank

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Section D - Roof/Deck Fitting (cont.)

Roof/Deck Fitting Details (cont.)

4. Gauge Hatch/Sample Well (8" diameter well)
- ___________ Weighted Mechanical Actuation, Gasketed
- ___________ Weighted Mechanical Actuation, Ungasketed

5. Ladder Well (36" diameter)
- ___________ Sliding Cover, Gasketed
- ___________ Sliding Cover, Ungasketed

6. Rim Vent (6" diameter)
- ___________ Weighted Mechanical Actuation, Gasketed
- ___________ Weighted Mechanical Actuation, Ungasketed

7. Roof Drain (3" diameter)
- ___________ Open
- ___________ 90% Close

8. Roof Leg (3" diameter leg)
- ___________ Adjustable, Pontoon Area, Ungasketed
- ___________ Adjustable, Center Area, Ungasketed
- ___________ Adjustable, Double-Deck Roofs
- ___________ Fixed
- ___________ Adjustable, Pontoon Area, Gasketed
- ___________ Adjustable, Pontoon Area, Sock
- ___________ Adjustable, Center Area, Gasketed
- ___________ Adjustable, Center Area, Sock

9. Roof Leg or Hang Well
- ___________ Adjustable
- ___________ Fixed

10. Sample Pipe (24" diameter)
- ___________ Slotted Pipe – Sliding Cover, Gasketed
- ___________ Slotted Pipe – Sliding Cover, Ungasketed
- ___________ Slit Fabric Seal, 10% Open

11. Guided Pole/Sample Well
- ___________ Ungasketed, Sliding Cover, Without Float
- ___________ Ungasketed Sliding Cover, With Float
- ___________ Gasketed Sliding Cover, Without Float
- ___________ Gasketed Sliding Cover, With Float
- ___________ Gasketed Sliding Cover, With Pole Sleeve
- ___________ Gasketed Sliding Cover, With Pole Wiper
- ___________ Gasketed Sliding Cover, With Float, Wiper
- ___________ Gasketed Sliding Cover, With Float, Sleeve, Wiper
- ___________ Gasketed Sliding Cover, With Pole Sleeve, Wiper

12. ___________ **Stub Drain (1" diameter)**

13. Unslotted Guide – Pole Well
- ___________ Ungasketed, Sliding Cover
- ___________ Gasketed Sliding Cover
- ___________ Ungasketed Sliding Cover with Sleeve
- ___________ Gasketed Sliding Cover with Sleeve
- ___________ Gasketed Sliding Cover with Wiper

14. Vacuum Breaker (10" diameter well)
- ___________ Weighted Mechanical Actuation, Gasketed
- ___________ Weighted Mechanical Actuation, Ungasketed

Section D - Authorization/Signature

I hereby certify that all information contained herein and information submitted with this application is true and correct.

Preparer Info	**Signature:** SO'Kane	**Date:** 09/04/15	**Name:** Stephen O'Kane	
	Title: Manager	**Company Name:** AES Huntington Beach	**Phone #:** 5624937840	**Fax #:** (562) 493-7320
			Email: stephen.okane@AES.com	
Contact Info	**Name:** Same as above.		**Phone #:**	**Fax #:**
	Title:	**Company Name:**	**Email:**	

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South Coast Air Quality Management District

Form 400-E-18
Storage Tank

This form must be accompanied by a completed Application for a Permit to Construct/Operate - Forms 400-A, Form 400-CEQA, and Form 400-PS.

Mail To:
SCAQMD
P.O. Box 4944
Diamond Bar, CA 91765-0944

Tel: (909) 396-3385
www.aqmd.gov

Section A - Operator Information

Facility Name (Business Name of Operator That Appears On Permit): AES Huntington Beach, LLC

Valid AQMD Facility ID (Available On Permit Or Invoice Issued By AQMD): 115389

Address where the equipment will be operated (for equipment which will be moved to various locations in AQMD's jurisdiction, please list the initial location site): 21730 Newland Street, Huntington Beach, CA 92646

(●) Fixed Location ( ) Various Locations

Tank Type (Select ONE)	( ) External Floating Roof Tank (EFRT) ( ) Internal Floating Roof Tank (IFRT) (●) Horizontal Tank (HT) ( ) Vertical Fixed Roof Tank (VFRT) ( ) Domed External Roof Tank (DEFRT)
Identification	Tank Identification Number: TBD Tank Contents/Product (include MSDS): Water and petroleum from Combined Cycle Power Block

Section B - Tank Information

Tank Characteristics

Shell Diameter (ft.): 5.33
Shell Length (ft.): 30
Shell Height (ft.): 5.46
Turnovers Per Year: 180

Is Tank Heated? ( ) Yes (●) No
Is Tank Underground? ( ) Yes (●) No
Net Throughput (gal/year): 897538
Self Support Roof: (●) Yes ( ) No

Number of Columns? ____
Effective Column Diameter: ( ) 9" by 7" Built Up Column - 1.1 ( ) 8" Diameter Pipe - 0.7 ( ) Unknown - 1

External Shell Condition: (●) Good ( ) Poor
Internal Shell Color: ( ) Light Rust ( ) Dense Rust ( ) Gunite Lining
External Shell Color: (●) White/White ( ) Aluminum/Specular ( ) Aluminum/Diffuse ( ) Gray/Light ( ) Gray/Medium ( ) Red/Primer

Average Liquid Height (ft.) (Vertical Only): ____
Maximum Liquid Height (ft.) (Vertical Only): ____
Working Volume (gal.) (Vertical Only): ____
Actual Volume (gal.) (Vertical Only): ____

Paint Condition: (●) Good ( ) Poor
Paint Color/Shade: (●) White/White ( ) Gray/Light ( ) Gray/Medium ( ) Aluminum/Diffuse ( ) Aluminum/Specular ( ) Red/Primer

Roof Characteristics (Floating Roof Tank)

Roof Type: ( ) Pontoon ( ) Double Deck ( ) Dome Roof (Height____ft.) ( ) Cone Roof (Height____ft.)
Roof Fitting Category: ( ) Typical ( ) Detail
Roof Height (ft.): ____
Roof Paint Condition: ( ) Good ( ) Poor
Roof Color/Shade: ( ) White/White ( ) Gray/Light ( ) Gray/Medium ( ) Aluminum/Diffuse ( ) Aluminum/Specular ( ) Red/Primer

Deck Characteristics (Floating Roof Tank)

Deck Type: ( ) Welded ( ) Bolted
Deck Fitting Characteristics: ( ) Typical ( ) Detailed (Complete Deck Seam)

Construction:	Deck Seam Length (ft.):	Deck Seam:
( ) Sheet	____	( ) 5 ft. wide ( ) 6 ft. wide ( ) 7 ft. wide
( ) Panel	____	( ) 5 x 7.5 ft. ( ) 5 x 12 ft.

Tank Construction and Rim-Seal System (Floating Roof Tank)

Tank Construction: ( ) Welded ( ) Riveted
Primary Seal: ( ) Mechanical Shoe ( ) Liquid Mounted ( ) Vapor Mounted
Secondary Seal: ( ) Rim Mounted ( ) None ( ) Shoe Mounted

Breather Vent Setting

Vacuum Setting (psig): ____
Pressure Setting (psig): ____

* Section D of the application MUST be completed.

South Coast Air Quality Management District

Form 400-E-18 Storage Tank

South Coast AQMD

This form must be accompanied by a completed Application for a Permit to Construct/Operate - Forms 400-A, Form 400-CEQA, and Form 400-PS.

Mail To:
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Tel: (909) 396-3385
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Section B - Tank Information (cont.)

Site Selection

Nearest Major City: Huntington Beach, CA

Daily Average Ambient Temperature (°F): 66

Annual Average Minimum Temperature (°F): 55

Annual Average Maximum Temperature (°F): 68

Average Wind Speed (mph): 5.5

Annual Average Solar Insulation Factor (Btu / (ft^3 * ft * day)): ____

Tank Contents

Chemical Category: ○ Organic Liquids ○ Crude Oil ○ Petroleum Distillates

Liquid: ◉ Single ○ Multiple

If Multiple, Select Speciation Option: ○ Full Speciation ○ Partial Speciation ○ Various Weight Speciation ○ None

Section C - Operation Information

Vapor Control

Vapor Control During Loading or Unloading: ☐ Sparger ☐ Vapor Balance System ☐ Vapor Return Line ☐ Vented to Air Pollution Control Equipment [1]

[1] A separate permit is required. If APC equipment is already permitted, provide Permit or Device Number: ____

Vent Valve Data

Indicate Type of Setting and Vapor Disposal

	Number	Pressure Setting	Vaccum Setting	Discharging to (Check Appropriate Box)		
				Atmosphere	Vapor Control	Flare
Combination				☐	☐	☐
Pressure				☐	☐	☐
Vaccum				☐	☐	☐
Open	1			☒	☐	☐

Materials

Name all liquids, vapors, gases, or mixtures of such material to be stored in this tank:
Oil/water separator will contain primarily precipitation oils/lubricants.

If material is stored in a solution, supply the following information:

Name of Solvent: Water

Name of Materials Dissolved: Petroleum Products

Concentration of Materials Dissolved: ____ % by Weight OR 0.00 % by Volume OR ____ lbs/gal

Section D - Roof/Deck Fitting

Section D is required for the following tanks: External Floating Roof Tank, Internal Floating Roof Tanks, or Domed External Floating Roof Tanks.

Select the number of fittings for each applicable question. Examples: 3 Unbolted Cover, Ungasketed
____ Unbolted Cover, Gasketed

Roof/Deck Fitting Details

1. Access Hatch (24" diameter well)
   - ____ Bolted Cover, Gasketed
   - ____ Unbolted Cover, UnGasketed
   - ____ Unbolted Cover, Gasketed

2. Automatic Gauge Float Well (20" diameter well)
   - ____ Bolted Cover, Gasketed
   - ____ Unbolted Cover, Ungasketed
   - ____ Unbolted Cover, Gasketed

3. Column Well (24" diameter well)
   - ____ Built-Up Col - Sliding Cover, Gasketed
   - ____ Built-Up Col - Sliding Cover, Ungasketed
   - ____ Pipe Col - Flex, Fabric Sleeve Seal
   - ____ Pipe Col - Sliding Cover, Gasketed
   - ____ Pipe Col - Sliding Cover, Ungasketed

South Coast Air Quality Management District
Form 400-E-18
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Section D - Roof/Deck Fitting (cont.)

Roof/Deck Fitting Details (cont.)

4. Gauge Hatch/Sample Well (8" diameter well)
- ____________ Weighted Mechanical Actuation, Gasketed
- ____________ Weighted Mechanical Actuation, Ungasketed

5. Ladder Well (36" diameter)
- ____________ Sliding Cover, Gasketed
- ____________ Sliding Cover, Ungasketed

6. Rim Vent (6" diameter)
- ____________ Weighted Mechanical Actuation, Gasketed
- ____________ Weighted Mechanical Actuation, Ungasketed

7. Roof Drain (3" diameter)
- ____________ Open
- ____________ 90% Close

8. Roof Leg (3" diameter leg)
- ____________ Adjustable, Pontoon Area, Ungasketed
- ____________ Adjustable, Center Area, Ungasketed
- ____________ Adjustable, Double-Deck Roofs
- ____________ Fixed
- ____________ Adjustable, Pontoon Area, Gasketed
- ____________ Adjustable, Pontoon Area, Sock
- ____________ Adjustable, Center Area, Gasketed
- ____________ Adjustable, Center Area, Sock

9. Roof Leg or Hang Well
- ____________ Adjustable
- ____________ Fixed

10. Sample Pipe (24" diameter)
- ____________ Slotted Pipe – Sliding Cover, Gasketed
- ____________ Slotted Pipe – Sliding Cover, Ungasketed
- ____________ Slit Fabric Seal, 10% Open

11. Guided Pole/Sample Well
- ____________ Ungasketed, Sliding Cover, Without Float
- ____________ Ungasketed Sliding Cover, With Float
- ____________ Gasketed Sliding Cover, Without Float
- ____________ Gasketed Sliding Cover, With Float
- ____________ Gasketed Sliding Cover, With Pole Sleeve
- ____________ Gasketed Sliding Cover, With Pole Wiper
- ____________ Gasketed Sliding Cover, With Float, Wiper
- ____________ Gasketed Sliding Cover, With Float, Sleeve, Wiper
- ____________ Gasketed Sliding Cover, With Pole Sleeve, Wiper

12. ____________ **Stub Drain (1" diameter)**

13. Unslotted Guide – Pole Well
- ____________ Ungasketed, Sliding Cover
- ____________ Gasketed Sliding Cover
- ____________ Ungasketed Sliding Cover with Sleeve
- ____________ Gasketed Sliding Cover with Sleeve
- ____________ Gasketed Sliding Cover with Wiper

14. Vacuum Breaker (10" diameter well)
- ____________ Weighted Mechanical Actuation, Gasketed
- ____________ Weighted Mechanical Actuation, Ungasketed

Section D - Authorization/Signature

I hereby certify that all information contained herein and information submitted with this application is true and correct.

Preparer Info	Signature: S O'Kane	Date: 09/04/15	Name: Stephen O'Kane	
	Title: Manager	Company Name: AES Huntington Beach	Phone #: 5624937840	Fax #: (562) 493-7320
			Email: stephen.okane@AES.com	
Contact Info	Name: Same as above.		Phone #:	Fax #:
	Title:	Company Name:	Email:	

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South Coast Air Quality Management District

Form 400-E-18
Storage Tank

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Section A - Operator Information

Facility Name (Business Name of Operator That Appears On Permit): AES Huntington Beach, LLC

Valid AQMD Facility ID (Available On Permit Or Invoice Issued By AQMD): 115389

Address where the equipment will be operated (for equipment which will be moved to various locations in AQMD's jurisdiction, please list the initial location site): 21730 Newland Street, Huntington Beach, CA 92646

(•) Fixed Location (○) Various Locations

Tank Type (Select ONE)	(○) External Floating Roof Tank (EFRT) (○) Internal Floating Roof Tank (IFRT) (•) Horizontal Tank (HT) (○) Vertical Fixed Roof Tank (VFRT) (○) Domed External Roof Tank (DEFRT)
Identification	Tank Identification Number: TBD Tank Contents/Product (include MSDS): Water and petroleum from Simple Cycle Power Block

Section B - Tank Information

Tank Characteristics	Shell Diameter (ft.): 5.33 Shell Length (ft.): 30 Shell Height (ft.): 5.46 Turnovers Per Year: 23 Is Tank Heated? (○) Yes (•) No Is Tank Underground? (○) Yes (•) No Net Throughput (gal/year): 114314 Self Support Roof: (•) Yes (○) No Number of Columns? ____ Effective Column Diameter: (○) 9" by 7" Built Up Column - 1.1 (○) 8" Diameter Pipe - 0.7 (○) Unknown - 1 External Shell Condition: (•) Good (○) Poor Internal Shell Color: (○) Light Rust (○) Dense Rust (○) Gunite Lining External Shell Color: (•) White/White (○) Aluminum/Specular (○) Aluminum/Diffuse (○) Gray/Light (○) Gray/Medium (○) Red/Primer Average Liquid Height (ft.) (Vertical Only): ____ Maximum Liquid Height (ft.) (Vertical Only): ____ Working Volume (gal.) (Vertical Only): ____ Actual Volume (gal.) (Vertical Only): ____ Paint Condition: (•) Good (○) Poor Paint Color/Shade: (•) White/White (○) Gray/Light (○) Gray/Medium (○) Aluminum/Diffuse (○) Aluminum/Specular (○) Red/Primer
Roof Characteristics (Floating Roof Tank)	Roof Type: (○) Pontoon (○) Double Deck (○) Dome Roof (Height____ ft.) (○) Cone Roof (Height____ ft.) Roof Fitting Category: (○) Typical (○) Detail Roof Height (ft.): ____ Roof Paint Condition: (○) Good (○) Poor Roof Color/Shade: (○) White/White (○) Gray/Light (○) Gray/Medium (○) Aluminum/Diffuse (○) Aluminum/Specular (○) Red/Primer
Deck Characteristics (Floating Roof Tank)	Deck Type: (○) Welded (○) Bolted Deck Fitting Characteristics: (○) Typical (○) Detailed (Complete Deck Seam) Construction: (○) Sheet — Deck Seam Length (ft.): ____ — Deck Seam: (○) 5 ft. wide (○) 6 ft. wide (○) 7 ft. wide Construction: (○) Panel — Deck Seam Length (ft.): ____ — Deck Seam: (○) 5 x 7.5 ft. (○) 5 x 12 ft.
Tank Construction and Rim -Seal System (Floating Roof Tank)	Tank Construction: (○) Welded (○) Riveted Primary Seal: (○) Mechanical Shoe (○) Liquid Mounted (○) Vapor Mounted Secondary Seal: (○) Rim Mounted (○) None (○) Shoe Mounted
Breather Vent Setting	Vacuum Setting (psig): ____ Pressure Setting (psig): ____

* Section D of the application MUST be completed.

South Coast AQMD

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Section B - Tank Information (cont.)

Site Selection

Nearest Major City: Huntington Beach, CA

Daily Average Ambient Temperature (˚F): 66   Annual Average Minimum Temperature (˚F): 55

Annual Average Maximum Temperature (˚F): 68   Average Wind Speed (mph): 5.5

Annual Average Solar Insulation Factor (Btu / (ft^3 • ft • day)): ____________

Tank Contents

Chemical Category: ○ Organic Liquids ○ Crude Oil ○ Petroleum Distillates

Liquid: ◉ Single ○ Multiple

If Multiple, Select Speciation Option: ○ Full Speciation ○ Partial Speciation ○ Various Weight Speciation ○ None

Section C - Operation Information

Vapor Control

Vapor Control During Loading or Unloading: ☐ Sparger ☐ Vapor Balance System ☐ Vapor Return Line ☐ Vented to Air Pollution Control Equipment [1]

[1] A separate permit is required. If APC equipment is already permitted, provide Permit or Device Number: ____________

Vent Valve Data

Indicate Type of Setting and Vapor Disposal

	Number	Pressure Setting	Vaccum Setting	Discharging to (Check Appropriate Box)		
				Atmosphere	Vapor Control	Flare
Combination				☐	☐	☐
Pressure				☐	☐	☐
Vaccum				☐	☐	☐
Open	1			☒	☐	☐

Materials

Name all liquids, vapors, gases, or mixtures of such material to be stored in this tank:
Oil/water separator will contain primarily precipitation oils/lubricants.

If material is stored in a solution, supply the following information:

Name of Solvent: Water   Name of Materials Dissolved: Petroleum Products

Concentration of Materials Dissolved: ________ % by Weight OR 0.00 % by Volume OR ________ lbs/gal

Section D - Roof/Deck Fitting

Section D is required for the following tanks: External Floating Roof Tank, Internal Floating Roof Tanks, or Domed External Floating Roof Tanks.

Select the number of fittings for each applicable question. Examples: __3__ Unbolted Cover, Ungasketed
_____ Unbolted Cover, Gasketed

Roof/Deck Fitting Details

1. Access Hatch (24" diameter well)
   - ______ Bolted Cover, Gasketed
   - ______ Unbolted Cover, UnGasketed
   - ______ Unbolted Cover, Gasketed

2. Automatic Gauge Float Well (20" diameter well)
   - ______ Bolted Cover, Gasketed
   - ______ Unbolted Cover, Ungasketed
   - ______ Unbolted Cover, Gasketed

3. Column Well (24" diameter well)
   - ______ Built-Up Col - Sliding Cover, Gasketed
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South Coast Air Quality Management District

Form 400-E-18
Storage Tank

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Section D - Roof/Deck Fitting (cont.)

Roof/Deck Fitting Details (cont.)

4. Gauge Hatch/Sample Well (8" diameter well)

__________ Weighted Mechanical Actuation, Gasketed
__________ Weighted Mechanical Actuation, Ungasketed

5. Ladder Well (36" diameter)

__________ Sliding Cover, Gasketed
__________ Sliding Cover, Ungasketed

6. Rim Vent (6" diameter)

__________ Weighted Mechanical Actuation, Gasketed
__________ Weighted Mechanical Actuation, Ungasketed

7. Roof Drain (3" diameter)

__________ Open
__________ 90% Close

8. Roof Leg (3" diameter leg)

__________ Adjustable, Pontoon Area, Ungasketed
__________ Adjustable, Center Area, Ungasketed
__________ Adjustable, Double-Deck Roofs
__________ Fixed
__________ Adjustable, Pontoon Area, Gasketed
__________ Adjustable, Pontoon Area, Sock
__________ Adjustable, Center Area, Gasketed
__________ Adjustable, Center Area, Sock

9. Roof Leg or Hang Well

__________ Adjustable
__________ Fixed

10. Sample Pipe (24" diameter)

__________ Slotted Pipe – Sliding Cover, Gasketed
__________ Slotted Pipe – Sliding Cover, Ungasketed
__________ Slit Fabric Seal, 10% Open

11. Guided Pole/Sample Well

__________ Ungasketed, Sliding Cover, Without Float
__________ Ungasketed Sliding Cover, With Float
__________ Gasketed Sliding Cover, Without Float
__________ Gasketed Sliding Cover, With Float
__________ Gasketed Sliding Cover, With Pole Sleeve
__________ Gasketed Sliding Cover, With Pole Wiper
__________ Gasketed Sliding Cover, With Float, Wiper
__________ Gasketed Sliding Cover, With Float, Sleeve, Wiper
__________ Gasketed Sliding Cover, With Pole Sleeve, Wiper

12. __________ **Stub Drain (1" diameter)**

13. Unslotted Guide – Pole Well

__________ Ungasketed, Sliding Cover
__________ Gasketed Sliding Cover
__________ Ungasketed Sliding Cover with Sleeve
__________ Gasketed Sliding Cover with Sleeve
__________ Gasketed Sliding Cover with Wiper

14. Vacuum Breaker (10" diameter well)

__________ Weighted Mechanical Actuation, Gasketed
__________ Weighted Mechanical Actuation, Ungasketed

Section D - Authorization/Signature

I hereby certify that all information contained herein and information submitted with this application is true and correct.

Preparer Info	**Signature:** S OKane	**Date:** 09/04/15	**Name:** Stephen O'Kane	
	Title: Manager	**Company Name:** AES Huntington Beach	**Phone #:** 5624937840	**Fax #:** (562) 493-7320
			Email: stephen.okane@AES.com	
Contact Info	**Name:** Same as above.		**Phone #:**	**Fax #:**
	Title:	**Company Name:**	**Email:**	

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South Coast Air Quality Management District

Form 400-PS

Plot Plan And Stack Information Form

This form must be accompanied by a completed Application for a Permit to Construct/Operate - Form 400A and Form 400-CEQA.

Mail To:
SCAQMD
P.O. Box 4944
Diamond Bar, CA 91765-0944

Tel: (909) 396-3385
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Section A - Operator Information

Facility Name (Business Name of Operator To Appears On The Permit): AES Huntington Beach, LLC

Valid AQMD Facility ID (Available On Permit Or Invoice Issued By AQMD): 115389

Address where the equipment will be operated (for equipment which will be moved to various location in AQMD's jurisdiction, please list the initial location site): 21730 Newland Street, Huntington Beach, CA 92646

(•) Fixed Location ( ) Various Locations

Section B - Location Data

Plot Plan	Please attach a site map for the project with distances and scales. Identify and locate the proposed equipment on the map. A copy of the appropriate Thomas Brothers page, a web-based map, or a sketch that shows the major streets and location of the equipment is acceptable.
Location of Schools Nearby	**Is the facility located within a 1/4 mile radius (1,320 feet) of the outer boundary of a school?** ( ) Yes (•) No If yes, please provide name(s) of school(s) below: **School Name:** ______ **School Name:** ______ **School Address:** ______ **School Address:** ______ **Distance from stack or equipment vent to the outer boundary of the school:** ______ feet **Distance from stack or equipment vent to the outer boundary of the school:** ______ feet **CA Health & Safety Code 42301.9:** "School" means any public or private school used for purposes of the education of more than 12 children in kindergarten or any of grades 1 to 12, inclusive, but does not include any private school in which education is primarily conducted in private homes.
Population Density	(•) Urban ( ) Rural (<50% of land within 3 km radius accounted for by urban land use categories, i.e., multi-family dwelling or industrial.)
Zoning Classification	(•) **Mixed Use Residential Commercial Zone (M-U)** ( ) **Service and Professional Zone (C-S)** ( ) **Medium Commercial (C-3)** ( ) **Heavy Commercial (C-4)** ( ) **Commercial Manufacturing (C-M)**

Section C - Emission Release Parameters - Stacks, Vents

Stack Data	**Stack Height:** 150 feet (above ground level) **What is the height of the closest building nearest the stack?** 84 feet **Stack Inside Diameter:** 240 inches **Stack Flow:** 1261924 acfm **Stack Temperature:** 223 °F **Rain Cap Present:** ( ) Yes (•) No **Stack Orientation:** (•) Vertical ( ) Horizontal If the stack height is less than 2.5 times the closest building height (H), please provide information on any building within 5xH distance from the stack (attach additional sheet if necessary): **Building #/Name:** See PTA Appendix 5.1C **Building #/Name:** See PTA Appendix 5.1C **Building Height:** ______ feet (above ground level) **Building Height:** ______ feet (above ground level) **Building Width:** ______ feet **Building Width:** ______ feet **Building Length:** ______ feet **Building Length:** ______ feet
Receptor Distance From Equipment Stack or Roof Vents/Openings	**Distance to nearest residence or sensitive receptor*:** 1350 feet **Distance to nearest business:** 850 feet
Building Information	**Are the emissions released from vents and/or openings from a building?** ( ) Yes (•) No If yes, please provide: **Building #/Name:** ______ **Building Width:** ______ feet **Building Height:** ______ feet (above ground level) **Building Length:** ______ feet

*AQMD Rule 1470 defines SENSITIVE RECEPTOR as meaning any residence including private homes, condominiums, apartments, and living quarters, schools as defined under paragraph (b)(57), preschools, daycare centers and health facilities such as hospitals or retirement and nursing homes. A sensitive receptor includes long term care hospitals, hospices, prisons, and dormitories or similar live-in housing.

Form 400-PS

Plot Plan And Stack Information Form

This form must be accompanied by a completed Application for a Permit to Construct/Operate - Form 400A and Form 400-CEQA.

Section D - Authorization/Signature

I hereby certify that all information contained herein and information submittfgfed with this application is true and correct.

Signature of Preparer:	Title of Preparer:	
SKane	Manager	Preparer's Phone #: 5624937840 Preparer's Email: stephen.okane@AES.com

Contact Person:		Date Signed:
Stephen O'Kane Contact's Email: stephen.okane@AES.com	Contact's Phone#: 5624937840 Contact's Fax#: (562) 493-7320	09/04/15

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South Coast Air Quality Management District

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Section B - Location Data

Plot Plan	Please attach a site map for the project with distances and scales. Identify and locate the proposed equipment on the map. A copy of the appropriate Thomas Brothers page, a web-based map, or a sketch that shows the major streets and location of the equipment is acceptable.
Location of Schools Nearby	**Is the facility located within a 1/4 mile radius (1,320 feet) of the outer boundary of a school?** ( ) Yes (●) No If yes, please provide name(s) of school(s) below: **School Name:** ______ **School Name:** ______ **School Address:** ______ **School Address:** ______ **Distance from stack or equipment vent to the outer boundary of the school:** ______ feet **Distance from stack or equipment vent to the outer boundary of the school:** ______ feet **CA Health & Safety Code 42301.9:** "School" means any public or private school used for purposes of the education of more than 12 children in kindergarten or any of grades 1 to 12, inclusive, but does not include any private school in which education is primarily conducted in private homes.
Population Density	(●) Urban ( ) Rural (<50% of land within 3 km radius accounted for by urban land use categories, i.e., multi-family dwelling or industrial.)
Zoning Classification	(●) **Mixed Use Residential Commercial Zone (M-U)** ( ) **Service and Professional Zone (C-S)** ( ) **Medium Commercial (C-3)** ( ) **Heavy Commercial (C-4)** ( ) **Commercial Manufacturing (C-M)**

Section C - Emission Release Parameters - Stacks, Vents

Stack Data	**Stack Height:** 150 feet (above ground level) **What is the height of the closest building nearest the stack?** 84 feet **Stack Inside Diameter:** 240 inches **Stack Flow:** 1261924 acfm **Stack Temperature:** 223 °F **Rain Cap Present:** ( ) Yes (●) No **Stack Orientation:** (●) Vertical ( ) Horizontal If the stack height is less than 2.5 times the closest building height (H), please provide information on any building within 5xH distance from the stack (attach additional sheet if necessary): **Building #/Name:** See PTA Appendix 5.1C **Building #/Name:** See PTA Appendix 5.1C **Building Height:** ______ feet (above ground level) **Building Height:** ______ feet (above ground level) **Building Width:** ______ feet **Building Width:** ______ feet **Building Length:** ______ feet **Building Length:** ______ feet
Receptor Distance From Equipment Stack or Roof Vents/Openings	**Distance to nearest residence or sensitive receptor*:** 1350 feet **Distance to nearest business:** 850 feet
Building Information	**Are the emissions released from vents and/or openings from a building?** ( ) Yes (●) No If yes, please provide: **Building #/Name:** ______ **Building Width:** ______ feet **Building Height:** ______ feet (above ground level) **Building Length:** ______ feet

*AQMD Rule 1470 defines SENSITIVE RECEPTOR as meaning any residence including private homes, condominiums, apartments, and living quarters, schools as defined under paragraph (b)(57), preschools, daycare centers and health facilities such as hospitals or retirement and nursing homes. A sensitive receptor includes long term care hospitals, hospices, prisons, and dormitories or similar live-in housing.

Form 400-PS

Plot Plan And Stack Information Form

This form must be accompanied by a completed Application for a Permit to Construct/Operate - Form 400A and Form 400-CEQA.

Section D - Authorization/Signature

I hereby certify that all information contained herein and information submittfgfed with this application is true and correct.

Signature of Preparer:	**Title of Preparer:**	
S O'Kane	Manager	**Preparer's Phone #:** 5624937840 **Preparer's Email:** stephen.okane@AES.com

Contact Person: Stephen O'Kane **Contact's Email:** stephen.okane@AES.com	**Contact's Phone#:** 5624937840 **Contact's Fax#:** (562) 493-7320	**Date Signed:** 09/04/15

THIS IS A PUBLIC DOCUMENT

Pursuant to the California Public Records Act, your permit application and any supplemental documentation are public records and may be disclosed to a third party. If you wish to claim certain limited information as exempt from disclosure because it qualifies as a trade secret, as defined in the District's Guidelines for Implementing the California Public Records Act, you must make such claim at the time of submittal to the District.

Check here if you claim that this form or its attachments contain confidential trade secret information. ☐

South Coast Air Quality Management District

Form 400-PS

Plot Plan And Stack Information Form

This form must be accompanied by a completed Application for a Permit to Construct/Operate - Form 400A and Form 400-CEQA.

Mail To:
SCAQMD
P.O. Box 4944
Diamond Bar, CA 91765-0944

Tel: (909) 396-3385
www.aqmd.gov

Section A - Operator Information

Facility Name (Business Name of Operator To Appears On The Permit): AES Huntington Beach, LLC

Valid AQMD Facility ID (Available On Permit Or Invoice Issued By AQMD): 115389

Address where the equipment will be operated (for equipment which will be moved to various location in AQMD's jurisdiction, please list the initial location site): 21730 Newland Street, Huntington Beach, CA 92646

(●) Fixed Location ( ) Various Locations

Section B - Location Data

Plot Plan	Please attach a site map for the project with distances and scales. Identify and locate the proposed equipment on the map. A copy of the appropriate Thomas Brothers page, a web-based map, or a sketch that shows the major streets and location of the equipment is acceptable.
Location of Schools Nearby	**Is the facility located within a 1/4 mile radius (1,320 feet) of the outer boundary of a school?** ( ) Yes (●) No If yes, please provide name(s) of school(s) below: **School Name:** ______ **School Name:** ______ **School Address:** ______ **School Address:** ______ **Distance from stack or equipment vent to the outer boundary of the school:** ______ feet **Distance from stack or equipment vent to the outer boundary of the school:** ______ feet **CA Health & Safety Code 42301.9:** "School" means any public or private school used for the purposes of the education of more than 12 children in kindergarten or any of grades 1 to 12, inclusive, but does not include any private school in which education is primarily conducted in private homes.
Population Density	(●) Urban ( ) Rural (<50% of land within 3 km radius accounted for by urban land use categories, i.e., multi-family dwelling or industrial.)
Zoning Classification	(●) **Mixed Use Residential Commercial Zone (M-U)** ( ) **Service and Professional Zone (C-S)** ( ) **Medium Commercial (C-3)** ( ) **Heavy Commercial (C-4)** ( ) **Commercial Manufacturing (C-M)**

Section C - Emission Release Parameters - Stacks, Vents

Stack Data	**Stack Height:** 80 feet (above ground level) **What is the height of the closest building nearest the stack?** 31 feet **Stack Inside Diameter:** 162 inches **Stack Flow:** 941438 acfm **Stack Temperature:** 997 °F **Rain Cap Present:** ( ) Yes (●) No **Stack Orientation:** (●) Vertical ( ) Horizontal If the stack height is less than 2.5 times the closest building height (H), please provide information on any building within 5xH distance from the stack (attach additional sheet if necessary): **Building #/Name:** See PTA Appendix 5.1C **Building #/Name:** See PTA Appendix 5.1C **Building Height:** ______ feet (above ground level) **Building Height:** ______ feet (above ground level) **Building Width:** ______ feet **Building Width:** ______ feet **Building Length:** ______ feet **Building Length:** ______ feet
Receptor Distance From Equipment Stack or Roof Vents/Openings	**Distance to nearest residence or sensitive receptor*:** 550 feet **Distance to nearest business:** 250 feet
Building Information	**Are the emissions released from vents and/or openings from a building?** ( ) Yes (●) No If yes, please provide: **Building #/Name:** ______ **Building Width:** ______ feet **Building Height:** ______ feet (above ground level) **Building Length:** ______ feet

*AQMD Rule 1470 defines SENSITIVE RECEPTOR as meaning any residence including private homes, condominiums, apartments, and living quarters, schools as defined under paragraph (b)(57), preschools, daycare centers and health facilities such as hospitals or retirement and nursing homes. A sensitive receptor includes long term care hospitals, hospices, prisons, and dormitories or similar live-in housing.

South Coast Air Quality Management District

Form 400-PS

Plot Plan And Stack Information Form

This form must be accompanied by a completed Application for a Permit to Construct/Operate - Form 400A and Form 400-CEQA.

Section D - Authorization/Signature

I hereby certify that all information contained herein and information submittfgfed with this application is true and correct.

Signature of Preparer:	Title of Preparer:	
S O'Kane	Manager	Preparer's Phone #: 5624937840 Preparer's Email: stephen.okane@AES.com

Contact Person:		Date Signed:
Stephen O'Kane	Contact's Phone#: 5624937840	09/04/15
Contact's Email: stephen.okane@AES.com	Contact's Fax#: (562) 493-7320	

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South Coast Air Quality Management District

Form 400-PS

Plot Plan And Stack Information Form

This form must be accepted by a completed Application for a Permit to Construct/Operate - Form 400A and Form 400-CEQA.

South Coast AQMD

Mail To:
SCAQMD
P.O. Box 4944
Diamond Bar, CA 91765-0944

Tel: (909) 396-3385
www.aqmd.gov

Section A - Operator Information

Facility Name (Business Name of Operator To Appears On The Permit): AES Huntington Beach, LLC

Valid AQMD Facility ID (Available On Permit Or Invoice Issued By AQMD): 115389

Address where the equipment will be operated (for equipment which will be moved to various location in AQMD's jurisdiction, please list the initial location site): 21730 Newland Street, Huntington Beach, CA 92646

◉ **Fixed Location** ○ **Various Locations**

Section B - Location Data

Plot Plan	Please attach a site map for the project with distances and scales. Identify and locate the proposed equipment on the map. A copy of the appropriate Thomas Brothers page, a web-based map, or a sketch that shows the major streets and location of the equipment is acceptable.
Location of Schools Nearby	**Is the facility located within a 1/4 mile radius (1,320 feet) of the outer boundary of a school?** ○ Yes ◉ No If yes, please provide name(s) of school(s) below: **School Name:** ____ **School Name:** ____ **School Address:** ____ **School Address:** ____ **Distance from stack or equipment vent to the outer boundary of the school:** ____ feet **Distance from stack or equipment vent to the outer boundary of the school:** ____ feet **CA Health & Safety Code 42301.9:** "School" means any public or private school used for purposes of the education of more than 12 children in kindergarten or any of grades 1 to 12, inclusive, but does not include any private school in which education is primarily conducted in private homes.
Population Density	◉ Urban ○ Rural (<50% of land within 3 km radius accounted for by urban land use categories, i.e., multi-family dwelling or industrial.)
Zoning Classification	◉ **Mixed Use Residential Commercial Zone (M-U)** ○ **Service and Professional Zone (C-S)** ○ **Medium Commercial (C-3)** ○ **Heavy Commercial (C-4)** ○ **Commercial Manufacturing (C-M)**

Section C - Emission Release Parameters - Stacks, Vents

Stack Data	**Stack Height:** 80 feet (above ground level) **What is the height of the closest building nearest the stack?** 31 feet **Stack Inside Diameter:** 162 inches **Stack Flow:** 941438 acfm **Stack Temperature:** 997 °F **Rain Cap Present:** ○ Yes ◉ No **Stack Orientation:** ◉ Vertical ○ Horizontal If the stack height is less than 2.5 times the closest building height (H), please provide information on any building within 5xH distance from the stack (attach additional sheet if necessary): **Building #/Name:** See PTA Appendix 5.1C **Building #/Name:** See PTA Appendix 5.1C **Building Height:** ____ feet (above ground level) **Building Height:** ____ feet (above ground level) **Building Width:** ____ feet **Building Width:** ____ feet **Building Length:** ____ feet **Building Length:** ____ feet
Receptor Distance From Equipment Stack or Roof Vents/Openings	**Distance to nearest residence or sensitive receptor*:** 550 feet **Distance to nearest business:** 250 feet
Building Information	**Are the emissions released from vents and/or openings from a building?** ○ Yes ◉ No If yes, please provide: **Building #/Name:** ____ **Building Width:** ____ feet **Building Height:** ____ feet (above ground level) **Building Length:** ____ feet

*AQMD Rule 1470 defines SENSITIVE RECEPTOR as meaning any residence including private homes, condominiums, apartments, and living quarters, schools as defined under paragraph (b)(57), preschools, daycare centers and health facilities such as hospitals or retirement and nursing homes. A sensitive receptor includes long term care hospitals, hospices, prisons, and dormitories or similar live-in housing.

South Coast Air Quality Management District

Form 400-PS

Plot Plan And Stack Information Form

This form must be accompanied by a completed Application for a Permit to Construct/Operate - Form 400A and Form 400-CEQA.

Section D - Authorization/Signature

I hereby certify that all information contained herein and information submittfgfed with this application is true and correct.

Signature of Preparer:	**Title of Preparer:**	
S O'Kane	Manager	**Preparer's Phone #:** 5624937840 **Preparer's Email:** stephen.okane@AES.com

Contact Person: Stephen O'Kane **Contact's Email:** stephen.okane@AES.com	**Contact's Phone#:** 5624937840 **Contact's Fax#:** (562) 493-7320	**Date Signed:** 09/04/15

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South Coast Air Quality Management District

Form 400-PS

Plot Plan And Stack Information Form

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South Coast AQMD

Mail To:
SCAQMD
P.O. Box 4944
Diamond Bar, CA 91765-0944

Tel: (909) 396-3385
www.aqmd.gov

Section A - Operator Information

Facility Name (Business Name of Operator To Appears On The Permit): AES Huntington Beach, LLC

Valid AQMD Facility ID (Available On Permit Or Invoice Issued By AQMD): 115389

Address where the equipment will be operated (for equipment which will be moved to various location in AQMD's jurisdiction, please list the initial location site): 21730 Newland Street, Huntington Beach, CA 92646

◉ **Fixed Location** ○ **Various Locations**

Section B - Location Data

Plot Plan	Please attach a site map for the project with distances and scales. Identify and locate the proposed equipment on the map. A copy of the appropriate Thomas Brothers page, a web-based map, or a sketch that shows the major streets and location of the equipment is acceptable.
Location of Schools Nearby	**Is the facility located within a 1/4 mile radius (1,320 feet) of the outer boundary of a school?** ○ Yes ◉ No If yes, please provide name(s) of school(s) below: **School Name:** ______ **School Name:** ______ **School Address:** ______ **School Address:** ______ **Distance from stack or equipment vent to the outer boundary of the school:** ______ feet **Distance from stack or equipment vent to the outer boundary of the school:** ______ feet **CA Health & Safety Code 42301.9:** "School" means any public or private school used for purposes of the education of more than 12 children in kindergarten or any of grades 1 to 12, inclusive, but does not include any private school in which education is primarily conducted in private homes.
Population Density	◉ Urban ○ Rural (<50% of land within 3 km radius accounted for by urban land use categories, i.e., multi-family dwelling or industrial.)
Zoning Classification	◉ **Mixed Use Residential Commercial Zone (M-U)** ○ **Service and Professional Zone (C-S)** ○ **Medium Commercial (C-3)** ○ **Heavy Commercial (C-4)** ○ **Commercial Manufacturing (C-M)**

Section C - Emission Release Parameters - Stacks, Vents

Stack Data	**Stack Height:** 80 feet (above ground level) **What is the height of the closest building nearest the stack?** 84 feet **Stack Inside Diameter:** 36 inches **Stack Flow:** 29473 acfm **Stack Temperature:** 318 °F **Rain Cap Present:** ○ Yes ◉ No **Stack Orientation:** ◉ Vertical ○ Horizontal If the stack height is less than 2.5 times the closest building height (H), please provide information on any building within 5xH distance from the stack (attach additional sheet if necessary): **Building #/Name:** See PTA Appendix 5.1C **Building #/Name:** See PTA Appendix 5.1C **Building Height:** ______ feet (above ground level) **Building Height:** ______ feet (above ground level) **Building Width:** ______ feet **Building Width:** ______ feet **Building Length:** ______ feet **Building Length:** ______ feet
Receptor Distance From Equipment Stack or Roof Vents/Openings	**Distance to nearest residence or sensitive receptor*:** 1200 feet **Distance to nearest business:** 970 feet
Building Information	**Are the emissions released from vents and/or openings from a building?** ○ Yes ◉ No If yes, please provide: **Building #/Name:** ______ **Building Width:** ______ feet **Building Height:** ______ feet (above ground level) **Building Length:** ______ feet

*AQMD Rule 1470 defines SENSITIVE RECEPTOR as meaning any residence including private homes, condominiums, apartments, and living quarters, schools as defined under paragraph (b)(57), preschools, daycare centers and health facilities such as hospitals or retirement and nursing homes. A sensitive receptor includes long term care hospitals, hospices, prisons, and dormitories or similar live-in housing.

South Coast Air Quality Management District

Form 400-PS

Plot Plan And Stack Information Form

This form must be accompanied by a completed Application for a Permit to Construct/Operate - Form 400A and Form 400-CEQA.

Section D - Authorization/Signature		
I hereby certify that all information contained herein and information submittfgfed with this application is true and correct.		
Signature of Preparer: SO'Kane	**Title of Preparer:** Manager	**Preparer's Phone #:** 5624937840 **Preparer's Email:** stephen.okane@AES.com
Contact Person: Stephen O'Kane **Contact's Email:** stephen.okane@AES.com	**Contact's Phone#:** 5624937840 **Contact's Fax#:** (562) 493-7320	**Date Signed:** 09/04/15

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Check here if you claim that this form or its attachments contain confidential trade secret information. ☐

South Coast Air Quality Management District

Form 500-A2

Title V Application Certification

Mail To:
SCAQMD
P.O. Box 4944
Diamond Bar, CA 91765-0944

Tel: (909) 396-3385
www.aqmd.gov

Section I - Operator Information

1. Facility Name (Business Name of Operator That Appears On Permit): AES Huntington Beach, LLC

2. Valid AQMD Facility ID (Available On Permit Or Invoice Issued By AQMD): 115389

3. This Certification is submitted with a (Check one):
   a. ◉ Title V Application (Initial, Revision or Renewal)
   b. ○ Supplement/Correction to a Title V Application
   c. ○ MACT Part 1

4. Is Form 500-C2 included with this Certification? ○ Yes ◉ No

Section II - Responsible Official Certification Statement

*Read each statement carefully and check each that applies – **You must check 3a or 3b.***

1. For Initial, Permit Renewal, and Administrative Application Certifications:

   a. ○ The facility, including equipment that are exempt from written permit per Rule 219, is currently operating and will continue to operate in compliance with all applicable requirement(s) identified in Section II and Section III of Form 500-C1,

      i. ☐ except for those requirements that do not specifically pertain to such devices or equipment and that have been identified as "Remove" on Section III of Form 500-C1.

      ii. ☐ except for those devices or equipment that have been identified on the completed and attached Form 500-C2 that will not be operating in compliance with the specified applicable requirement(s).

   b. ◉ The facility, including equipment that are exempt from written permit per Rule 219, will meet in a timely manner, all applicable requirements with future effective dates.

2. For Permit Revision Application Certifications:

   a. ☑ The equipment or devices to which this permit revision applies, will in a timely manner comply with all applicable requirements identified in Section II and Section III of Form 500-C1.

3. For MACT Hammer Certifications:

   a. ○ The facility is subject to Section 112(j) of the Clean Air Act (Subpart B of 40 CFR part 63), also known as the MACT "hammer." The following information is submitted with a Title V application to comply with the Part 1 requirements of Section 112(j).

   b. ◉ The facility is not subject to Section 112(j) of the Clean Air Act (Subpart B of 40 CFR part 63).

Section III - Authorization/Signature

I certify under penalty of law that I am the responsible official for this facility as defined in AQMD Regulation XXX and that based on information and belief formed after reasonable inquiry, the statement and information in this document and in all attached application forms and other materials are true, accurate, and complete.

1. Signature of Responsible Official: S O'Kane	**2. Title of Responsible Official:** Manager
3. Print Name: Stephen O'Kane	**4. Date:** 09/04/15
5. Phone #: 5624937840	**6. Fax #:** (562) 493-7320

7. Address of Responsible Official:

Street #	City	State	Zip
690 N. Studebaker Road	Long Beach	CA	90803

Acid Rain Facilities Only: Please Complete Section IV

Acid Rain facilities must certify their compliance status of the devices subject to applicable requirements under Title IV by an individual who meets the definition of Designated (or Alternate) Representative in 40 CFR Part 72.

Section IV - Designated Representative Certification Statement	
***For Acid Rain Facilities Only*: I am authorized to make this submission on behalf of the owners and operators of the affected source or affected units for which the submission is made. I certify under penalty of law that I have personally examined, and am familiar with, the statements and information submitted in this document and all its attachments. Based on my inquiry of those individuals with primary responsibility for obtaining the information, I certify that the statements and information are to the best of my knowledge and belief true, accurate, and complete. I am aware that there are significant penalties for submitting false statements and information or omitting required statements and information, including the possibility of fine or imprisonment.**	
1. Signature of Designated Representative or Alternate: SO'Kane	**2. Title of Designated Representative or Alternate:** Manager
3. Print Name of Designated Representative or Alternate: Stephen O'Kane	**4. Date:** 09/04/15
5. Phone #: 5624937840	**6. Fax #:** (562) 793-7320
7. Address of Designated Representative or Alternate: 690 N. Studebaker Road (Street #), Long Beach (City), CA (State), 90803 (Zip)	

South Coast Air Quality Management District

Form 500-B

Title V List of Exempt Equipment

South Coast AQMD

Mail To:
SCAQMD
P.O. Box 4944
Diamond Bar, CA 91765-0944

Tel: (909) 396-3385
www.aqmd.gov

Use this form for all application submittals requesting an initial Title V permit or permit renewal. If you are applying for a permit revision, you may also use this form to have your exempt equipment listing updated prior to renewing your permit.

This form is designed to summarize all of the equipment at a facility that is exempt per SCAQMD Rule 219 from SCAQMD permit requirements (e.g., I.C. Engines ≤ 50 BHP, Boilers < 2 MM BTU/hr etc.). This equipment can be listed according to category. However, if there is a specific device that is vented to control equipment, then the equipment must be listed separately. Trivial activities listed on the back of this form or the Technical Guidance Document do not have to be listed on this form. Note: If your facility is in the RECLAIM program, it is not necessary to repeat any equipment currently listed in Appendix A of the RECLAIM permit.

Section I - Operator Information

1. Facility Name (Business Name of Operator That Appears On Permit): AES Huntington Beach, LLC

2. Valid AQMD Facility ID (Available On Permit Or Invoice Issued By AQMD): 115389

3. Check box if facility is in RECLAIM program: ☒

4. Provide Current Permit Issue Date: 05/04/2011 **5. Permit Revision No.:** 30

Section II - Summary of Equipment Exempt from Permit Requirements (Including Portable)

Exempt Equipment Description [e.g., Small Boilers (75,000 BTU/hr-2,000,000 BTU/hr)]	Venting to Control (Device# or Application#)	Control Device Description	Basis for Exemption [e.g., Rule 219 (b)(2), 05/19/00]	Source Specific Rule [e.g., Rule 1146.2]

Trivial Activities	
• Combustion emissions from propulsion of mobile sources, except for vessel emissions from Outer Continental Shelf sources • Air-conditioning units used for human comfort that do not have applicable requirements under Title VI of the Act • Ventilating units used for human comfort that do not exhaust air pollutants into the ambient air from any manufacturing/industrial or commercial process • Non-commercial food preparation • Consumer use of office equipment and products, not including printers or businesses primarily involved in photographic reproduction • Janitorial services and consumer use of janitorial products • Internal combustion engines used for landscaping purposes • Laundry activities, except for dry-cleaning and steam boilers • Bathroom/toilet vent emissions • Emergency (backup) electrical generators at residential locations • Tobacco smoking rooms and areas • Blacksmith forges • Plant maintenance and upkeep activities (e.g., grounds-keeping, general repairs, cleaning, painting, welding, plumbing, re-tarring roofs, installing insulation, and paving parking lots) provided these activities are not conducted as part of a manufacturing process, are not related to the source's primary business activity, and not otherwise triggering a permit modification[1] • Repair or maintenance shop activities not related to the source's primary business activity, not including emissions from surface coating or de-greasing (solvent metal cleaning) activities, and not otherwise triggering a permit modification • Portable electrical generators that can be moved by hand from one location to another[2] • Hand-held equipment for buffing, polishing, cutting, drilling, sawing, grinding, turning or machining wood, metal or plastic • Brazing, soldering and welding equipment, and cutting torches related to manufacturing and construction activities that do not result in emission of HAP metals[3] • Bench-scale laboratory equipment used for physical or chemical analysis, but not lab fume hoods or vents[4] • Routine calibration and maintenance of laboratory equipment or other analytical instruments • Equipment used for quality control/assurance or inspection purposes, including sampling equipment used to withdraw materials for analysis • Hydraulic and hydrostatic testing equipment • Environmental chambers not using hazardous air pollutant (HAP) gasses • Shock chambers • Humidity chambers • Solar simulators	• Fugitive emission related to movement of passenger vehicles, provided any required fugitive dust control plan or its equivalent is submitted • Process water filtration systems and demineralizers • Demineralized water tanks and demineralizer vents Air compressors and pneumatically operated equipment, including hand tools • Batteries and battery charging stations, except at battery manufacturing plants • Storage tanks, vessels and containers holding or storing liquid substances that will not emit any VOC or HAP[5] • Storage tanks, reservoirs, and pumping and handling equipment of any size containing soaps, vegetable oil, grease, animal fat and nonvolatile aqueous salt solutions, provided appropriate lids and covers are utilized • Equipment used to mix and package soaps, vegetable oil, grease, animal fat, and nonvolatile aqueous salt solutions, provided appropriate lids and covers are utilized • Drop hammers or hydraulic presses for forging or metalworking • Equipment used exclusively to slaughter animals, but not including other equipment at slaughterhouses, such as rendering cookers, boilers, heating plants, incinerators, and electrical power generating equipment • Vents from continuous emissions monitors and other analyzers • Natural gas pressure regulator vents, excluding venting at oil and gas production facilities • Hand-held applicator equipment for hot melt adhesives with no VOC in the adhesive formulation • Equipment used for surface coating, painting, dipping or spraying operations, except those that will emit VOC or HAP • CO_2 lasers, used only on metals and other materials which do not emit HAP in the process • Consumer use of paper trimmers/binders • Electric or steam-heated drying ovens and autoclaves, but not the emissions from the articles or substance being processed in the ovens or autoclaves or the boilers delivering the steam • Salt baths using nonvolatile salts that do not result in emissions of any regulated air pollutants • Laser trimmers using dust collection to prevent fugitive emissions • Boiler water treatment operations, not including cooling towers • Oxygen scavenging (de-aeration) of water • Ozone generators • Fire suppression systems • Emergency road flares • Steam vents and safety relief valves • Steam leaks • Steam cleaning operations • Steam sterilizers

[1] Cleaning and painting activities qualify as trivial if they are not subject to VOC or HAP control requirements. Asphalt batch plant owners/operators must still get a permit if otherwise required.

[2] "Moved by hand" means it can be moved without the assistance of any motorized or non-motorized vehicle, conveyance or device.

[3] Brazing, soldering and welding equipment, and cutting torches related to manufacturing and construction activities that emit HAP metals are more appropriate for treatment as unpermitted equipment. Brazing, soldering, welding and cutting torches directly related to plant maintenance and upkeep and repair or maintenance shop activities that emit HAP metals are treated as trivial and listed separately in this appendix.

[4] Many lab fume hoods or vents might qualify for treatment as unpermitted equipment.

[5] Exemptions for storage tanks containing petroleum liquids or other volatile organic liquids should be based on size limits such as storage tank capacity and vapor pressure of liquids stored and are not appropriate for this list.

South Coast Air Quality Management District

Form 500-F1 (Title V)

Title IV - Acid Rain Phase II Facility Information Summary

Mail To:
SCAQMD
P.O. Box 4944
Diamond Bar, CA 91765-0944
Tel: (909) 396-3385
www.aqmd.gov

This form shall be completed by Acid Rain facilities ONLY and shall accompany all requests for Phase II permit actions unique to Acid Rain facilities. Also attach a completed Form 500-A2. In addition, if an initial Title V permit, permit renewal, or permit revision is requested, attach Form 500-A1 and any supplemental Acid Rain forms (Forms 500-F2, 500-F3, and 500-F4), as appropriate.

Section I - General Information

1. Facility Name (Business Name of Operator That Appears On Permit): AES Huntington Beach, LLC

2. Valid AQMD Facility ID (Available On Permit Or Invoice Issued By AQMD): 115389

3. ORIS Code (5-Digit): ______

4. This is an application for a (Check all that apply to the facility):

a. ☑ Phase II Acid Rain Permit or Revision (Complete Section II of this form)

b. ☐ Repowering Extension Plan or Revision (Complete Form 500-F2)

c. ☐ New Unit Exemption or Revision (Complete Form 500-F3)

d. ☐ Retired Unit Exemption or Revision (Complete Form 500-F4)

5. The requested permit action involves a(n) (Check one):

a. ○ Administrative Permit Revision

b. ◉ Significant Permit Revision

c. ○ Fast Track Permit Revision

d. ○ Automatic Permit Revision

e. ○ Other (specify): ______

6. For all applications requesting a permit revision, provide a general description of the proposed changes (Attach additional sheets as necessary):

Section II - Phase II Acid Rain Device Summary

1. The following information is (Check one): **a.** ○ X New **b.** ○ Revised

AQMD Device #	EPA Unit #	Will device need a Repowering Extension Plan?	Has device started operations on or after 11/15/90?	Device Operations Start Date (mo/day/yr)	For devices starting-up after 11/15/90, provide date when Monitoring Certification will begin (mo/day/yr)
TBD	TBD	○ Yes ○ No	○ Yes ○ No		
		○ Yes ○ No	○ Yes ○ No		
		○ Yes ○ No	○ Yes ○ No		
		○ Yes ○ No	○ Yes ○ No		
		○ Yes ○ No	○ Yes ○ No		

To complete this application, type or print the information in the appropriate blanks.

Section I - General Information

1. **Facility Name:** Provide the name of the legal entity that operates the facility.

   AQMD Facility ID: Complete only if the facility has been issued a 6-digit identification or ID number by AQMD. If not, leave these boxes blank. An ID number will be assigned when the application is submitted.

   ORIS Code: Provide the 5-digit code that has been assigned to facility by Department of Energy.

2. Check all applicable boxes to indicate the type of Acid Rain application filed. If box 1a. is checked, complete Section II of this form. If box 1b. is checked, complete and attach Form 500-F2 - Title IV Phase II Acid Rain Repowering Extension Plan. If box 1c. is checked, complete and attach Form 500-F3 - Title IV Phase II Acid Rain New Unit Exemption Request. If box 1d. is checked, complete and attach Form 500-F4 - Title IV Phase II Acid Rain Retired Unit Exemption Request.

3. Check one box that best represents the type of permit action requested. If box 1e. is checked, in the space provided identify any additional elements regarding the application or the facility that need to be considered during the processing of this application (i.e., Initial Title V Permit Application).

4. If the application is a revision request, describe in general terms the changes that are proposed in the application revision request. Attach additional sheets as necessary.

Section II - Phase II Acid Rain Device Summary

1. Before completing this section, check one box to indicate whether this is a new application or a revision.

AQMD Device #:	Provide the identification number for each AQMD-assigned device subject to Phase II requirements.
EPA Unit #:	Provide the identification number for each EPA-assigned device subject to Phase II requirements.
Will device need a Repowering Extension Plan?:	Indicate with a "yes" or "no" if the device is or will be participating under a Repowering Extension Plan.
Has device started operations on or after 11/15/90?:	Indicate with a "yes" or "no" if the device was source tested or started operating on or after November 15, 1990.
Device Operations Start Date:	Complete this column <u>only</u> if the device was source tested or started operating on or after November 15, 1990. Provide the date (mo/day/yr) when the device started or will start operating. Note: If the date of beginning operations changes, an administrative permit revision application will be required.
For Devices starting-up after 11/15/90, provide date when Monitoring Certification will begin:	Complete this column <u>only</u> if the device was source tested or started operating on or after November 15, 1990. Provide the date (mo/day/yr) when compliance with the monitoring procedures for the device will begin. Refer to 40 CFR Part 75.4 to determine this date. Note: If the monitoring certification date changes, an administrative permit revision application will be required.

South Coast Air Quality Management District

Form 500-H

Title V - Compliance Assurance Monitoring (CAM) Applicability Determination for Initial, Renewal, & Significant Permit Revision

Mail To:
SCAQMD
P.O. Box 4944
Diamond Bar, CA 91765-0944

Tel: (909) 396-3385
www.aqmd.gov

This form is required as part of an initial, significant permit revision, or renewal Title V application. If your Title V facility has control devices in use, the CAM rule may apply.
Follow the instructions on the reverse side of this form to determine whether your facility is subject to CAM requirements.

Section I - Operator Information

1. Facility Name (Business Name of Operator That Appears On Permit): AES Huntington Beach, LLC

2. Valid AQMD Facility ID (Available On Permit Or Invoice Issued By AQMD): 115389

Section II - CAM Status Summary for Emission Units

3. Based on the criteria in the instructions (check one and attach additional pages as necessary):

a. ☐ The emission units identified below are subject to the CAM rule[1] and a CAM plan[2] is attached for each affected emissions unit:

b. ☑ There are no emission units with control devices at this Title V facility that are subject to the CAM rule.

Emission Unit[3] (Application, Permit or Device No.)	Equipment Description[4]	Uncontrolled Emissions		Connected to Control Unit[3] (Application, Permit or Device No.)	Equipment Description[4]	Controlled Emissions	
		Pollutant	PTE[5] (tons/year)			Pollutant	PTE[5] (tons/year)

1 For more detailed information regarding the CAM rule applicability, refer to Title 40, Chapter I, Part 64, Section 64.1 of the Code of Federal Regulations (40 CFR Part 64, Section 64.1). This also can be accessed via the internet at: http://www.access.gpo.gov/nara/cfr/waisidx_99/40cfr64_99.html.

2 Only one CAM plan is required for a control device that is common to more than one emissions unit, or if an emissions unit is controlled by more than one control device similar in design and operation. If the control devices are not similar in design and operation, one plan is required for each control device.

3 List all new and existing emission units and the connected control devices either by AQMD application, permit or device number. When the emission unit is new and has not yet been assigned an application number, leave this column blank.

4 Provide a brief equipment description of the emission units and control devices by indicating equipment type, make, and model and serial numbers as appropriate.

5 Potential to Emit

Instructions for Determining Applicability to the CAM Rule

With the exception of emission units that are municipally-owned backup utility power units as described by 40 CFR Part 64, Section 64.2(b)(2)[1], the CAM rule is applicable to each emission unit (existing and new construction) at a Title V facility that meets ALL of the following criteria[2]:

1. The emission unit is subject to an emission limitation or standard[3] (often found in permit conditions);
2. The emission unit uses a control device to achieve compliance with the emission limitation or standard; and,
3. The emission unit has a potential to emit (PTE)[4], either pre-control or post-control depending on the type of Title V application[5], that exceeds or is equivalent to any of Title V major source thresholds shown in the following table:

CAM Potential to Emit (PTE) Emission Threshold[6] For Individual Emission Units at a Title V Facility (tons per year)			
Pollutant	South Coast Air Basin (SOCAB)	Riverside County Portion of Salton Sea Air Basin (SSAB) and Los Angeles County Portion of Mojave Desert Air Basin (MDAB)	Riverside County Portion of Mojave Desert Air Basin (MDAB)
VOC	10	25	100
NOx	10	25	100
SOx	100	100	100
CO	50	100	100
PM-10	70	70	100
1 HAP[7]	10	10	10
2+ HAPs	25	25	25

1 The facility must attach the documentation required by 40 CFR Part 64, Section 64.2 (b)(2) to demonstrate that the backup utility power unit only operates during periods of peak demand or emergency situations; and has actual emissions, averaged over the last three calendar years of operation, less than 50% of the major source emission thresholds.

2 Additional information about the CAM rule can be found on EPA's website at http://www.epa.gov/ttnemc01/cam.html.

3 Only emission limitations and standards from an "applicable requirement" for emission units with control devices are subject to the CAM rule. Applicable requirements are federally-enforceable requirements that are rules adopted by AQMD or the State that are approved by EPA into the State Implementation Plan (SIP) (i.e. "SIP-approved rules"). Refer to Form 500-C1 for the latest versions of SIP-approved and non-SIP approved rules.

For emissions units with control devices that are subject to following federally enforceable requirements, the CAM rule does NOT apply: 1) NSPS (40 CFR Part 60); 2) NESHAP (40 CFR Parts 61 and 63); 3) Title VI of the Federal Clean Air Act (CAA) for Stratospheric Ozone Protection; 4) Title IV of the CAA and SCAQMD Regulation XXXI for Acid Rain facilities; 5) SCAQMD Regulation XX – RECLAIM; 6) Any emission cap that is federally enforceable, quantifiable, and meets the requirements in 40 CFR Part 70, Section 70.4 (b)(12); and 6) Emission limitation or standards for which a continuous compliance determination method is required.

4 To calculate the pre-control device and post-control device PTE for emission units at the facility, refer to the Title V Technical Guidance Document Version 4 .0, Appendix A (pages A-12 through A-23). The calculations are used to determine the CAM applicability according to 40 CFR Part 64, Section 64.5 of the CAM rule.

5 For initial Title V or significant permit revision applications submitted after April 20, 1998, use the post-control device PTE emissions to determine CAM applicability. For Title V permit renewal applications (submittals will begin in 2002), the CAM applicability will be based on the pre-control device PTE.

6 The following table is based on Rule 3001 (Amended November 14, 1997) and Rule 3008 (Amended March 16, 2001). Please be advised that the threshold values are subject to change based on rule amendments.

7 Hazardous Air Pollutant

Fee Calculation

Below are the permit fees we have calculated based on the information you have entered. To complete the permit process, please click the print button to print the Fee Sheet and submit a signed check for the Total amount due along with your application package.

Thank you for using AQMD's online Fee Calculator!

Fee Sheet

RESTART PRINT

Facility Information EDIT

Name:	AES Huntington Beach, LLC	ID: 115389
Address:	21730 Newland Street Huntington Beach, CA 92646	
Operation Type:		Non-Manufacturing Facility
Number of Employees:		N/A
Annual Revenue:		$ N/A
Prior Permit?:		Yes

Add Applications ADD

Permit Unit	
Gas Turbine, 50 MW, other fuel	$18,050.38
Gas Turbine, 50 MW, other fuel (3 Identical)	$27,075.57
Expedited Processing Fee	$22,562.99
Permit Unit	
Selective Catalytic Reduction (SCR)	$3,835.06
Selective Catalytic Reduction (SCR) (3 Identical)	$5,752.59
Expedited Processing Fee	$4,793.84
Permit Unit	
Storage Tank, Other	$1,521.32
Storage Tank, Other (1 Identical)	$760.66
Expedited Processing Fee	$1,140.99
Permit Unit	
Oil/Water Separator (>= 10,000 GPD)	$3,835.06
Oil/Water Separator (>= 10,000 GPD) (1 Identical)	$1,917.53

Expedited Processing Fee	$2,876.30
Permit Unit	
Boiler, Other Fuel (> 50 MMBTU/hr)	$6,085.38
Expedited Processing Fee	$3,042.69
Facility Permit Revision Fee	
Administrative Permit Revision Fee	$1,994.55
Summary of Subtotals	
Permit Fees	$68,833.55
Expedited Processing Fees	$34,416.81
Higher Fees	$0.00
Small Business Discount	$0.00

Fees are calculated based on current fiscal year (July 1st - June 30th).
Fee calculation date: August 25, 2015.

Grand Total: **$105,244.91**

BACK PRINT

NE NOOTER/ERIKSEN

June 5, 2015

TO: **Burns & McDonnell**
9400 Ward Parkway
Kansas City, MO 64114

Attention: **Mr. Justin Schnegelberger**

SUBJECT: **AES Southland – Emissions Guarantee**

Dear Sir,

Nooter/Eriksen is pleased to provide the following HRSG stack emissions guarantees to support the facility air permit application process. This will serve to document the stack guarantee values, the applicable ranges and operating conditions, and the basis for the guarantees.

Please do not hesitate to contact us with any questions or concerns.

NOOTER/ERIKSEN, INC.

Julie Lux

Name: Julie Lux

Title: Regional Sales Manager

Cc: Hallie Shin- N/E
Steve Meierotto- N/E
Mark French- N/E
Steve Furman- N/E
Todd Sundbom- BMcD
Bradley Deer- BMcD
Jeff Yakle- BMcD

Emissions Guarantees

1.1 SCR System

The SCR vendor guarantees the following emission levels at the HRSG outlet:

The SCR Catalyst System will reduce the NOx content of the exhaust gas to a maximum of 2.0 ppmvd at 15% O2 at the HRSG stack for Natural Gas operation, at the SCR design conditions specified in section 1.6 Stack Emissions of the specification 74473.HB.5.1215 AES Southland.

NH3 concentration at stack sampling ports shall not exceed 5.0 ppmvd @ 15% O2.

The SCR catalyst guarantee life is the earlier of 36 months from first gas in or 39 months from contracted delivery.

1.2 CO System

The CO vendor guarantees the following emission levels at the HRSG outlet:

The CO catalyst system will oxidize the CO content of the exhaust gas to a maximum of 2.0 ppmvd at 15% O2 at the HRSG stack for the design conditions specified in 74473.HB.5.1215 AES Southland.

The CO catalyst system will oxidize the VOC content of the exhaust gas to a maximum of 1.0 ppmvd at 15% O2 at the HRSG stack for the design conditions specified in 74473.HB.5.1215 AES Southland.

The CO catalyst guarantee life is the earlier of 36 months from first gas in or 39 months from contracted delivery.

1.3 Stack Particulate Guarantee

The HRSG will limit the contribution of PM-10 (total) emissions of the exhaust gas to a maximum of 10.2 lb/hr at the HRSG stack for the design conditions specified in 74473.HB.5.1215 AES Southland.

1.4 Basis of Emissions Guarantee

1.4.1 The emissions guarantees are met for the combustion turbine conditions as defined in Heat Balance file provided with the following GT emissions:

Gas Turbine Emissions		
NOx @ 15% O2	ppmvd	9.0
CO @ 15% O2	ppmvd	9.0
VOC @ 15% O2	ppmvd	1.2
PM 10 (total)	lb/hr	6.7
PM 2.5 (total)	lb/hr	6.7
Note: It is assumed that PM2.5 (total) and PM10 are mutually exclusive and not additive.		

1.4.2 If the PM 10 (total) emissions are not met it is the client/owner's responsibility to prove the GT emissions contributions are correct.

1.4.3 All emission level guarantees are at steady state operation.

1.4.4 The SCR catalyst design assumes the NO2 content of the total combustion turbine outlet NOX does not exceed 20%.

1.4.5 Emissions testing will be in accordance with a mutually agreed test procedure that is in general accordance with standard EPA test methods.

1.4.6 Any emissions measurement uncertainty will be to the Customer's account.

1.4.7 VOC's are defined as non-methane, non-ethane unburned hydrocarbons and are assumed to be less than 50% saturated.

1.4.8 Total Sulfur Maximum provided in the fuel flow is 0.25 grains/100 SCF.

1.4.9 Fuel flow estimate for particulate guarantee is based on the provided Total CTG Heat Input (LHV) on a per case basis and a fuel LHV of 19,715 Btu/lb.

1.4.10 PM10 emissions shall be the sum of non-condensable emissions determined using Method 201 or 201A and condensable emissions determined using Method 202

1.4.11 These guarantees are provided on a no-harm, no-foul basis. If the air permit requirements are met, then N/E's guarantees will be deemed to have been met.

1.4.12 N/E is not subject to any delay damages for failure to meet these guarantees.

GUARANTEE
PROJECT: AES SOUTHLAND
LOCATION: USA

KW AT GEN TERMS	99016
BTU/KW-HR, LHV	8196

Christopher H. Vu
Vu, Christopher
Performance Engineer
Date: 06/16/2015

Start Up Time to Base Load, 10 Minutes
(See conditions for 10-minute start)

EMISSIONS GUARANTEED W/ GE SUPPLIED SCR AND COR
EMISSIONS ARE VALID FOR T2 WITHIN 20F-110F AND A GTG LOAD DOWN TO 50% AS DEFINED IN STEADY STATE CONDITIONS FOR EMISSIONS GUARANTEE.

NOX: 2.5 PPMVD AT 15% O2
(5 mg/Nm3)
CO: 4.0 PPMVD AT 15% O2
(5 mg/Nm3)
VOC: 2 PPMVD AT 15% O2
(1 mg/Nm3)
NH3: 5.0 PPMVD AT 15% O2

EMISSIONS GUARANTEED W/ GE SUPPLIED SCR/CO CATALYST
EMISSIONS ARE VALID FOR T2 WITHIN 20F-110F AND A GTG LOAD DOWN TO 50% AS DEFINED IN STEADY STATE CONDITIONS AND PER THE CONDITIONS FOR A PM10 EMISSIONS GUARANTEE.

PM10: 5.0 LB/HR

NOT VALID WITHOUT SIGNATURE

VALID UNTIL 09/16/2015

BASIS OF GUARANTEE:	BASE LOAD, GAS FUEL NOZZLE SYSTEM
	NO BLEED OR EXTRACTED POWER
ENGINE:	(1) GE LMS100PB DRY FIN FAN COOLING DLE GAS TURBINE
FUEL:	20,674 Btu/lb LHV, GAS FUEL (#900-4519)
FUEL SPEC:	MID-TD-0000-1 LATEST REVISION
FUEL TEMP:	SITE FUEL TEMPERATURE OF 76.9°F
FUEL PRESS:	900 PSIG
GENERATOR:	BDAX 82-445ER
GENERATOR OUTPUT	13.8kV, 60 Hz
POWER FACTOR:	0.9
AMBIENT TEMP:	65.8°F
AMBIENT RH:	58.3%
INLET CONDITIONING:	NONE
ALTITUDE:	14.0 feet
INLET FILTER LOSS:	5.00 inH_2O
EXHAUST LOSS:	10.00 inH_2O
NOX CONTROL:	DLE
INTERCOOLER:	COOLING WATER SUPPLY TEMP AT 80°F / 100% WATER
ENGINE CONDITION:	NEW AND CLEAN ≤ 200 SITE FIRED HOURS
FIELD TEST METHODS	
PERFORMANCE:	GE POWER & WATER SGTGPTM
NOX:	EPA METHOD 20
CO:	EPA METHOD 10
VOC:	EPA METHOD 25A/18
PM10:	EPA METHOD 5 / 202
NH3:	EPA METHOD CTM 027

BASIS OF GUARANTEE IS NOT FOR DESIGN, REFER TO PROJECT DRAWINGS FOR DESIGN REQUIREMENTS.
SI VALUES ARE FOR REFERENCE PURPOSES ONLY.

THIS GUARANTEE SUPERSEDES ANY PREVIOUS GUARANTEES PRESENTED

GUARANTEE
PROJECT: AES SOUTHLAND
LOCATION: USA

Vu, Christopher
Performance Engineer
Date: 06/16/2015

NEAR FIELD NOISE:
85 DB(A) ARITHMETIC AVERAGE SOUND PRESSURE LEVEL (dB REF 20 MICROPASCALS, RMS) OF LOCATIONS AROUND THE PACKAGE (VERTICAL DISTANCE OF 5FT. (1.5M) ABOVE PACKAGE BASE AT A HORIZONTAL DISTANCE OF 3FT. (1M) FROM THE EXTERIOR PLANE OF EQUIPMENT AS TESTED IN A FREE-FIELD CONDITION OVER A HARD REFLECTING GROUND PLANE, OPERATING AT BASE LOAD)

NOT VALID WITHOUT SIGNATURE VALID UNTIL 09/16/2015

BASIS OF GUARANTEE:	BASE LOAD, GAS FUEL NOZZLE SYSTEM NO BLEED OR EXTRACTED POWER
ENGINE:	(1) GE LMS100PB DRY FIN FAN COOLING DLE GAS TURBINE
FUEL:	20,674 Btu/lb LHV, GAS FUEL (#900-4519)
FUEL SPEC:	MID-TD-0000-1 LATEST REVISION
FUEL TEMP:	SITE FUEL TEMPERATURE OF 76.9°F
FUEL PRESS:	900 PSIG
GENERATOR:	BDAX 82-445ER
GENERATOR OUTPUT	13.8kV, 60 Hz
POWER FACTOR:	0.9
AMBIENT TEMP:	65.8°F
AMBIENT RH:	58.3%
INLET CONDITIONING:	NONE
ALTITUDE:	14.0 feet
INLET FILTER LOSS:	5.00 inH_2O
EXHAUST LOSS:	10.00 inH_2O
NOX CONTROL:	DLE
INTERCOOLER:	COOLING WATER SUPPLY TEMP AT 80°F / 100% WATER
ENGINE CONDITION:	NEW AND CLEAN ≤ 200 SITE FIRED HOURS
NEAR FIELD NOISE:	GE POWER & WATER SGTGPTM EPA METHOD 20 EPA METHOD 10 EPA METHOD 25A/18 EPA METHOD 5 / 202 EPA METHOD CTM 027

BASIS OF GUARANTEE IS NOT FOR DESIGN, REFER TO PROJECT DRAWINGS FOR DESIGN REQUIREMENTS.
SI VALUES ARE FOR REFERENCE PURPOSES ONLY.

THIS GUARANTEE SUPERSEDES ANY PREVIOUS GUARANTEES PRESENTED

Estimated Average Engine Performance NOT FOR GUARANTEE, REFER TO PROJECT F&ID FOR DESIGN
Predicted Intercooler Performance not to be utilized for Balance of Plant design. Please contact GE.

GE Power & Water

Performance By: **Vu, Christopher**
Project Info: **AES Southland**

Engine: **LMS100 PB DLE**
Deck Info: **G0179E - 8jy.scp**
Generator: **BDAX 82-445ER 60Hz, 13.8kV, 0.9PF (EffCurve#: 32398; CapCurve#: 32396)**
Fuel: **Site Gas Fuel#900-4519, 20674 Btu/lb,LHV**

Date: **6/16/2015**
Time: **2:33:25 PM**
Version: **4.0.1**

Case #	**100**
Ambient Conditions	
Dry Bulb, °F	65.8
Wet Bulb, °F	57.0
RH, %	58.3
Altitude, ft	14.0
Ambient Pressure, psia	14.689
Engine Inlet	
Comp Inlet Temp, °F	65.8
RH, %	58.3
Conditioning	NONE
Tons(Chilling) or kBtu/hr(Heating)	0
Pressure Losses	
Inlet Loss, inH2O	5.00
Exhaust Loss, inH2O	10.00
Partload %	**100**
kW, Gen Terms	**98827**
Est. Btu/kW-hr, LHV	**7955**
Guar. Btu/kW-hr, LHV	**8196**
Fuel Flow	
MMBtu/hr, LHV	786.2
lb/hr	38026
NOx Control	**DLE**
Intercooler	**Dry Fin Fan Cooling**
Humidification	OFF
IC Heat Extraction, btu/s	30216
Exhaust Parameters	
Temperature, °F	797.7
lb/sec	478.8
lb/hr	1723559

Emissions (ESTIMATED, NOT FOR GUARANTEE)

NOx ppmvd Ref 15% O2	25
NOx as NO2, lb/hr	79

Exh Wght % Wet (NOT FOR USE IN ENVIRONMENTAL PERMITS)

AR	1.2498
N2	73.3042
O2	14.0480
CO2	5.8982
H20	5.4689
SO2	0.0000
CO	0.0208
HC	0.0069
NOX	0.0032

Exh Mole % Dry (NOT FOR USE IN ENVIRONMENTAL PERMITS)

AR	0.9709
N2	81.2057
O2	13.6247
CO2	4.1592
H20	0.0000
SO2	0.0000
CO	0.0230
HC	0.0134
NOX	0.0031

Exh Mole % Wet (NOT FOR USE IN ENVIRONMENTAL PERMITS)

AR	0.8873
N2	74.2140
O2	12.4516
CO2	3.8011
H20	8.6099
SO2	0.0000
CO	0.0211
HC	0.0123
NOX	0.0028

Aero Energy Fuel Number	**900-4519 (AES Southland LMS100PB (New Fuel))**	
	Volume %	**Weight %**
Hydrogen	0.0000	0.0000
Methane	95.8300	91.6635
Ethane	2.4400	4.3745
Ethylene	0.0000	0.0000
Propane	0.0300	0.0789
Propylene	0.0000	0.0000
Butane	0.0300	0.1040
Butylene	0.0000	0.0000
Butadiene	0.0000	0.0000
Pentane	0.0100	0.0430
Cyclopentane	0.0000	0.0000
Hexane	0.0000	0.0000
Heptane	0.0000	0.0000
Carbon Monoxide	0.0000	0.0000
Carbon Dioxide	1.0100	2.6504
Nitrogen	0.6500	1.0857
Water Vapor	0.0000	0.0000
Oxygen	0.0000	0.0000
Hydrogen Sulfide	0.0000	0.0000
Ammonia	0.0000	0.0000

Btu/lb, LHV	20674
Btu/scf, LHV	916.0
Btu/scf, HHV	1015.7
Btu/lb, HHV	22923
Fuel Temp, °F	76.9
NOx Scalar	0.984
Specific Gravity	0.58
Wobbe	51.973

GE POWER & WATER

Conditions for Near-field Noise Guarantee

1. Based on arithmetic average of sound pressure levels at locations around the package.
2. The following areas are excluded from the noise measurements: between (a) VBV valves and silencer, and the main unit; (b) intercooler heat exchanger and the main unit, which includes intercooler ducting and water pump skid.
3. BRUSH 82-445 Generator must be enclosed with a full-weather enclosure, or it must be supplied with the Brush low-noise option.
4. Gas Filter (Coalescer) / Metering Skid must be at least 25-ft away from the main unit and other ancillary skids.
5. Generator/Clutch Lube Oil Skid must be enclosed.
6. Other Ancillary skids must be at least 10-ft away from any fin-fan lube oil cooler, measuring nearest edge-to-edge.
7. Fin Fan Coolers must be located at least 75-ft away from the main unit and ancillary skids of the package, measuring nearest edge-to-edge.
8. Per unit basis.
9. Baseload operation only .
10. GE Power & Water GTG package scope of supply only, customer supplied equipment is not included.
11. GE Power & Water GTG package scope of supply only, GE Power & Water supplied BOP equipment is not included.
12. If GE Power & Water supplies BOP equipment, then GE Power & Water is to advise best location.

Steady State Conditions for Emissions Guarantee

1.	Power Output (electrical)	±10.0% / Min
2.	T2 Compressor Inlet air temperature	± 2.5°F / 5.0 Min
3.	Heat Value - gaseous fuel per unit volume	±0.25% / Min
4.	Pressure - gaseous fuel as supplied to engine	± 10 PSIG / 5.0 Min

*Conditions for 10-minute Start Up Guarantee

1. The engine/stack purge times in the 10-minute start apply to exhaust systems that terminate with a (SCR) Selective Catalytic Reduction Unit that is purged by a forced air purging system or has been pre-purged in accordance to NFPA and GE position papers pp#19-LMS100 Turbine Purge Requirements and pp# 22 LMS100 10-minute start.
2. If SCR is not purged per item 1 above, then proper purging of SCR will be required prior to the beginning of Startup Test. **SCR purge time is to be excluded from 10-minute Start.**
3. 10-Minute Start is for Simple Cycle Operation only.
4. Lube oil heaters and heat tracing are required to be energized during offline periods
5. Intercooler water flow initiation requires 45 seconds. The turbine warm up cycle is controlling when they occur together.
6. Lube oil initiation and pressure checks performed during enclosure purge cycle
7. Start sequence is for 60 or 50 Hz applications.
8. Per unit basis.
9. Emission guarantees are not in effect during Startup.
10. Valid over ambient temperature range of 30°F to 90°F . However, the unit must be out of an icing condition as defined by PP17 before ramping to full load. This "warm up period" is to be excluded from the 10-minute start.

GE POWER & WATER

Conditions for PM10 Emissions Guarantee

PM10 emissions include filterable (front half) and condensable (back half) emissions. The following additional criteria and precautions are required for this particulate emissions guarantee level:

1. Fuel must meet GE specification MID-TD-000-01 and satisfy "pipeline quality natural gas" requirements as defined by EPA 40CFR72.2 with the added requirement that the total sulfur must be below 0.75 grains / 100 scf.
2. The timing of test to should not occur when ambient particulate levels are higher than normal. A site particulate evaluation and conditions at the stack must be reported, including any activities in the surrounding area that might impact PM levels (e.g. high winds, high pollen count, wildfires, road grading, etc.). Any unusual conditions may require postponement, additional test runs, or an allowance for background PM.
3. Gas turbine must run for a minimum of 300 total fired hours prior to particulate testing.
4. Gas turbine must be operating for a minimum of 2 hours at base load prior to initiating the test.
5. Gas turbine inlet, exhaust, and emissions catalyst system (if applicable) must be free of any dirt, sand, mud, rust, oil, or other contaminates.
6. Multiple re-testing must be allowed if required. Re-testing shall be at Purchaser's cost.
7. An off-line compressor water wash must be executed prior to starting with particulate test.
8. The area around the turbine is to be treated (e.g. sprayed down with water) to minimize airborne dust.
9. Evaporative coolers and/or chiller systems shall not be used during the time of testing.
10. If a SCR/COR is supplied and includes the use of dilution air fans, the dilution air system must utilize highly efficient HEPA filtration with 2 micron or better rating.
11. If a SCR is supplied, the ammonium slip must be less than 5 ppmvd @ 15%O2.
12. GE/Customer must mutually agree on a PM/PM10 testing firm that
    Test Firm:
    - A) Must have 10 years particulate testing experience
    - B) Must have experience on Natural Gas Power Plants
    - C) Must have 2 Customer references
    - D) Must be ASTM Certified or equivalent
    - E) Must submit an example test report for review

    Individual Tester:
    - A) Must have 5 years particulate testing experience
    - B) Must have experience on Natural Gas Power Plants
    - C) Must be SES Certified
    - D) Must submit an example test report for review

Continued … Conditions for PM10 Emissions Guarantee

Laboratory:

A) Must be State Certified
B) Must use 6 Place Balance
C) Must have experience with optional procedures
D) Must have 10 years particulate testing experience
E) Must have experience with low level ion chromatography
F) Must submit an example report with detail for review

Laboratory Technician:

A) Must have 1 years particulate testing experience

13. The following test process adjustments must be followed:
    A) At least 4 test runs must be performed and averaged to produce the final result.
    B) Each baseload test run duration shall be at least 240 minutes (continuous). If partload testing is applicable, each run's duration shall be at least 360 minutes (continuous).
    C) At least three fuel analyses are required per test run and shall include total sulfur per method ASTM D5504 (report as total sulfur in grains per one hundred standard cubic feet).
    D) If SCR is provided, ammonium slip shall be measured for each test run per CTM 027 or equivalent.
    E) Measurement of oxygen and carbon dioxide shall be done per EPA Method 3A (not Method 3).
    F) Mass emission rates of particulate matter shall be calculated using fuel flow and exhaust flow determined by the EPA Method 19, F-factor method (40CFR60 Appendix A).
    G) For condensable PM measurements, the sample train must be purged with N2 gas at the end of each test run.
    H) For condensable PM measurements, NH4OH titration shall be used to neutralize acid in the sample.

Conditions for VOC Emissions Guarantee

1. Fuel must meet GE specification MID-TD-000-01.
2. The timing of test to coincide with lowest site ambient VOCs levels.
3. Gas turbine must run for a minimum of 300 total fired hours at base load prior to testing.
4. Gas turbine inlet and exhaust system must be free of any dirt,sand,mud,rust,oil or any other contaminates.
5. Re-testing (at purchaser's expense) must be allowed, if required.
6. GE receives a copy of the final test results.
7. An off-line compressor water wash must be executed prior to starting with particulate test.

CleaverBrooks®
6940 Cornhusker Highway
Lincoln, Nebraska 68507
(402) 434-2000 Phone
(402)434-2064 Fax

June 10, 2015

Burns & McDonnell
9400 Ward Parkway
Kansas City, MO 64114

Re: Your Project Contract No. 5.2910, AES Southland Gas Fired Auxiliary Boiler

Dear Mr. Schnegelberger:

As per your request for the above referenced project, we confirm that we can design for the following emissions using a combination of flue gas recirculation and an SCR system:

Guaranteed Stack Emissions		Natural Gas		
NOx (post-SCR)	ppmv	5		
CO	ppmv	50		
VOC	lb/MMBtu	0.003		
PM10	lb/MMBtu	0.0043		
Ammonial Slip	ppmv	5		

Based on:
From 25% to 100% MCR corrected to 3% O_2 on a dry basis.
NATCOM technician is required for start-up and adjustments.
PM is exclusive of any particulates in combustion air or other sources of residual particulates from material.

Natural gas analysis shall be as per the attached *GNN36157.pdf.* Burner emissions for this application are based on a firing natural gas at a maximum rate of 71 MMBtu/hr with emissions guaranteed between 25% to 100% MCR corrected to 3% O2 dry basis.

Sincerely yours,

David Obrecht
Application Sales Engineer
Cleaver-Brooks, Inc.
402-434-2045

Enclosure:
GNN36157.pdf dated 5/20/2014

Appendix 5.1F
Dispersion Modeling Protocols

APPENDIX 5.1F

Dispersion Modeling Protocols

This Appendix contains the air dispersion modeling protocols used to assess air quality impacts near the Amended Huntington Beach Energy Project. The files contained within this Appendix are as follows:

Protocol	Dispersion Modeling Protocol for the Amended Huntington Beach Energy Project
Protocol Addendum	Dispersion Modeling Protocol for the Amended Huntington Beach Energy Project

Dispersion Modeling Protocol for the Amended Huntington Beach Energy Project

Prepared for

AES Southland Development, LLC

690 N. Studebaker Road
Long Beach, CA 90803

April 28, 2015

Submitted to

The California Energy Commission

Prepared by

CH2MHILL

2485 Natomas Park Drive, Suite 600
Sacramento, CA 95833

Contents

Attachments

Tables

Figures

Acronyms and Abbreviations

°F	degrees Fahrenheit
ΔE	color difference
μg/m^3	micrograms per cubic meter
AES	AES Southland Development, LLC
AFC	Application for Certification
AQRV	air quality-related values
ARB	California Air Resources Board
ASOS	automated surface observational system
CAAQS	California Ambient Air Quality Standard
CalEEMod	California Emissions Estimator Model
CEC	California Energy Commission
CFR	Code of Federal Regulations
CO	carbon monoxide
DPM	diesel particulate matter
EPA	U.S. Environmental Protection Agency
FLM	Federal Land Managers
GE	General Electric
GHG	greenhouse gas
GRP	General Reporting Protocol
H_2S	hydrogen sulfide
H_2SO_4	sulfuric acid
HBEP	Huntington Beach Energy Project
HBGS	Huntington Beach Generating Station (existing)
HI	hazard index
HRA	health risk assessment
HRSG	heat recovery steam generator
ISC	Industrial Source Complex
K	degrees Kelvin
km	kilometer
lb	pound
MPRM	Meteorological Processor for Regulatory Modeling Applications
N/A	not applicable
NAAQS	National Ambient Air Quality Standards
NAD83	North American Datum 1983
NO_2	nitrogen dioxide
NO_x	oxides of nitrogen

NSR	New Source Review
NWS	National Weather Service
OEHHA	Office of Environmental Health Hazard Assessment
PM_{10}	particulate matter less than 10 microns in aerodynamic diameter
$PM_{2.5}$	particulate matter less than 2.5 microns in aerodynamic diameter
PPA	power purchase agreement
ppm	parts per million
ppmv	parts per million by volume
PSD	Prevention of Significant Deterioration
PTA	Petition to Amend
PTE	potential to emit
PVMRM	plume volume molar ratio method
Q/D	emissions/distance
RECLAIM	Regional Clean Air Incentives Market
REL	Reference Exposure Level
SSCAQMD	South Coast Air Quality Management District
SCE	Southern California Edison
SCR	selective catalytic reduction
SIL	significant impact level
SO_2	sulfur dioxide
SO_x	sulfur oxide
T-BACT	Best Available Control Technology for Toxics
TAC	toxic air contaminant
TCR	The Climate Registry
tpy	tons per year
UTM	Universal Transverse Mercator
VOC	volatile organic compound

SECTION 1

Introduction

AES Southland Development, LLC (AES) proposes to construct the Amended Huntington Beach Energy Project (HBEP or Project) at the existing AES Huntington Beach Generating Station (HBGS) site, located at 21730 Newland Street in Huntington Beach, California (see Figure 1-1). The California Energy Commission (CEC) issued a license for the construction and operation of the HBEP on October 29, 2014. In November 2014, AES received notice from Southern California Edison (SCE) that it was shortlisted for a power purchase agreement (PPA). The power plant configuration selected by SCE for a PPA was different from the HBEP configuration licensed by the CEC. Therefore, AES is amending the HBEP's CEC license to be consistent with the SCE PPA.

The Amended HBEP will consist of one two-on-one combined-cycle power block and one simple-cycle power block with a net capacity of 844 megawatts. The combined-cycle power block will consist of two General Electric (GE) 7FA.05 natural-gas-fired combustion turbines, one steam turbine, and an air-cooled condenser. Each combustion turbine will be equipped with a heat recovery steam generator (HRSG). The HRSG will **not** be fitted with supplemental natural gas firing (duct firing). The turbines will use advanced combustion controls, dry low oxides of nitrogen (NO_x) burners, and selective catalytic reduction (SCR) to limit NO_x emissions to 2 parts per million by volume (ppmv). Emissions of carbon monoxide (CO) and volatile organic compounds (VOC) will be limited to 2 ppmv and 2 ppmv, respectively, through the use of advanced combustion controls, combined with the use of an oxidation catalyst. The combined-cycle power block of the Amended Project will also include a natural-gas-fired auxiliary boiler, used to decrease the start-up duration and air emissions of the combined-cycle turbines. The auxiliary boiler will include ultra-low-NO_x burners and/or SCR to control NO_x emissions to 5 ppmv.

The Amended HBEP simple-cycle power block will consist of two GE LMS100PB natural-gas-fired combustion turbines and two closed-loop cooling fin fan coolers. The turbines will use advanced combustion controls, dry low NO_x burners, and SCR to limit NO_x emissions to 2.5 ppmv. Emissions of CO and VOC will be limited to 4 ppmv and 2 ppmv, respectively, through the use of advanced combustion controls, combined with the use of an oxidation catalyst. Good combustion practices and burning pipeline-quality natural gas will minimize emissions of the remaining pollutants for both the simple-cycle and combined-cycle turbines.

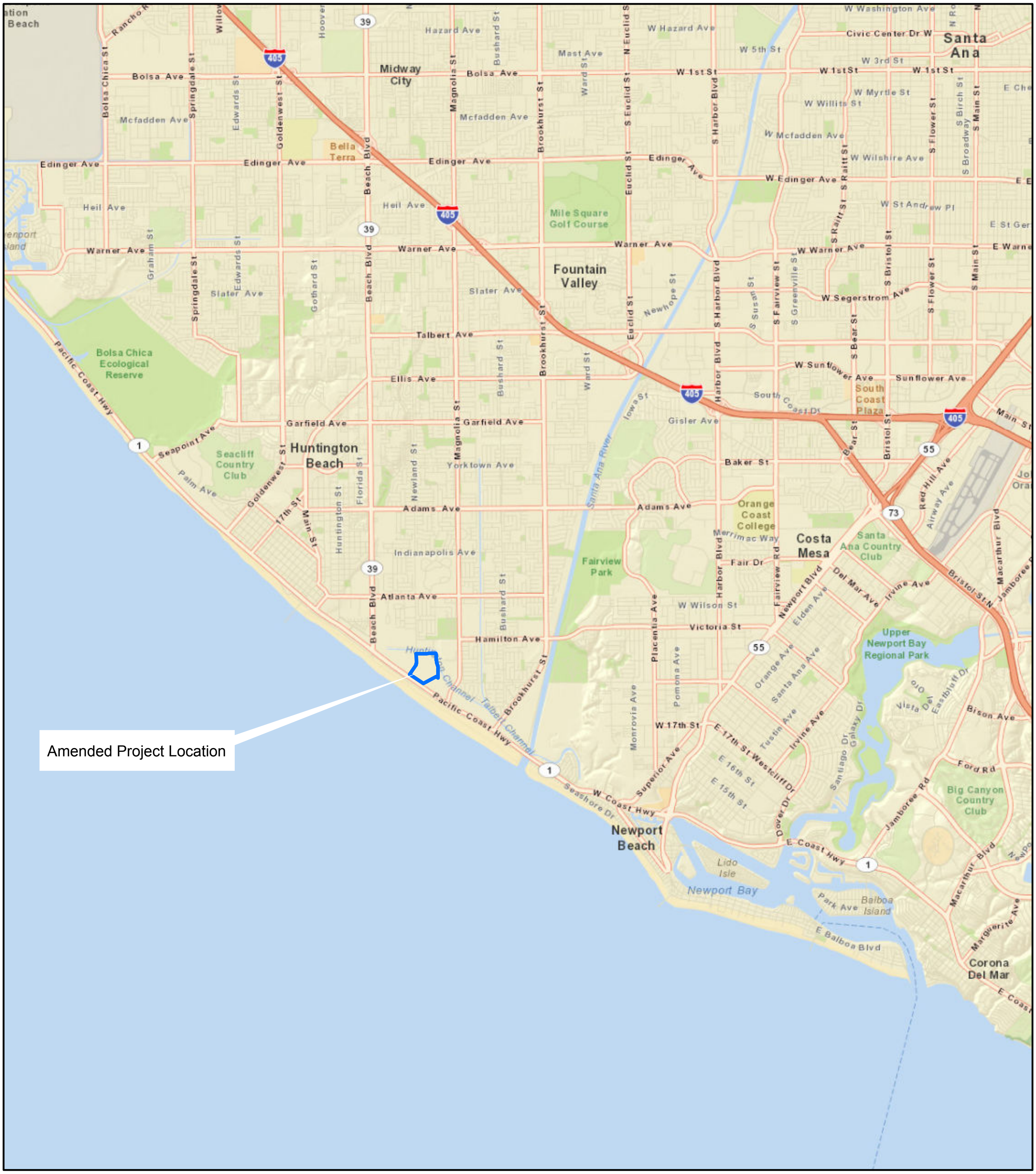
The Amended HBEP will reuse existing onsite potable water, natural gas, stormwater, process wastewater, and sanitary pipelines, as well as electrical transmission facilities. There are no offsite linear developments proposed as part of the Amended Project.

The HBEP license will be amended by the CEC and permitted through the South Coast Air Quality Management District's (SCAQMD) New Source Review (NSR) process. Because the HBEP includes the use of steam to generate electricity, the Amended Project is also categorized as one of the 28 Prevention of Significant Deterioration (PSD) major source categories (40 Code of Federal Regulations [CFR] 52.21(b)(1)(i)). Therefore, the Amended Project is considered a new major source subject to PSD permitting requirements. The existing HBGS Units 1 and 2 will be retired as part of the Amended Project. In the event that emissions from these existing units are required for modeling purposes, the maximum 2-year historical past actual emission rates will be calculated for the calendar years 2010 through 2014.

The Amended Project's potential to emit (PTE) is expected to exceed the 100 tons per year (tpy) threshold for two PSD-regulated pollutants (see Section 3.3, Operation). Therefore, the Amended Project will be considered a major stationary source in accordance with PSD regulations. The SCAQMD has also been delegated partial PSD permitting authority. Therefore, the PSD modeling results will be submitted to the SCAQMD as part of the permitting process.

Dispersion modeling will be conducted to demonstrate that the Amended Project will neither cause a new violation of a state or federal ambient air quality standard nor make an existing violation significantly worse for nitrogen dioxide (NO_2), CO, particulate matter less than 10 microns in aerodynamic diameter (PM_{10}), particulate matter less than 2.5 microns in aerodynamic diameter ($PM_{2.5}$), and sulfur dioxide (SO_2). AES intends to submit an air quality impacts analysis to both the SCAQMD and CEC that evaluates the impacts from Amended HBEP commissioning, start-up/shutdown, and normal facility operations. AES will also evaluate the demolition and construction-based air quality impacts per the CEC regulations. In addition, an assessment of the cumulative air quality impacts analysis and the potential human health risks associated with the Amended Project will be performed. Although VOC emissions are included in the following discussion, there are no regulatory-approved models available for assessing VOC impacts on ambient ozone levels. As such, VOC emissions will not be modeled as part of the air quality impacts analysis. Similarly, although greenhouse gas (GHG) emissions are also included in the following discussion, they will not be modeled as part of the air quality impacts analysis.

The following discussion presents the protocol proposed for evaluating the potential air quality and public health impacts associated with demolition, construction, commissioning, and operation of the Amended HBEP.



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N

Legend

AES Amended Huntington Beach Energy Project

FIGURE 1-1
Regional Location Map
AES Amended Huntington Beach Energy Project

CH2MHILL

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SECTION 2

Existing Setting

This section describes the area designations and background concentrations associated with the Amended Project.

2.1 Area Designations

The Amended HBEP will be located in Orange County, California. Orange County is in attainment for all federal National Ambient Air Quality Standards (NAAQS) with the exception of ozone and $PM_{2.5}$. Orange County is in attainment for all California Ambient Air Quality Standards (CAAQS) with the exception of ozone, PM_{10}, and $PM_{2.5}$. The area designations for each of the pollutants are included in Table 2-1.

TABLE 2-1
State and Federal Air Quality Designations for Orange County, California

Pollutant	State Designation	Federal Designation
Ozone	1-Hour: Nonattainment (Extreme) 8-Hour: Nonattainment	1-Hour: N/A 8-Hour: Nonattainment (Extreme)
CO	1-Hour: Attainment 8-Hour: Attainment	1-Hour: Attainment 8-Hour: Attainment
NO_2	1-Hour: Attainment Annual: Attainment	1-Hour: Attainment Annual: Attainment
SO_2	1-Hour: Attainment 24-Hour: Attainment	1-Hour: Attainment 24-Hour: N/A
PM_{10}	24-Hour: Nonattainment Annual: Nonattainment	24-Hour: Attainment* Annual: N/A
$PM_{2.5}$	24-Hour: N/A Annual: Nonattainment	24-Hour: Nonattainment Annual: Nonattainment
Lead, H_2S, and Sulfates	Attainment, Unclassified, Attainment	Attainment, N/A, N/A

*Effective July 26, 2013, the South Coast Air Basin was reclassified by the U.S. Environmental Protection Agency (EPA) from nonattainment to attainment with an approved maintenance plan for PM_{10} (78 Federal Register 38223; EPA-R09-OAR-2013-0007-0021).

Notes:

H_2S = hydrogen sulfide

N/A = Not applicable (i.e., no standard)

Sources: California Air Resources Board (ARB), 2013; EPA, 2015b

2.2 Background Concentrations

The three California Air Resources Board (ARB)-certified monitoring stations closest to the HBEP site are located approximately 3.5 miles northeast of the site in Costa Mesa, California (Orange County); approximately 13 miles to the north of the site in Anaheim, California (Orange County); and 15 miles to the northwest of the site in (South) Long Beach, California (Los Angeles County). There are also ARB-certified monitoring stations located in Mission Viejo, California (Orange County) and Long Beach, California (Los Angeles County). These monitoring stations are located approximately 17 miles to the southeast and 17 miles to the northwest of the HBEP site, respectively. These ARB-certified monitoring stations will continue to be used for the Amended HBEP, as appropriate based on the following discussion.

Table 2-2 lists the pollutants monitored at each of the monitoring stations.

TABLE 2-2
Summary of the Closest Monitoring Stations and the Pollutants Monitored at Each Station

Monitoring Location	Ozone	CO	NO_2	SO_2	PM_{10}	$PM_{2.5}$
North Coastal Orange County (Costa Mesa)	X	X	X	X	N/A	N/A
Saddleback Valley (Mission Viejo)	X	X	N/A	N/A	X	X
Central Orange County (Anaheim)	X	X	X	N/A	X	X
South Coastal Los Angeles County 1 (Long Beach)	X	X	X	X	X	X
South Coastal Los Angeles County 2 (South Long Beach)	N/A	N/A	N/A	N/A	X	X

Notes:

X = Pollutant is monitored at this location

N/A = Not applicable (i.e., pollutant is not monitored at this location)

As outlined in 40 CFR 51, Appendix W, Section 9.2, the background data used to evaluate the potential air quality impacts need not be collected on a project site, as long as the data are representative of the air quality in the subject area. The following three criteria were used for determining whether the background data are representative of the Project site: (1) location, (2) data quality, and (3) data currentness. These criteria are defined and apply to the Amended Project as follows:

- **Location:** The measured data must be representative of the areas where the maximum concentration occurs for the proposed stationary source, existing sources, and a combination of the proposed and existing sources.

  The monitoring station nearest to the Project site is the North Coastal Orange County (Costa Mesa) station. This monitoring station is located approximately 3.5 miles from the Project site. Based on a review of meteorological data collected at the National Weather Service (NWS) John Wayne Airport monitoring station, the Costa Mesa monitoring station is downwind of the HBEP site for most meteorological conditions. Therefore, the maximum short- and long-term concentrations are expected to occur in proximity to this monitoring station.

  Because the Costa Mesa monitoring station does not include PM_{10} and $PM_{2.5}$ monitoring equipment, the nearest representative location for PM_{10} and $PM_{2.5}$ was selected based on the surrounding terrain and a comparison of wind roses from the Long Beach, Anaheim, and Mission Viejo monitoring stations to the NWS John Wayne Airport monitoring station (SCAQMD, 2009). The nearest complex terrain is located approximately 5.5 miles east-southeast of the Project site, and the wind roses suggest a westerly flow inland toward the Mission Viejo monitoring station. Therefore, the Mission Viejo monitoring station was chosen as the most representative monitoring station for PM_{10} and $PM_{2.5}$.

- **Data quality:** Data must be collected and equipment must be operated in accordance with the requirements of 40 CFR 58, Appendices A and B, and PSD monitoring guidance.

  The SCAQMD, ARB, and U.S. Environmental Protection Agency (EPA) ambient air quality data summaries will be used as the primary sources of data. Therefore, the data at all five monitoring stations listed in Table 2-2 will meet the data quality requirements of 40 CFR 58, Appendices A and B, and PSD monitoring guidance.

- **Data currentness:** The data are current if they have been collected within the preceding 3 years and are representative of existing conditions.

The ambient background concentrations from the most recent 3-year period will be combined with the modeled concentrations and used for comparison to the ambient air quality standards. Currently, the three most recent years are 2011 through 2013; however, AES requests that the SCAQMD provide a copy of SCAQMD-approved data for 2014, if available. The background data will be updated to include 2014 if those data are made available by the SCAQMD prior to filing the Petition to Amend (PTA). Therefore, the data at all five monitoring stations listed in Table 2-2 represent the three most recent years of available data.

Based on the criteria presented above, the three most recent years of background NO_2, CO, SO_2, and ozone data from the Costa Mesa monitoring station and the three most recent years of background PM_{10} and $PM_{2.5}$ data from the Mission Viejo monitoring station will be combined with the modeled concentrations and used for comparison to the ambient air quality standards. A summary of the background concentrations for 2011 through 2013 are presented in Table 2-3.

TABLE 2-3
Background Air Concentrations (2011–2013) [a]

		2011		**2012**		**2013**		**Maximum**	**Average**
Pollutant	**Averaging Time**	**ppm**	**µg/m³**	**ppm**	**µg/m³**	**ppm**	**µg/m³**	**µg/m³**	**µg/m³**
Ozone [b]	1-hour	0.093	183	0.090	177	0.095	187	187	--
	8-hour	0.077	151	0.076	149	0.083	163	163	--
CO [b]	1-hour	2.9	3,321	2.1	2,405	2.4	2,748	3,321	--
	8-hour	2.2	2,519	1.7	1,947	2.0	2,290	2,519	--
NO_2 [b]	1-hour (maximum)	0.0605	114	0.0744	140	0.0757	142	142	--
	1-hour (98th percentile)	0.0528	99.3	0.0506	95.2	0.0532	100	--	98.2
	Annual [d]	0.010	18.8	0.0104	19.6	0.0116	21.8	21.8	--
SO_2 [b]	1-hour (maximum)	0.0077	20.2	0.0062	16.2	0.0042	11.0	20.2	--
	1-hour (99th percentile)	0.0048	12.6	0.0020	5.2	0.0033	8.6	--	8.8
	3-hour [e]	0.0077	20.2	0.0062	16.2	0.0042	11.0	20.2	--
	24-hour	0.002	5.2	0.001	2.6	0.001	2.6	5.2	--
PM_{10} [c]	24-hour	--	48.0	--	37.0	--	51.0	51.0	--
	Annual	--	19.2	--	17.3	--	19.3	19.3	--
$PM_{2.5}$ [c]	24-hour (maximum)	--	33.4	--	27.6	--	28.0	33.4	--
	24-hour (98th percentile)	--	28.8	--	17.6	--	17.5	--	21.3
	Annual	--	8.6	--	7.9	--	8.1	8.6	--

[a] The SCAQMD, ARB, and EPA ambient air quality data summaries were used as reference.

[b] Data from the Costa Mesa monitoring station.

[c] Data from the Mission Viejo monitoring station.

[d] Annual Arithmetic Mean.

[e] Background concentrations for the 3-hour EPA Secondary Standard for SO_2 were not available for the three most recent years. Therefore, the maximum 1-hour background concentrations were conservatively used.

Notes:

ppm = parts per million
µg/m³ = micrograms per cubic meter

Sources: SCAQMD, 2015b; ARB, 2015; EPA, 2015a

SECTION 3

Methodology for Estimating Project-Related Emissions

This section presents the methodology for estimating Project-related emissions from construction, decommissioning, and operation.

3.1 Construction

Construction of the Amended HBEP will require the removal of existing HBGS Units 1, 2, and 5 during the construction process. Existing HBGS Units 3 and 4 were licensed through the CEC (00-AFC-13C) and demolition of these units will be authorized under that license. Therefore, demolition of existing HBGS Units 3 and 4 is not part of the Amended HBEP project definition, but will be included as part of the CEC cumulative impact assessment.

Approximately 15 acres will be disturbed at the HBEP site during demolition and construction activities. Onsite demolition activities will include removal of the nonoperational HBGS Unit 5 peaker, the buildings and small tanks associated with Unit 5, and a fuel oil storage tank. Onsite demolition activities will also include demolition of existing HBGS Units 1 and 2 to the steam turbine deck and their ancillary mechanical and electrical equipment, except for the existing reverse osmosis/electro-deionization building and service water and deionized water tanks. Demolition debris will be transported to an offsite location for recycling. No overlap in demolition and construction activities is expected. Onsite construction activities will consist of installing two new combined-cycle gas turbines, two simple-cycle gas turbines, various auxiliary equipment, and administrative structures. To the maximum extent possible, the Amended HBEP will reuse existing onsite potable water, natural gas, stormwater, process wastewater, and sanitary pipelines, as well as electrical transmission facilities; however, some modification and interconnection of the Amended HBEP into these systems will require construction activity.

Onsite and offsite Project emissions will be divided into three categories: (1) vehicle and construction equipment exhaust; (2) fugitive dust from vehicle and construction equipment, including grading and bulldozing during construction; and (3) fugitive dust from demolition activities such as the top-down removal of the boiler stack and loading of waste haul trucks with the generated debris.

The following criteria pollutant emissions will be calculated: NO_x, sulfur oxides (SO_x), VOCs, CO, PM_{10}, and $PM_{2.5}$. Fugitive dust and construction equipment exhaust emissions will be estimated using methodology and emission factors consistent with the California Emissions Estimator Model (CalEEMod; Version 2013.2.2), which incorporates OFFROAD2011 and portions of EPA's *AP-42* (ENVIRON, 2013; SCAQMD et al., 2011). Vehicle exhaust emissions for travel on both paved and unpaved roads will be estimated using EMFAC2014 (Version 1.0.1) emission factors, as consistent with the CalEEMod methodology.[1]

GHG emissions from construction equipment exhaust will be estimated using emission factors from The Climate Registry (TCR) General Reporting Protocol (GRP, Version 2.0) (TCR, 2014) and fuel consumption rates from OFFROAD2011. GHG emissions from vehicle exhaust for truck trips and worker commutes will be estimated using emission factors from TCR GRP (Version 2.0) (TCR, 2014) and fuel economy values from

[1] CalEEMod is a statewide computer model created by ENVIRON and the SCAQMD to quantify criteria pollutant and GHG emissions associated with the construction activities from a variety of land use projects (ENVIRON, 2013). Developed in cooperation with air districts throughout the state, CalEEMod is intended to standardize air quality analyses while allowing air districts to provide specific defaults reflecting regional conditions, regulations, and policies (SCAQMD et al., 2011). CalEEMod is generally viewed as an improvement and replacement of URBEMIS2007 by providing updated factors, methodologies, and defaults that are robustly documented.

EMFAC2014 (Version 1.0.1). No significant emissions of hydrofluorocarbons, perfluorocarbons, or sulfur hexafluoride are expected during construction and demolition.

3.2 Commissioning

During the commissioning phase of the Amended HBEP, the GE 7FA.05s and the GE LMS100PBs initially will be operated at various load rates without the benefit of the emission control systems to facilitate proper operation of the equipment. However, maximum hourly emission rates for SO_2, PM_{10}, and $PM_{2.5}$ are expected to be equal to or lower than normal operating rates owing to reduced loads during commissioning. Therefore, emission calculations for commissioning activities will be limited to NO_x, CO, and VOCs. The NO_x, CO, and VOC emissions will be estimated based on turbine performance data provided by the vendor, estimated durations and control efficiencies of each commissioning event, and turbine operating rates.

3.3 Operation

Emissions of CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and VOCs, to the atmosphere from the Amended HBEP will occur from combustion of natural gas in the combustion turbines. Emission rates will be calculated based on vendor data and additional conservative assumptions of turbine performance. Turbine emissions and stack parameters, such as flow rate and exit temperature, will exhibit some variation with ambient temperature and operating load. Therefore, to evaluate the worst-case air quality impacts during normal operation, dispersion modeling for each combustion turbine will be conducted at a minimum, intermediate, and 100 percent load at 32, 66, and 110 degrees Fahrenheit (°F), representing minimum, average, and maximum temperatures at the Project site. In addition to the normal operating load/temperature scenarios, emission estimates and an air quality impacts analysis will also be conducted for start-up and shutdown events.

The preliminary annual Amended HBEP PTE criteria pollutant emissions are presented in Table 3-1. The combined-cycle PTE is based on 6,600 hours of base load operation per turbine per year and the simple-cycle PTE is based on 5,000 hours of base load operation per turbine per year. Start-up and shutdown emission rates are not available at this time, but will be incorporated into the dispersion modeling analysis.

TABLE 3-1
Preliminary Annual Facility Emissions Estimates

Facility	Facility Emission Totals – Tons Per Year (Estimate)					
	CO	NO_2	SO_2	PM_{10}	$PM_{2.5}$	VOC
Amended HBEP (PTE) [a]	106	149	9 [b]	81	81	49

[a] Assumes the combined-cycle turbines are operated 6,600 hours per year and the simple-cycle turbines are operated 5,000 hours per year, excluding start-up and shutdown emissions. Note that the preliminary potential to emit (PTE) does not include emissions associated with operation of the auxiliary boiler, which are expected to be small relative to the combustion turbine emissions.

[b] Assumes an annual average fuel sulfur content of 0.25 grains per 100 standard cubic feet.

Combustion of natural gas in the turbines will also result in emissions of the following GHGs: carbon dioxide, methane, and nitrous oxide. Therefore, GHG emissions for normal facility operations will be calculated based on the maximum fuel usage predicted for the Amended HBEP and emission factors contained in TCR GRP (Version 2.0) (TCR, 2014).

Criteria pollutant and GHG emissions from the Amended HBEP operational worker commutes and material deliveries will also be calculated. Criteria pollutant emissions will be estimated using emission factors from EMFAC2014 (Version 1.0.1). GHG emissions will be estimated using emission factors from TCR GRP (Version 2.0) (TCR, 2014) and fuel economy values from EMFAC2014 (Version 1.0.1). Criteria pollutant and GHG emissions from the Amended HBEP operational worker commutes and material deliveries will be calculated for CEC informational purposes, but will not be included in the air quality impacts analysis.

SECTION 4

Topography and Meteorology

This section provides a summary-level description of the topography and meteorology associated with the Amended Project.

4.1 Topography

The HBEP site is located near sea level on the California coast, approximately 1.5 miles southeast of downtown Huntington Beach. The nearest complex terrain (i.e., terrain exceeding stack height) in relation to the Amended Project is located in the San Joaquin Hills, approximately 5.5 miles (or approximately 9 kilometers [km]) to the east and southeast.

4.2 Meteorology

4.2.1 Meteorology for Dispersion Modeling

According to EPA's *Guideline on Air Quality Models* (EPA, 2005), representativeness of meteorological data used in dispersion modeling depends on (1) the proximity of the meteorological monitoring site to the area under consideration; (2) the complexity of the terrain; (3) the exposure of the meteorological monitoring site; and (4) the period of time during which data are collected.

Meteorological data from two surface station sites were considered for use in the dispersion modeling analysis for the Amended Project: the SCAQMD Costa Mesa station and the NWS John Wayne Airport station (Station #93184). A previous study conducted by CH2M HILL determined that, although the Costa Mesa station is closer to the Project site, the John Wayne Airport data would be more representative (see Attachment 1). Therefore, the meteorological data collected at the NWS John Wayne Airport monitoring station will be used to model the ambient air quality impacts. Though the representativeness study analyzed meteorological data from the years 2008 through 2012, the meteorological data used for this analysis will be updated to include the periods of January 1, 2010, through December 31, 2014. A wind rose for the NWS John Wayne Airport monitoring station is presented in Figure 4-1.

4.2.2 Upper Air Data

Twice-daily National Climatic Data Center soundings from the NWS San Diego Miramar station (Station #03190) will be coupled with the NWS surface station data to create the AERMET meteorological dataset.

4.2.3 AERMET Preprocessing

Processing of the meteorological data will be performed using the latest version of AERMET (Version 14134) according to the procedures outlined in EPA's *Guideline on Air Quality Models* (EPA, 2005). The 1-minute automated surface observational system data will be processed using the latest version of AERMINUTE (Version 14337), with a 0.5 meter per second minimum wind speed threshold, and used in conjunction with the five years of integrated surface hourly data and upper air sounding data described above.

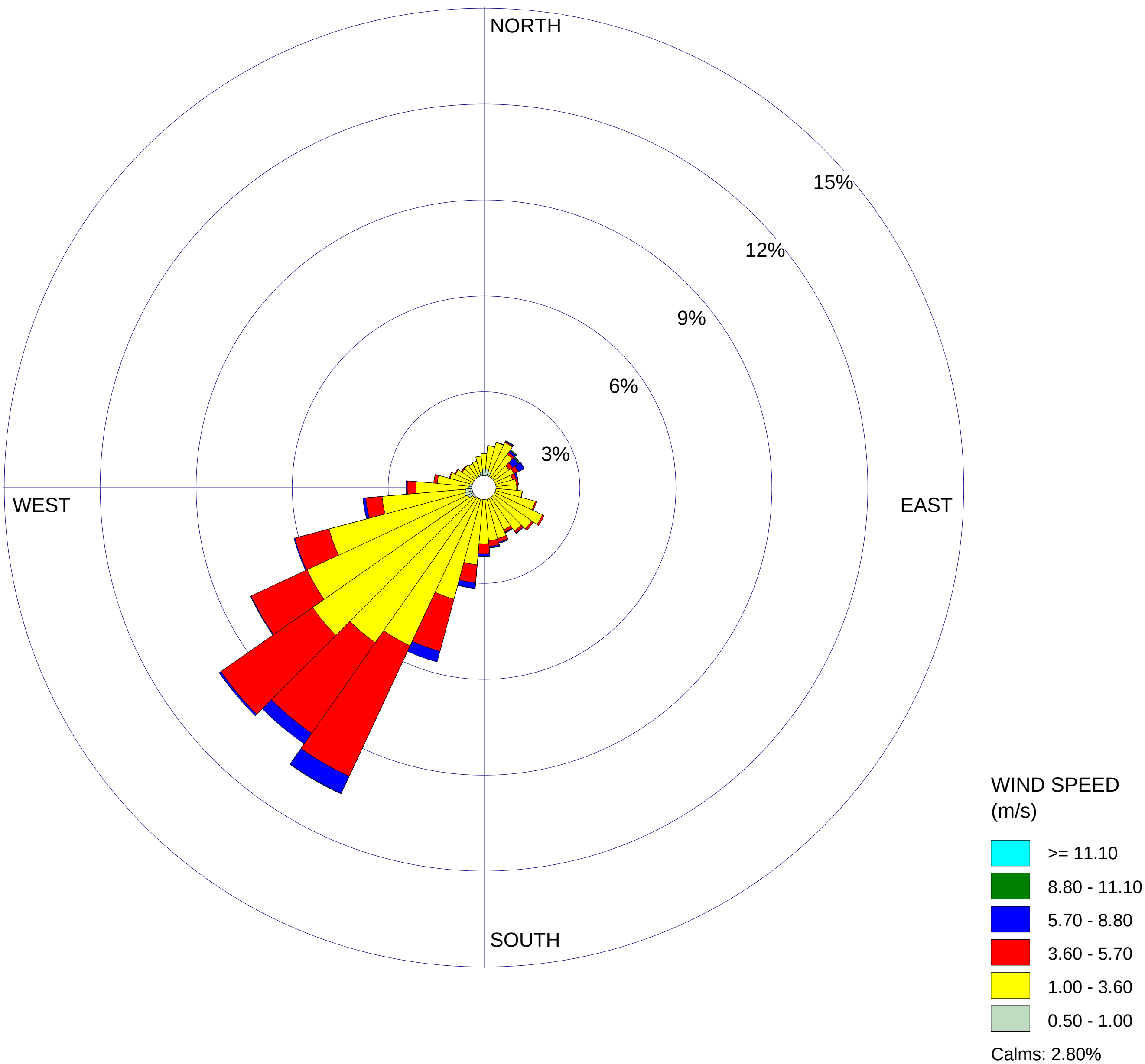


FIGURE 4-1
NWS John Wayne Airport Meteorological Station Wind Rose
AES Amended Huntington Beach Energy Project

CH2MHILL.

SECTION 5

Dispersion Modeling Approach

This section describes the proposed approach to dispersion modeling. Model selection, input defaults/options, land use/designation, the receptor network, source characterization, and building wake downwash and good engineering practice are summarized.

5.1 Model Selection

The EPA-approved AERMOD (Version 14134 or most recent version) dispersion model will be used to evaluate the air quality emissions from the Amended HBEP. AERMOD is the latest generation of EPA's short-term model recommended for predicting impacts from industrial point sources, as well as area and volume sources.

5.2 Model Input Defaults/Options

AERMOD will be used with regulatory default options, as recommended in EPA's *Guideline on Air Quality Models* (EPA, 2005). The following supporting preprocessing programs for AERMOD will also be used:

- BPIP-Prime (Version 04274)
- AERMAP (Version 11103)

The technical options to be selected for AERMOD will include the following:

- Regulatory default control options
- Receptor elevations and controlling hill heights obtained from AERMAP output

The emission units will be modeled as point sources within AERMOD. Emission rates and other source parameters will be determined from the manufacturer's data or EPA-established emission factors.

Initially, a complete conversion of NO_x emissions to NO_2 will be assumed. If this assumption leads to predicted exceedances of the NAAQS, CAAQS, or significance criteria for NO_2 identified in Section 6, Air Quality Impacts Analysis, the default ambient ratios of 0.75 NO_2/NO_x (i.e., 75 percent of NO_x emissions are converted to NO_2) and 0.80 will be applied to annual and 1-hour predicted impacts, respectively, to determine NO_2 concentrations (EPA, 2005; EPA, 2011). If 1-hour predicted NO_2 impacts still exceed the NAAQS after application of the ambient ratio, the predicted impacts will instead be estimated by pairing the maximum modeled concentration with the 98th percentile seasonal, hour-of-day NO_2 background concentrations. The 98th percentile seasonal, hour-of-day NO_2 background concentrations for 2011 through 2013 or 2014, depending on data availability, will be provided via e-mail by the SCAQMD.

If predicted 1-hour NO_2 impacts require further refinement, the plume volume molar ratio method (PVMRM) will be used. PVMRM options will assume an initial in-stack NO_2/NO_x ratio of 0.5 and an out-of-stack NO_2/NO_x ratio of 0.9 (EPA, 2011; California Air Pollution Control Officers Association, 2011). Corresponding hourly ozone data from the North Long Beach monitoring station will be provided via e-mail by the SCAQMD.

5.3 Land Use/Classification

AERMOD will be run in urban dispersion mode because land use within 3 km of the HBEP site is primarily classified as urban (Auer Method). A population of 3,010,759 will be used in AERMOD, as recommended by the SCAQMD for projects in Orange County (SCAQMD, 2015a).

5.4 Receptor Network

The base receptor grid for the AERMOD modeling will consist of receptors that are placed at the ambient air boundary and Cartesian-grid receptors that are placed beyond the Amended Project's property boundary, at spacing that increases with distance from the origin. The Amended Project's property boundary will be used as the ambient air boundary. Property boundary receptors will be placed at 30-meter intervals. Beyond the Amended Project's property boundary, receptor spacing will be as follows:

- 50-meter spacing from property boundary to 500 meters from the origin
- 100-meter spacing from beyond 500 meters to 3 km from the origin
- 500-meter spacing from beyond 3 km to 10 km from the origin
- 1,000-meter spacing from beyond 10 km to 25 km from the origin
- 5,000-meter spacing from beyond 25 km to 50 km from the origin

All receptors and source locations will be expressed in the Universal Transverse Mercator (UTM) North American Datum 1983 (NAD83), Zone 11 coordinate system.

The base receptor grid will be extended if predicted concentration gradients increase at the edge of the grid. The base (coarse) receptor grid will be supplemented with receptors at closer (tighter) receptor spacing, where appropriate, so that the maximum points of impact have been identified.

AERMAP (Version 11103) will be used to calculate the receptor elevations and the controlling hill heights. Terrain in the vicinity of the Amended Project will be accounted for by assigning base elevations to each receptor. National Elevation Dataset files from the U.S. Geological Survey will be obtained in one-third arc-second resolution for the 50-km grid. The AERMAP domain will be large enough to encompass the 10 percent slope factor required for calculating the controlling hill height.

5.5 Source Characterization

5.5.1 Construction

The Amended HBEP construction site will be represented as a set of point sources and area sources in the modeling analysis. The exhaust emissions will be modeled as a set of point sources spaced approximately 25 meters (82 feet) apart over the construction areas with a horizontal stack release. The horizontal release type is an AERMOD beta option (i.e., nonregulatory default option), which negates mechanical plume rise. This conservative approach is proposed because it is unknown whether the construction equipment will have vertically oriented exhaust stacks. Stack release parameters will consist of a stack release temperature of 533 degrees Kelvin (K; 500°F), a stack diameter of 0.127 meters (5 inches), and a release height of 4.6 meters (15 feet) based on data for typical construction equipment. The wind-blown and fugitive dust emissions will be modeled as area sources assuming a ground-level release height with an initial vertical dimension of 1 meter.

As discussed in Section 6, Air Quality Impacts Analysis, predicted concentrations of NO_x, CO, PM_{10}, $PM_{2.5}$, and SO_2 from onsite construction-related activities will be combined with the ambient background concentrations and compared to the ambient air quality standards. Note that if the predicted concentrations initially exceed the ambient air quality standards, the model will be refined to limit the hours in which concentrations are predicted to align with the expected hours of construction activities.

5.5.2 Commissioning

Each of the combustion turbine exhaust stacks will be modeled as point sources within AERMOD. Exhaust parameters will be based on information provided by the vendor for each combustion turbine type and commissioning phase. Only maximum hourly impacts for NO_x and CO will be modeled for each commissioning phase. Emission rates of PM_{10}, $PM_{2.5}$, and SO_x are expected to be equal to or lower than normal operating rates as a result of reduced loads during commissioning.

Although commissioning is expected to be completed in less than one year, annual impacts for the combined commissioning and operation for a rolling 12-month period will also be evaluated because annual emissions during the commissioning year could be higher than those during a noncommissioning year. As a result, annual NO_x, PM_{10}, and $PM_{2.5}$ impacts from commissioning with operation will also be modeled.

5.5.3 Operation

The proposed combustion turbines will be modeled as point sources within AERMOD. Exhaust parameters will be based on information provided by the vendor. The modeling analysis will include a load screening to determine which operating conditions, including start-up and shutdown of the combustion turbines, will yield the highest ground-level concentrations. Owing to the timing of the construction of the combined- and simple-cycle turbines, a number of operational scenarios will be modeled to reflect expected operating conditions. Where necessary, modeling will include both construction/demolition emission sources and commissioning emissions for the simple-cycle turbines while the combined-cycle turbines are in commercial operation. As the existing HBGS Units 1 and 2 will not be in operation for more than 90 days after the first fire of the combined-cycle turbines, modeling of HBGS Units 1 and 2 will not be included in the ambient air quality impacts analysis.

5.6 Building Wake Downwash and Good Engineering Practice

AERMOD can account for building downwash and cavity zone effects. Existing HBGS and the Amended HBEP stack locations, heights, building locations, and dimensions will be input to BPIP-PRIME (Version 04274). The first step of BPIP-PRIME determines and reports on whether a stack follows good engineering practice or is being subjected to wake effects from a structure or structures. The second step calculates direction-dependent equivalent building dimensions if a stack is being influenced by structure wake effects. The BPIP-PRIME output will be used in the AERMOD modeling.

SECTION 6

Air Quality Impacts Analysis

The Amended HBEP will require an ambient air quality impacts analysis for emissions of CO, NO_x, SO_2, and $PM_{10/2.5}$. This section summarizes the approach used to address the requirements applicable to each reviewing agency and highlights the criteria required for each analysis.

6.1 SCAQMD New Source Review

6.1.1 Rule 1303 and Rule 1304

SCAQMD Rule 1303 requires an ambient air quality impacts analysis for each new emission source to demonstrate that a proposed project will not cause a violation or make significantly worse an existing violation of the CAAQS or NAAQS. However, under SCAQMD Rule 1304(a)(2), the Amended HBEP is exempt from this rule because the Amended HBEP is a replacement of existing electric utility steam boilers with combined-cycle and advanced simple-cycle gas turbines with no increase in basin-wide energy capacity. Therefore, a comparison of potential impacts to the significant change in air quality thresholds of SCAQMD Rule 1303, Table A-2, is not required as part of this air quality impacts analysis.

Per SCAQMD Rule 1303(b)(5)(C), a modeling analysis is required to evaluate impacts on plume visibility if the net emission increase from the new or modified source exceeds 15 tpy of PM_{10} or 40 tpy of NO_x, and the location of the source, relative to the closest boundary of a specified Federal Class I area, is within 28 km. Net emissions of NO_x will exceed the emissions threshold, but the distance to the nearest Class I area is approximately 69 km, as presented in Figure 6-1. Therefore, a visibility analysis is not required for Class I areas under SCAQMD Rule 1303.

Although not required by its rules, SCAQMD requested an analysis of the Project's impacts on visibility for nearby State Parks and National Wilderness Areas designated as Class II areas. As such, a visibility analysis for Class II areas will be performed using the EPA-recommended VISCREEN model. The general procedures to determine visibility impacts will follow the approach outlined in the *Workbook for Plume Visual Impact Screening and Analysis (Revised)* (EPA, 1992), with clarification of the following particular inputs:

- Background visual ranges for the Class II areas will be determined using maps supplied by the Interagency Monitoring of Protected Visual Environments. The average of the annual upper and lower bounds will be used.
- If a Tier 1 approach exceeds the Class I criterion for color difference (ΔE) and contrast, a Tier II assessment will be conducted. The Tier II assessment will use the NWS John Wayne Airport AERMET meteorological dataset for years 2010 through 2014 described previously. These data will be preprocessed with the EPA Meteorological Processor for Regulatory Modeling Applications (MPRM, Version 99349) for the Industrial Source Complex (ISC) modeling system.[2]

Based on a survey of State Parks and National Wilderness Areas designated as Class II areas within 50 km of the Amended HBEP, AES proposes to include the following Class II areas in the visibility assessment, as presented in Figure 6-2:

- Crystal Cove State Park
- Water Canyon National Park
- Chino Hills State Park
- Huntington Beach State Park
- San Mateo Canyon Wilderness Area

[2] ISC-ready data, preprocessed with MPRM, contain the wind speed, wind direction, and stability class for each hour of the year. These data are required to create the Joint Frequency Distribution tables used to calculate the Tier II wind speed and stability class for each area analyzed.

6.1.2 Rule 1401

SCAQMD Rule 1401 specifies limits for maximum individual cancer risk, cancer burden, and noncancer acute and chronic hazard index (HI) from new permit units, relocations, or modifications to existing permit units that emit toxic air contaminants (TAC) listed in SCAQMD Rule 1401, Table I. The Amended HBEP will be subject to the SCAQMD Rule 1401 NSR requirements. Therefore, a health risk assessment (HRA) will be completed as part of the air quality impacts analysis for the Amended HBEP. The procedure for evaluating the potential impacts is discussed in Section 7, Human Health Risk Assessment.

6.1.3 Rule 2005

SCAQMD Rule 2005 sets forth preconstruction review requirements for new facilities subject to the requirements of the Regional Clean Air Incentives Market (RECLAIM) program, for modifications to RECLAIM facilities, and for facilities that increase their allocation to a level greater than their starting allocation plus nontradable credits. The existing AES HBGS facility is currently subject to RECLAIM requirements, and, as shown in Table 6-1, the Amended Project will also exceed the major NO_x modification threshold of 1 pound (lb) per day. Therefore, SCAQMD Rule 2005 requires an ambient air quality impacts analysis to demonstrate the Amended HBEP will not cause a significant increase in the air quality concentration of NO_x, as specified in SCAQMD Rule 2005, Appendix A.

TABLE 6-1
Rule 2005 Emissions Levels That Trigger Dispersion Modeling Requirements

Pollutant	Estimated PTE (tpy)	Major Source Threshold	Major Modification Threshold	Exceeds Threshold? (Yes/No)
NO_x	149	10	1 lb/day	Yes
SO_2	9 [a]	100	40 tpy	No

[a] Assumes an annual average fuel sulfur content of 0.25 grains per 100 standard cubic feet.

Notes:

lb/day = pounds per day

PTE = potential to emit

tpy = tons per year

The significance thresholds and the most stringent air quality standards for NO_2 are presented in Table 6-2. The maximum modeled NO_2 concentrations from the refined dispersion modeling analysis for each turbine will be compared to the significance values identified in Table 6-2. The maximum modeled NO_2 concentrations will also be added to representative background concentrations, and the results compared to the state and federal ambient air quality standards for NO_2. The highest ambient concentration from the three most recent years of ambient monitoring data will be used as the background concentration.

TABLE 6-2
Rule 2005 Air Quality Thresholds and Standards Applicable to the Amended Project (Per Emission Unit)

Averaging Period/ Pollutant	Significant Change in Air Quality Concentration [a] ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)	CAAQS ($\mu g/m^3$)
NO_2 (1-hour)	20	188 [b]	339
NO_2 (Annual)	1	100	57

[a] Allowable change in air quality concentration per emission unit.

[b] National 1-hour standard represents the 3-year average of the 98th percentile of the daily maximum 1-hour average.

Notes:

μg/m[3] = micrograms per cubic meter

CAAQS = California Ambient Air Quality Standards

NAAQS = National Ambient Air Quality Standards

6.2 Prevention of Significant Deterioration

SCAQMD Regulation XVII sets forth preconstruction review requirements for stationary sources to ensure that air quality in clean air areas does not significantly deteriorate, while maintaining a margin for future industrial growth. This requirement applies to preconstruction review of new or modified stationary sources that emit more than 100 tpy of federal attainment air contaminants. As discussed in Section 2, Existing Setting, CO, NO_2, PM_{10}, and SO_2 are designated as federal attainment pollutants. Therefore, the estimated Amended HBEP emissions were compared to the major source thresholds of 100 tpy and the significant emissions increase threshold of 40 tpy (Table 6-3) to determine which pollutants are subject to dispersion modeling requirements as outlined in SCAQMD Rule 1703. Note that although the Amended HBEP is not expected to emit more than 100 tpy of PM_{10}, PM_{10} impacts were also evaluated against the significant emissions increase threshold of 15 tpy because of Orange County's new designation as an attainment area for PM_{10}. Based on the estimated emissions and attainment designations, NO_x, CO, and PM_{10} are the only attainment pollutants from the Amended HBEP that will exceed the significant emissions increase threshold and be subject to dispersion modeling requirements.

Low-sulfur natural gas will be the only fuel allowed for the Amended HBEP. Therefore, emissions of asbestos, beryllium, mercury, vinyl chloride, fluoride, lead, and sulfur compounds are expected to be negligible.

TABLE 6-3
Preliminary PSD Emissions Levels That Trigger Dispersion Modeling Requirements

Pollutant	Estimated PTE (tpy)	Significant Emission Increase Threshold a (tpy)	Exceeds Threshold? (Yes/No)
CO	106	100	Yes
NO_x	149	40	Yes
SO_2	9 [b]	40	No
PM_{10}	81	15	Yes
VOC [c]	49	40	Yes
Asbestos	Negligible	0.007	No
Beryllium	Negligible	0.0004	No
Mercury	Negligible	0.1	No
Vinyl Chloride	Negligible	1.0	No
Fluorides	Negligible	3	No
Lead	Negligible	0.6	No
Sulfuric Acid Mist	Negligible	7	No
Hydrogen Sulfide	Negligible	10	No
Total Reduced Sulfur (including	Negligible	10	No

TABLE 6-3
Preliminary PSD Emissions Levels That Trigger Dispersion Modeling Requirements

Pollutant	Estimated PTE (tpy)	Significant Emission Increase Threshold a (tpy)	Exceeds Threshold? (Yes/No)
H_2S)			
Reduced Sulfur Compounds (including H_2S)	Negligible	10	No

[a] The Prevention of Significant Deterioration (PSD) significance level is listed here for reference.

[b] Assumes an annual average fuel sulfur content of 0.25 grains per 100 standard cubic feet.

[c] Modeling is not required for volatile organic compounds (VOCs).

Notes:

PTE = potential to emit

tpy = tons per year

6.3 Class II Area Analysis

Based on the emissions presented in Table 6-3, a dispersion modeling analysis will be conducted to demonstrate that the Amended HBEP will not cause or contribute to a violation of the NAAQS or CAAQS and will not exceed the federal PSD Class II Increment Standards for NO_2, CO, and PM_{10}. To demonstrate compliance with the standards, the Amended HBEP will be modeled in two tiers. A description of each tier is presented below. Modeling for either tier will be performed per the methodology described in Section 5.0, Dispersion Modeling Approach, unless otherwise noted below.

6.3.1 Tier 1 Analysis

Using the worst-case load identified as part of the operations modeling, the preliminary Tier 1 analysis for each pollutant will be conducted as follows:

- If the predicted impacts are less than the significant impact levels (SIL) presented in Table 6-4 for each criteria pollutant, the modeling is complete for that pollutant and averaging period.
- If the predicted impacts are significant, a Tier 2 refined analysis will be conducted.

Table 6-4 summarizes the Class II SILs, PSD Class II Increment Standards, and the significant monitoring concentration levels. Currently, no ambient air quality data are collected at the existing HBGS. If modeling results for the Amended HBEP are greater than the significant monitoring concentrations listed in Table 6-4, onsite ambient air quality data collection may be required. If such monitoring is required, AES requests that the monitoring be conducted in parallel with construction of the Amended HBEP and that alternate background concentrations listed in Table 2-3 be used for permit modeling.

TABLE 6-4
PSD Air Quality Impact Standards Applicable to the Amended Project

Averaging Period/ Pollutant	Significant Impact Level ($\mu g/m^3$)	PSD Class II Increment Standard ($\mu g/m^3$)	Significant Monitoring Concentrations ($\mu g/m^3$)
NO_2 (1-hour)	7.52*	N/A	N/A
NO_2 (Annual)	1.0	25	14
CO (1-hour)	2,000	N/A	N/A
CO (8-hour)	500	N/A	575
PM_{10} (24-hour)	5.0	30	10
PM_{10} (Annual)	1.0	17	N/A

*The significant impact level (SIL) for 1-hour NO_2 is based on SCAQMD correspondence.

Notes:

$\mu g/m^3$ = micrograms per cubic meter

N/A = Not applicable (i.e., no standard)

PSD = Prevention of Significant Deterioration

6.3.2 Tier 2 Analysis

The refined Tier 2 analysis will include a comparison to the ambient air quality standards and PSD Class II Increment Standards, as follows:

- For pollutants with concentrations greater than the respective SIL, a significant impact radius will be defined.
- The maximum modeled concentrations will be determined and compared to the NAAQS, CAAQS, and PSD Class II Increment Standards, as appropriate. These concentrations will include contributions from the facility, competing nearby sources, and ambient background concentrations.
- SCAQMD will be consulted to identify competing nearby sources and exhaust characteristics, if available, for inclusion in the refined analysis. Section 6.3.2.1, Competing Source Inventory, summarizes the approach to develop the competing source inventory.
- Only receptors identified above the SIL in the Tier 1 analysis will be included in the Tier 2 analysis.
- Background concentrations described in Section 6.3.2.2, 1-hour NO_2 Refined Analysis, will be included in the Tier 2 analysis.

6.3.2.1 Competing Source Inventory

It is anticipated that the 1-hour NO_2 SIL will be exceeded by operation of the Amended HBEP. At the request of SCAQMD, the Costa Mesa monitoring station (North Coastal Orange County, EPA ID 06-059-1003) will be used as the ambient monitor because it captures the NO_x-emitting sources in the Project area and is downwind of the Amended Project. Based on the determined significant impact radius and the location of the representative ambient monitor, AES proposes to include competing sources within a distance of 10 km of the significant impact radius in the analysis. AES proposes to use the competing source inventory of NO_x-emitting sources that was previously approved by the SCAQMD on October 8, 2013, which is included as Attachment 2. AES still considers this inventory representative of emission sources within 10 km of the HBEP site and requests that the SCAQMD again approve this inventory for use in this competing source analysis.

6.3.2.2 1-hour NO_2 Refined Analysis

Emergency equipment will not be included in the 1-hour NO_2 competing source analysis. Consistent with recent EPA guidance addressing intermittent emissions for the 1-hour NO_2 analysis (EPA, 2011), exclusion of emergency equipment is appropriate. Start-up emissions from the Amended HBEP turbines will be included in the 1-hour NO_2 competing source analysis because start-ups of the units are expected to occur frequently.

Further refinements of the 1-hour NO_2 modeling include the incorporation of seasonal, hour-of-day NO_2 background concentrations and the use of an ambient NO_2 equilibrium ratio and PVMRM in AERMOD, if necessary, described as follows:

- Seasonal, hour-of-day NO_2 background concentrations will be determined by following the most recent EPA NO_2 modeling guidance (EPA, 2011). This includes using the third-highest concentration for each hour-of-day, by season, at the NO_2 monitor. AERMOD will automatically pair the modeled NO_2 concentration to the appropriate background concentration for each hour to determine the model design concentration for comparison to the NAAQS. The 98th percentile seasonal, hour-of-day NO_2 background concentrations for 2011 through 2013 or 2014, depending on data availability, will be provided by SCAQMD for the Costa Mesa monitoring station.
- The Ambient Ratio Method uses 0.80 as a default ambient ratio for the 1-hour NO_2 standard.
- PVMRM options, if needed, will initially conservatively assume an in-stack NO_2/NO_x ratio of 0.5 and an ambient NO_2 ratio of 0.9 (EPA, 2011). If additional analysis is required, AES will consult with the SCAQMD to define alternative appropriate in-stack and ambient NO_2 ratios consistent with EPA guidance. Corresponding hourly ozone data from the Costa Mesa monitoring station will be provided via e-mail by the SCAQMD.

To complete the refined 1-hour NO_2 competing source analysis, hourly emissions from the competing sources approved by SCAQMD will be modeled by apportioning each source's permitted emissions (tpy) evenly throughout the year, unless otherwise noted. The model design concentration of the 5-year average of the 98th percentile hourly impact at each receptor will be compared to the NAAQS of 188 micrograms per cubic meter ($\mu g/m^3$).

If the model design concentration at any receptor exceeds the NAAQS, the Amended Project's impacts during the NAAQS exceedances will be evaluated and compared to the SIL. If the Amended Project's impacts are below the SIL during all modeled exceedances of the NAAQS, then the Amended Project will be assumed to not significantly contribute to the modeled exceedances.

6.4 Class I Area Increment Analysis

In addition to addressing the Amended HBEP's impacts within the near field (i.e., Class II impacts), a Class I impact analysis will be conducted to demonstrate that the Amended HBEP will not cause or contribute to an exceedance of the Class I SIL or PSD Class I Increment Standards (Table 6-5) and will not adversely affect air quality-related values (AQRV). If necessary, a separate protocol will be prepared and submitted to address AQRVs at the nearby Class I areas. To evaluate the potential impacts on Class I areas near the HBEP site, all Class I areas within 300 km of the HBEP were identified. Based on this survey, the Cucamonga Wilderness, which is approximately 69 km from the HBEP site, was identified as the nearest Class I area. Figure 6-1 shows the locations and distances to the Class I areas within 300 km of HBEP.

Federal Class I area air quality guidance (Federal Land Managers [FLM], 2010) allows an emissions/distance (Q/D) factor of 10 to be used as a screening criterion for sources located more than 50 km from a Class I area. This screening criterion includes all AQRVs. Emissions are calculated as the total SO_2, NO_x, PM_{10}, and sulfuric acid (H_2SO_4) annual emissions (in tpy, based on 24-hour maximum allowable emissions). These emissions are divided by the distance (in km) from the Class I area.

Based on the combined annual emissions of NO_x, SO_2, H_2SO_4, and PM_{10}, calculated using the 24-hour maximum allowable emissions, the maximum Q/D for the Amended Project is expected to be less than the FLM Q/D ratio of 10. Therefore, visibility and deposition modeling are not required for any of the Class I areas.

To address PSD Class I Increment Standards, AERMOD will be used with a receptor ring at 50 km from the facility. The ring will be spaced in 5-degree increments centered on the Amended HBEP site. AERMOD maximum modeled impacts of NO_x and PM_{10} will be compared to the applicable SILs. If modeled impacts are below the SILs, then the Amended Project would be considered to have negligible impact at the more distant Class I areas. If impacts are above the SILs in the direction of the Class I areas, SCAQMD would be contacted to determine a refined approach to quantify criteria pollutant impacts at the Class I areas.

TABLE 6-5
Class I SIL and PSD Class I Increment Standards Applicable to the Amended Project

Averaging Period/ Pollutant	Significant Impact Level ($\mu g/m^3$)	PSD Class I Increment Standard ($\mu g/m^3$)
NO_2 (Annual)	0.1	2.5
PM_{10} (24-hour)	0.3	2.0
PM_{10} (Annual)	0.2	1.0

Notes:

$\mu g/m^3$ = micrograms per cubic meter

PSD = Prevention of Significant Deterioration

SIL = significant impact level

6.5 California Energy Commission Air Dispersion Analysis

The sections below summarize the requirements and modeling assessment to be submitted to the CEC.

6.5.1 Construction Emissions Impact Assessment

The Amended HBEP construction site will be represented as a set of point sources and area sources in the modeling analysis. The exhaust emissions will be modeled as a set of point sources spaced approximately 25 meters (82 feet) apart over the construction areas with a horizontal stack release. Stack release parameters will consist of a stack release temperature of 533 K (500°F), a stack diameter of 0.127 meters (5 inches), and a release height of 4.6 meters (15 feet) based on data for typical construction equipment. The wind-blown and fugitive dust emissions will be modeled as area sources assuming a ground-level release height with an initial vertical dimension of 1 meter. Modeled concentrations of CO, NO_x, SO_2, PM_{10}, and $PM_{2.5}$, from construction activities related to the Amended HBEP will be combined with the ambient background concentrations and compared to the ambient air quality standards.

6.5.2 Commissioning Emissions Impact Assessment

The short-term concentrations of NO_2 and CO (i.e., the 1- and 8-hour impacts) from the commissioning phase of the Amended HBEP will be combined with the ambient background concentrations and compared to the short-term ambient air quality standards. Although commissioning is expected to be completed in less than 1 year, annual impacts for the combined commissioning and operation for a rolling 12-month period will also be evaluated because annual emissions during the commissioning year could be higher than those during a noncommissioning year. As a result, annual concentrations of NO_x, PM_{10}, and $PM_{2.5}$ from commissioning with operation will be combined with the ambient background concentrations and compared to the annual ambient air quality standards. Furthermore, because commissioning activities only occur once in the life of the Project and are expected to be less than 1 year in duration, the impacts will not be compared to the 1-hour federal NO_2 NAAQS, which is a 3-year average of a 98th percentile daily maxima concentration standard.

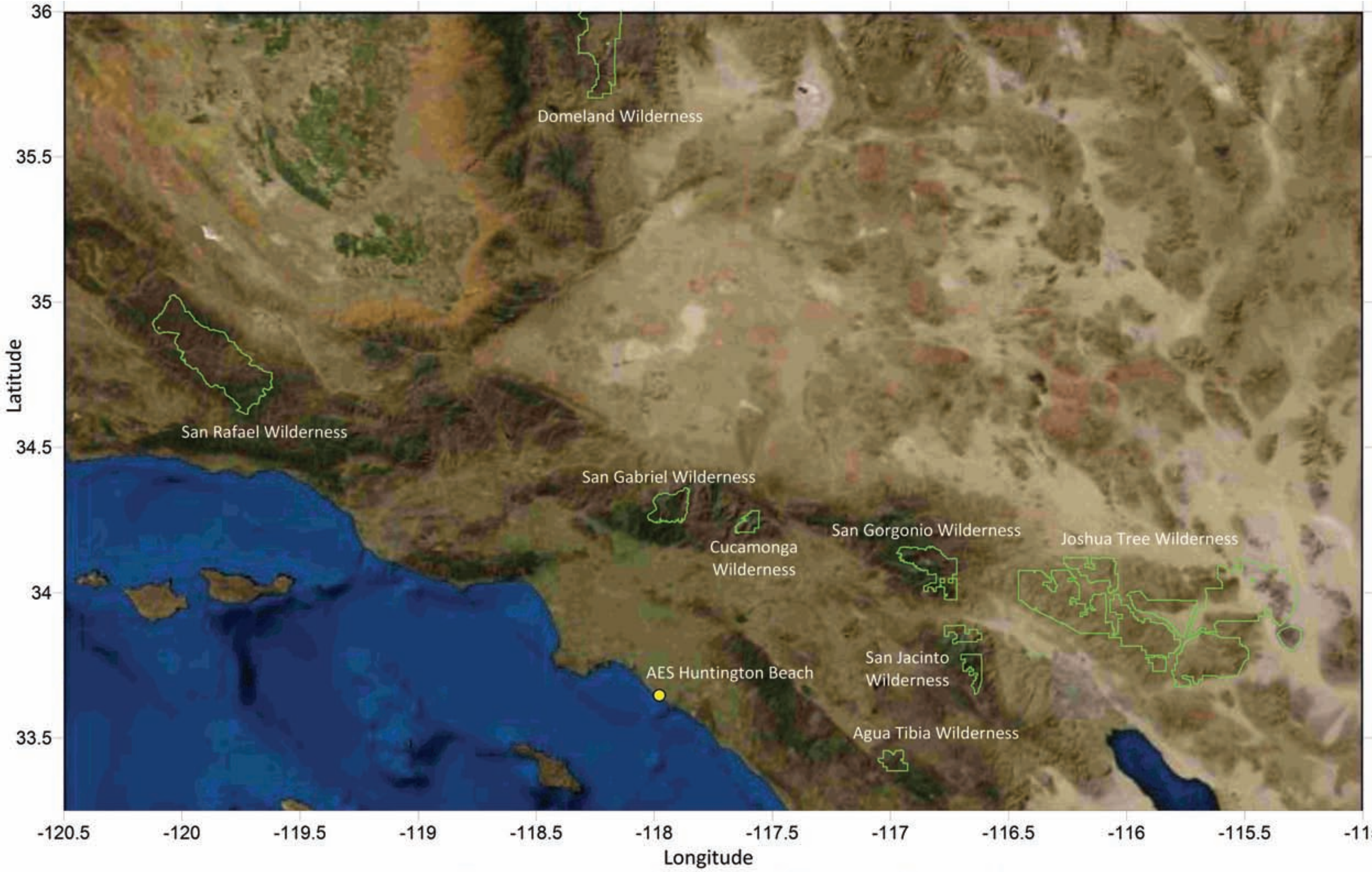
6.5.3 Operational Emissions NAAQS and CAAQS Impact Assessment

The maximum modeled concentrations will be added to representative background concentrations and the results compared to the state and federal ambient air quality standards for SO_2, NO_2, CO, PM_{10}, and $PM_{2.5}$. The ambient concentrations from the three most recent years of ambient monitoring data identified in Section 2, Existing Setting, will be used as the background concentration.

6.5.4 Fumigation Impact Assessment

Fumigation can occur during the breakup of the nocturnal radiation inversion by solar warming of the ground surface. Shoreline fumigation occurs when a plume is emitted into a stable layer of air and is then mixed to the surface as a result of advection of the air mass to less stable surroundings. Under these conditions, an exhaust plume may be drawn to the ground with little diffusion, causing high ground-level pollutant concentrations, although typically for periods less than 1 hour.

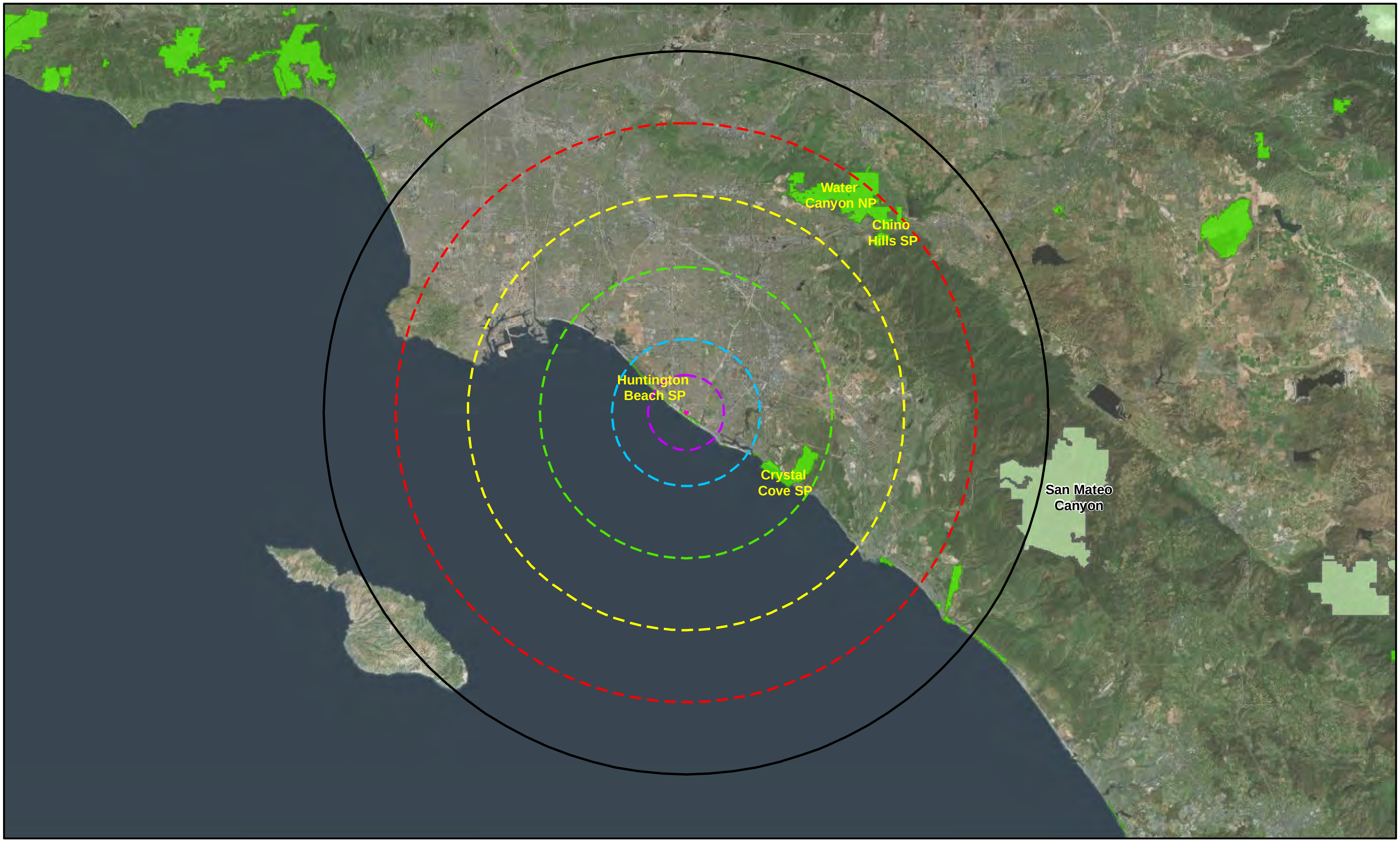
SCREEN3 will be used to determine the predicted impacts associated with these fumigation scenarios. The maximum modeled concentrations from the fumigation impact assessment will then be added to representative background concentrations, and the results compared to the state and federal ambient air quality standards. The condition would be short-lived; therefore, impacts will only be compared to the 1-, 3-, 8-, and 24-hour standards.



Distance to Nearby Class I Areas (km)

Agua Tibia Wilderness	Cucamonga Wilderness	Domeland Wilderness	Joshua Tree Wilderness	San Gabriel Wilderness	San Gorgonio Wilderness	San Jacinto Wilderness	San Rafael Wilderness
90.6	69.0	229.2	145.4	69.9	107.6	114.2	192.3

FIGURE 6-1
Distance to Nearby Class I Areas
AES Amended Huntington Beach Energy Project



LEGEND

AES Amended Huntington Beach Energy Project
50 km Buffer
NLCS Wilderness [1]
California State Parks [2]

Project Buffers
5 km
10 km
20 km
30 km
40 km

Sources:
1. Bureau of Land Management (http://www.blm.gov.ca/gis/)
2. Cal-Atlas Geospatial Clearinghouse (https://projects.atlas.ca.gov/)

N

0 6 12
Miles

FIGURE 6-2

Class II Areas within 50 km of Amended HBEP
AES Amended Huntington Beach Energy Project

Aerial Source: Esri Imagery

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SECTION 7

Human Health Risk Assessment

A human HRA will be performed to evaluate the potential cancer, chronic, and acute health impacts related to the Amended HBEP. This section describes the methodology proposed for conducting the HRA.

7.1 Approach

The HRA will follow the latest version of the *Air Toxics Hot Spot Program Risk Assessment Guidelines* (Office of Environmental Health Hazard Assessment [OEHHA], 2015), EPA's *Guideline on Air Quality Models* (EPA, 2005), and, where applicable based on revised OEHHA guidance, the SCAQMD guidance documents.

TAC from the combustion turbines will be included in the HRA. Combustion turbine emissions will be estimated assuming that all combustion turbines operate simultaneously under normal load conditions. For maximum hourly emissions, the maximum natural gas consumption rate per turbine will be used. For annual emissions, the annual average natural gas consumption rate per turbine will be used, assuming that the turbines will operate the allowable annual operating hours at the base load rate. Ammonia emissions associated with potential ammonia slip from the SCR system will be calculated based on a permit limit maximum of 5 ppmv, dry at 15 percent oxygen.

Owing to the length of the proposed construction and demolition period, TAC associated with construction of the Amended HBEP and demolition of the existing HBGS units, which consist of combustion byproducts generated during movement of onsite construction/demolition equipment and onsite and offsite movement of vehicles, will also be included in the HRA. The primary exhaust TAC associated with construction and demolition activities is diesel particulate matter (DPM). Total DPM exhaust emissions from construction and demolition activities will be averaged over the construction period and spatially distributed over the areas in which activities are expected to occur.

7.2 Model Selection

The HRA modeling for the normal Amended HBEP operations will be conducted using the ARB's *Hotspots Analysis Reporting Program Version 2*. The AERMOD modeling approach, such as default options, source parameters, meteorological data, receptor spacing, and terrain data, will be similar to the criteria pollutant modeling analysis. The receptor grid will also include sensitive receptors as defined by SCAQMD and CEC siting regulation Appendix B (g)(9)(E)(i). The sensitive receptors included in the analysis will be based on a search conducted by Environmental Data Resources. Additionally, census block receptors will be included in the analysis in order to calculate the increased cancer burden.

7.3 Evaluation of Impacts

Cancer risks will be evaluated for each source and the Amended HBEP based on the annual TAC ground-level concentrations, inhalation cancer potency, oral slope factor, frequency and duration of exposure at the receptor, and breathing rate of the exposed persons. Cancer risks from operation of the Amended HBEP will be estimated using a conservative assumption of a 30-year continuous exposure duration for residential receptors, and a 25-year, 5-day week, 8-hours-per-day exposure duration for commercial/industrial receptors. To assess chronic and acute noncancer exposures, annual and 1-hour TAC ground-level concentrations, respectively, will be compared with the Reference Exposure Levels (RELs) developed by OEHHA to obtain a chronic or acute HI.

The HRA for construction of the Amended HBEP and demolition of the existing HBGS units will be performed for a shorter exposure duration, based on the OEHHA guidance (OEHHA, 2015). Because the primary TAC for construction and demolition activities is DPM, the cancer risks will be evaluated based on annual average

TAC ground-level concentrations and inhalation cancer potency assuming initial exposure during the 3rd trimester and continuing through the duration of construction activities. Chronic toxicity will also be considered using the average annual emissions, calculated as previously described.

In addition to inhalation exposure, the HRA will assess potential health impacts related to exposure from homegrown produce, dermal absorption, soil ingestion, and mother's milk, as required by SCAQMD guidelines (SCAQMD, 2011). The inhalation cancer potency, oral slope factor values, and RELs used to characterize health risks associated with the modeled impacts will be obtained from the most recent version of the *Consolidated Table of OEHHA/ARB Approved Risk Assessment Health Values* (OEHHA, 2014).

Consistent with SCAQMD Rule 1401, the modeled health risk values for each permitted unit will be compared to the following de minimus thresholds:

- Incremental increase in cancer risk of 10 in 1 million individuals (if the permitted unit is constructed with Best Available Control Technology for Toxics [T-BACT])
- Incremental increase in cancer risk of 1 in 1 million individuals (if the permitted unit is constructed without T-BACT)
- Cancer burden greater than 0.5
- Chronic HI of 1.0
- Acute HI of 1.0

Predicted cancer risk and HIs less than the thresholds will be considered an acceptable increase in risk associated with the Amended HBEP.

SECTION 8

Cumulative Impacts Analysis

Per CEC requirements, a cumulative air quality modeling impacts analysis for the Amended HBEP's typical operating mode will be conducted. Impacts from the Amended Project will be combined with other stationary emission sources within a 6-mile radius that have received construction permits but are not yet operational or are in the permitting process (such as the NSR or California Environmental Quality Act permitting process). The stationary emission sources included in the cumulative impacts assessment will be limited to new or modified sources (individual emission units) that would cause a net increase of 5 tons or more per modeled criteria pollutant. Therefore, VOC sources, equipment shutdowns, permit-exempt equipment registrations, rule compliance, permit renewals, or replacement/upgrading of existing systems will not be included in the cumulative impacts analysis. TAC emissions will also be excluded from the cumulative impacts analysis.

For this cumulative impact analysis, AES proposes to use the list of sources submitted to the CEC on January 17, 2013, which is included as Attachment 3. This list was developed through consultation with the SCAQMD and CEC staffs and captures newer air pollution sources within the 6-mile radius surrounding the HBEP site, which is centered approximately at 409,336 meters (East); 3,723,113 meters (North) (UTM, NAD83, zone 11). AES still considers this list representative of emission sources within a 6-mile radius of the HBEP site and requests that the CEC again approve this list for use in this cumulative assessment.

The cumulative air quality impacts analysis will be performed using the model settings and receptor grid outlined in Section 4, Topography and Meteorology, and Section 5, Dispersion Modeling Approach. The Amended HBEP fence line for the cumulative sources will not be included in the modeling analysis.

The maximum predicted cumulative impacts will represent the impact at the receptor location identified as the maximum receptor for each pollutant in the ambient air quality impacts assessment. The maximum modeled concentrations from the analysis will then be added to representative background concentrations, and the results compared to the state and federal ambient air quality standards for SO_2, NO_2, CO, PM_{10}, and $PM_{2.5}$.

SECTION 9

Presentation of Results

The results of the air dispersion modeling analyses for the Amended HBEP will be presented to each reviewing agency as follows:

- Description of modeling methodologies and input data
- Summary of the results in tabular form
- Compact disk of modeling files used by AERMOD provided with the PTA
- Description of any significant deviations from the methodology proposed in this protocol

SECTION 10

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Attachment 1
Representative Meteorological Data for the Revised HBEP Permit Modeling

Representative Meteorological Data for the HBEP PSD Permit Modeling

PREPARED FOR: AES Southland Development, LLC

COPY TO: CH2M HILL Project Folder

PREPARED BY: John Frohning/CH2M HILL

DATE: July 17, 2013

AES Huntington Beach, LLC (AES) owns and operates the Huntington Beach Generating Station located in Huntington Beach, California and is proposing to replace the existing power boilers with more efficient natural gas fired combustion turbines in a combined cycle configuration. The proposed Huntington Beach Energy Project (HBEP or project) would be one of the 28 major source categories defined in 40 Code of Federal Regulations (CFR) 51.166 and the modification would trigger prevention of significant deterioration (PSD) for the South Coast Air Basin attainment pollutants of oxides of nitrogen (NOx), volatile organic compounds (VOC), and greenhouse gases (GHG). Therefore, the project is required to conduct an ambient air quality dispersion modeling analysis to determine the project's impacts on both the national ambient air quality standards (NAAQS) and PSD Class II Increment standards (Increments) for NOx (no NAAQS or Increments exist for VOCs or GHGs).

The modeling procedures outlined in 40 CFR 51 Appendix W, *Guideline on Air Quality Models* (Guideline) (EPA, 2005), will be followed to determine the appropriate inputs to be used in the modeling analysis. A key piece of this analysis is the selection of the appropriate dispersion model utilized to characterize impacts. PSD dispersion modeling for the HBEP will use the U.S. Environmental Protection Agency (EPA) approved AERMOD dispersion modeling system. The AERMOD dispersion modeling system is comprised of three main components:

- AERMOD Dispersion Model (version 12345)
- AERMAP terrain data pre-processor (version 11059)
- AERMET meteorological data pre-processor (version 12345)

The meteorological data used in the analysis, and pre-processed by AERMET, is a critical component to the analysis. This memorandum summarizes the PSD-quality meteorological data criteria recommended by EPA for dispersion modeling, summarizes the available meteorological data collected in the vicinity of the proposed HBEP, and selects the appropriate meteorological data to be used for the AERMOD analysis. The proposed meteorological data for the analysis meets EPA recommendations for conducting an ambient air quality analysis with AERMOD for PSD permitting.

EPA Meteorological Data Selection

Section 8.3 in the Guideline outlines the criteria and recommendations for selecting representative meteorological data for regulatory modeling applications. The main criteria recommended by EPA to determine representativeness are listed and discussed below:

- Proximity of the meteorological monitoring station to the project site
- Complexity of terrain
- Exposure of the meteorological monitoring equipment
- Period of time during which data are collected
- For AERMOD modeling analyses, the surface characteristics surrounding the source and the meteorological monitoring station

The proximity of the meteorological monitoring station to the project site should also consider complex terrain in the area. That is, if a station is closer, it does not necessarily indicate that winds would be representative of the project site if major terrain features exist between the project site and the nearest meteorological monitoring station that may result in different wind flows.

Exposure of the meteorological monitoring equipment should be adequate to characterize the meteorology at the release height of the modeled source. The EPA *Meteorological Monitoring Guidance for Regulatory Modeling Applications* (EPA, 2000) is referenced in the Guideline and outlines the criteria and quality of meteorological data collection and validation for use in dispersion modeling analyses.

The time period of meteorological data recommended by EPA for regulatory modeling is at least a single year of on-site data or 5 years of representative off-site meteorological data. The Guideline specifically mentions that the most recent 5 years of National Weather Service (NWS) data should be used in dispersion modeling for off-site data sources. The monitoring guidance summarizes the meteorological data completeness requirements for dispersion modeling as 90 percent complete on a quarterly basis prior to data substitution (EPA, 2000).

The Guideline includes additional criteria for determining representativeness of meteorological data for use in AERMOD-based modeling assessments in order for AERMOD to construct realistic boundary layer profiles. This requires an additional analysis of the representativeness of surface characteristics around the meteorological monitoring station in comparison to the project site. This is similar to considering complex terrain when selecting a meteorological monitoring station. That is, the surface characteristics for the primary wind directions should be similar between the meteorological monitoring station and the source location. The *AERMOD Implementation Guide* (EPA, 2009) recommends a comparison of surface characteristics between the meteorological monitoring station and the source location.

The noontime albedo, daytime Bowen ratio, and surface roughness lengths are collectively known as surface characteristics. Surface characteristics can vary by season and region (sector) around the data collection site. The mid-day albedo is the fraction of total incident solar radiation reflected by the surface back to the atmosphere without absorption. The daytime Bowen ratio is an indicator of surface moisture, which is the ratio of the sensible heat flux to the latent heat flux. The Bowen ratio is used to determine the planetary boundary layer parameters for convective conditions. Surface roughness length is related to the height of obstacles to the wind flow and is the height at which the mean horizontal wind speed is zero. The AERMOD model uses the surface characteristics to define dispersion coefficients in the model. The *AERMOD Implementation Guide* outlines the procedures to calculate the surface characteristics based on the land cover around the site.

Additionally, the EPA has recently released guidance for using NWS data for AERMET (EPA, 2013). This guidance recommends that 1-minute automated surface observational system (ASOS) data be routinely used in the meteorological data processing for PSD permit modeling if the NWS station is considered representative of the project site. The final processed AERMET meteorological data using the 1-minute ASOS data in conjunction with the integrated surface hourly (ISH) data from the same meteorological data station should be greater than 90 percent complete by quarter (EPA, 2013)[1].

Meteorological monitoring stations which meet the criteria above as representative of the project site would be adequate for PSD permit dispersion modeling.

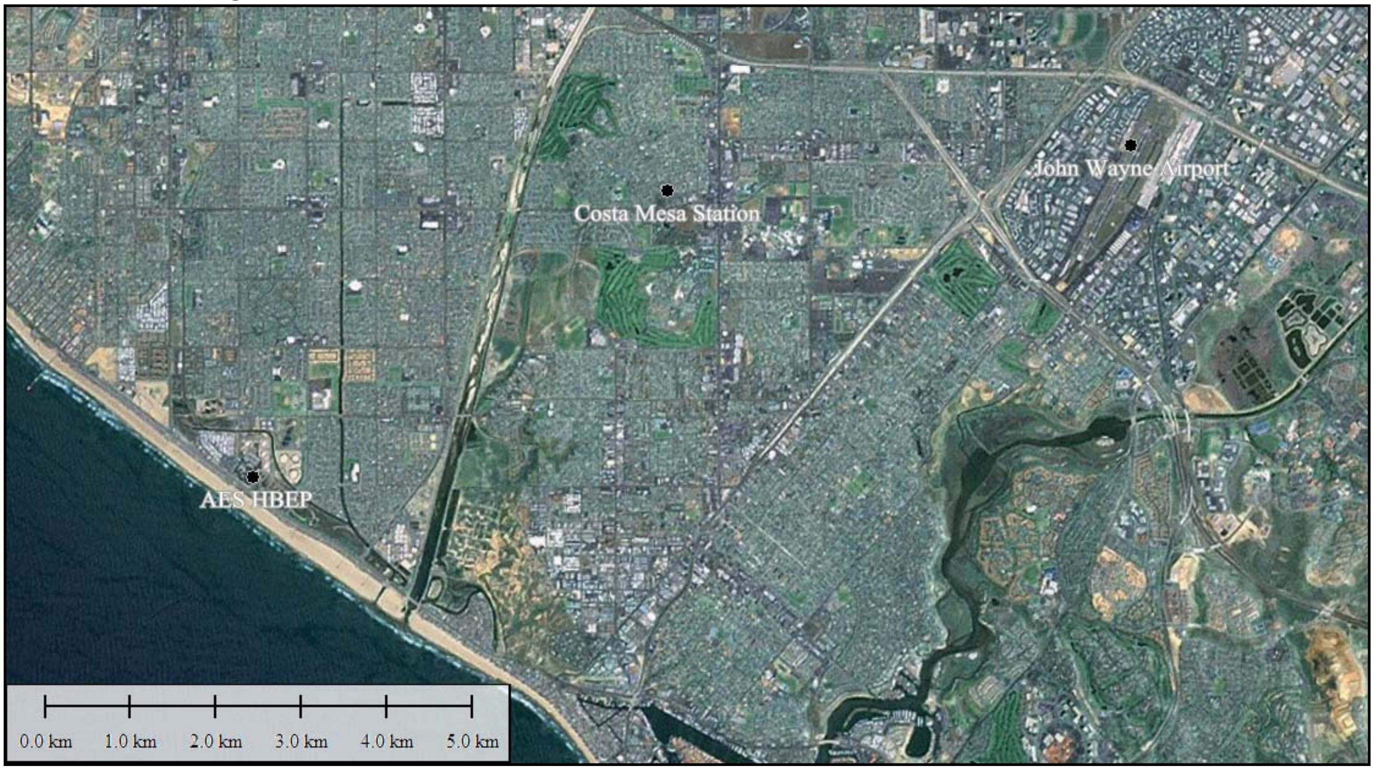
Available Meteorological Data Near HBEP

HBEP does not collect meteorological data onsite. Therefore, a search of meteorological monitoring stations within 15 kilometers (km) of the project site was conducted. The results of this search identified two stations with hourly meteorological data. These stations are the South Coast Air Quality Management District (SCAQMD) Costa Mesa meteorological monitoring station and the NWS John Wayne Airport meteorological monitoring station. The Costa Mesa meteorological monitoring station is located approximately 6 km northeast of the project site

[1] "Although the Guideline does not establish a minimum requirement on data completeness for NWS data, the 90 percent joint capture by quarter serves as a useful benchmark, and if NWS data completeness is less than 90 percent by quarter with the use of AERMINUTE, then the representativeness of the data may be suspect and alternative sources of meteorological data should be considered."

whereas the John Wayne Airport meteorological monitoring station is located 10.5 km northeast of the project site. Figure 1 shows the location of each meteorological monitoring station in relation to the HBEP.

FIGURE 1
Available Meteorological Data Near HBEP



The Costa Mesa meteorological data is available on the SCAQMD's website for download. The data has already been pre-processed with AERMET for years 2005 through 2009. Meteorological data at the John Wayne Airport is available as 1-minute ASOS data and hourly ISH format. The most recent 5 years of data are for 2008 through 2012 and are publicly available by the National Climatic Data Center (NCDC) in a default input format for AERMET. As mentioned above, for NWS data, EPA recommends that the 1-minute ASOS data be used in conjunction with the ISH data for PSD permit modeling. Data should be greater than 90 percent complete on a quarterly basis after the ISH data has been supplemented with the 1-minute ASOS data (EPA, 2013).

No complex terrain exists between HBEP and either of the meteorological monitoring stations and the predominant southwest winds observed at each site are similar. Figures 2 and 3 show the 5-year wind roses for Costa Mesa and John Wayne Airport meteorological monitoring stations, respectively.

FIGURE 2
Costa Mesa 5-Year Wind Rose

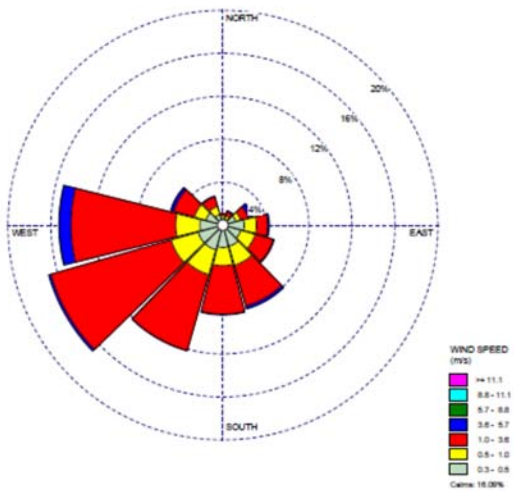
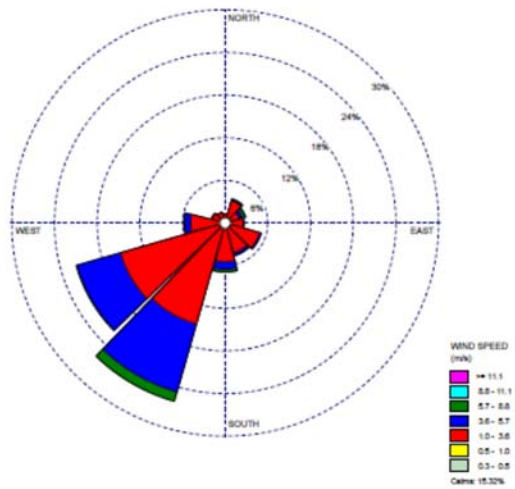


FIGURE 3
John Wayne Airport 5-Year Wind Rose



Tables 1 and 2 summarize the data completeness by quarter for Costa Mesa and John Wayne Airport meteorological monitoring stations, respectively. Tables 1 and 2 were generated using the final AERMET output. The Costa Mesa meteorological monitoring station AERMET processed files were supplied by the SCAQMD. The John Wayne Airport meteorological monitoring station AERMET processed files incorporated the ISH data in conjunction with the 1-minute ASOS data, as recommended by EPA guidance (EPA, 2013)[2].

TABLE 1
Costa Mesa Meteorological Data Completeness (Percent)

Quarter	**1**		**2**		**3**		**4**	
Year	**WS/WD**	**Temp**	**WS/WD**	**Temp**	**WS/WD**	**Temp**	**WS/WD**	**Temp**
2005	**89**	100	96	100	96	100	93	100
2006	**89**	100	95	100	93	100	**87**	100
2007	92	100	100	100	99	100	92	100
2008	97	100	100	100	100	100	99	100
2009	99	99	99	100	100	91	99	97

Bold values do not meet the EPA data completeness requirement
WS/WD: Wind Speed/Wind Direction
Temp: Temperature

[2] Twice-daily National Climatic Data Center soundings from the San Diego Miramar National Weather Service station (Station #03190) was also utilized in developing the AERMET processed meteorological data files. This same upper air station was used by the SCAQMD to process the Costa Mesa meteorological data and is considered appropriate for use at the HBEP site.

TABLE 2

John Wayne Airport Meteorological Data Completeness (Percent)

Quarter	1		2		3		4	
Year	WS/WD	Temp	WS/WD	Temp	WS/WD	Temp	WS/WD	Temp
2008	99	97	100	99	99	99	99	100
2009	99	99	98	98	100	100	99	99
2010	99	100	99	100	99	99	100	99
2011	100	100	98	99	100	100	100	100
2012	99	100	100	100	100	100	100	100

WS/WD: Wind Speed/Wind Direction
Temp: Temperature

The quarterly data completeness tables demonstrate that the Costa Mesa meteorological data do not meet the 90-percent completeness criteria by quarter for PSD permitting. The John Wayne Airport ISH meteorological data, with the inclusion of 1-minute ASOS data, do meet the minimum requirement of 90-percent data completeness, as recommended by EPA guidance (EPA, 2013).

Representativeness to HBEP

Both the Costa Mesa meteorological monitoring station and the John Wayne Airport meteorological monitoring station are near HBEP and no complex terrain features occur between the project site and either station. Figures 2 and 3 above demonstrate that the winds are similar between the two meteorological monitoring stations and are representative of the HBEP site due to its location on the California coastline, as shown in Figure 1.

The AERMOD modeling system will be used to characterize the impacts from the project against the NAAQS and Increments. As mentioned above, EPA recommends that the surface characteristics be similar between the project site and the meteorological monitoring station when using the AERMOD modeling system. The EPA AERSURFACE program is used to determine the surface characteristics surrounding modeled sources and the meteorological monitoring stations.

The AERSURFACE program was developed by EPA to assist in the selection of surface characteristics surrounding meteorological monitoring stations. AERSURFACE uses a user-defined coordinate and United States Geological Survey (USGS) land use and land classification (NLCD) data to output the appropriate surface characteristics for noon-time albedo, daytime Bowen Ratio, and surface roughness lengths following EPA guidance (EPA, 2009). The AERSURFACE output is then used in AERMET to assist in the calculation of the boundary layer profiles.

The AERSURFACE program was run for HBEP, the Costa Mesa meteorological monitoring station, and the John Wayne Airport meteorological monitoring station. Twelve 30-degree sectors surrounding the locations were used as criteria for calculating surface roughness. Noon-time albedo and daytime Bowen ratio calculations in AERSURFACE use the default 10 km-by-10 km survey surrounding the specified coordinate. The default seasonal months without continuous snow cover during winter was assumed. AERSURFACE also uses the default 1-km downwind distance and user-entered sectors for determining surface roughness lengths. Table 3 summarizes the AERSURFACE output surface roughness lengths at each location. Table 4 summarizes the noon-time albedo and daytime Bowen ratios.

TABLE 3
AERSURFACE Surface Roughness

Season	Sector (degrees)	HBEP	CSTA	John W.
Winter	1 (0-30)	0.298	0.375	0.119
	2 (30-60)	0.311	0.514	0.095
	3 (60-90)	0.28	0.441	0.111
	4 (90-120)	0.162	0.386	0.129
	5 (120-150)	0.275	0.407	0.099
	6 (150-180)	0.026	0.34	0.108
	7 (180-210)	0.007	0.209	0.098
	8 (210-240)	0.009	0.22	0.105
	9 (240-270)	0.013	0.258	0.149
	10 (270-300)	0.183	0.261	0.128
	11 (300-330)	0.479	0.29	0.144
	12 (330-360)	0.403	0.389	0.138
Spring	1 (0-30)	0.352	0.459	0.151
	2 (30-60)	0.358	0.578	0.132
	3 (60-90)	0.331	0.516	0.119
	4 (90-120)	0.19	0.453	0.138
	5 (120-150)	0.292	0.464	0.115
	6 (150-180)	0.027	0.403	0.115
	7 (180-210)	0.007	0.251	0.123
	8 (210-240)	0.009	0.265	0.112
	9 (240-270)	0.013	0.32	0.158
	10 (270-300)	0.191	0.338	0.141
	11 (300-330)	0.5	0.364	0.171
	12 (330-360)	0.446	0.474	0.158
Summer	1 (0-30)	0.381	0.469	0.163
	2 (30-60)	0.377	0.583	0.148
	3 (60-90)	0.36	0.527	0.123
	4 (90-120)	0.202	0.466	0.143
	5 (120-150)	0.294	0.483	0.122
	6 (150-180)	0.027	0.434	0.118
	7 (180-210)	0.007	0.296	0.135
	8 (210-240)	0.009	0.288	0.116
	9 (240-270)	0.014	0.345	0.158
	10 (270-300)	0.193	0.357	0.142
	11 (300-330)	0.503	0.377	0.176

	12 (330-360)	0.462	0.48	0.162
Autumn	1 (0-30)	0.376	0.463	0.163
	2 (30-60)	0.374	0.58	0.148
	3 (60-90)	0.357	0.523	0.123
	4 (90-120)	0.199	0.464	0.143
	5 (120-150)	0.294	0.483	0.122
	6 (150-180)	0.027	0.432	0.118
	7 (180-210)	0.007	0.288	0.135
	8 (210-240)	0.009	0.276	0.116
	9 (240-270)	0.014	0.332	0.158
	10 (270-300)	0.193	0.347	0.142
	11 (300-330)	0.503	0.369	0.175
	12 (330-360)	0.461	0.478	0.162

CSTA: Costa Mesa Monitoring Station Location
John W.: John Wayne Airport Monitoring Station Location
Sectors define 30-degree segments around the location starting at true north.
Values are in meters (m).

TABLE 4
AERSURFACE Bowen Ratio and Albedo Output

Bowen Ratio			
Season	**HBEP**	**CSTA**	**John W.**
Winter	0.38	1.12	1.15
Spring	0.33	0.88	0.9
Summer	0.34	0.91	0.92
Autumn	0.38	1.12	1.15
Noon-time Albedo			
Season	**HBEP**	**CSTA**	**John W.**
Winter	0.14	0.18	0.18
Spring	0.14	0.17	0.17
Summer	0.14	0.17	0.17
Autumn	0.14	0.18	0.18

CSTA: Costa Mesa Monitoring Station Location
John W.: John Wayne Airport Monitoring Station Location

The noon-time Albedo and daytime Bowen ratios do vary slightly for both the Costa Mesa meteorological monitoring station location and the John Wayne Airport meteorological monitoring station location compared to the HBEP. However, the AERMOD model-predicted concentrations are not as sensitive to these parameters for buoyant source types at HBEP (Wesson, 2005). Therefore, these small differences for noon-time Albedo and daytime Bowen ratios between the HBEP and the meteorological monitoring station locations would have little influence on the AERMOD model results for HBEP. However, the AERMOD model is more sensitive to the surface roughness lengths.

Although the surface roughness lengths appear to vary between the three locations, the primary wind directions are from the southwest. That corresponds to wind directions from the segment between 180 degrees and 270 degrees. These southwest winds correspond to sector 7, sector 8, and sector 9 in the AERSURFACE surface roughness length output. HBEP is located on the coast where the southwest sector could be characterized by open water with a low surface roughness. The John Wayne Airport meteorological monitoring station is located near an airport runway which is oriented southwest to northeast. This orientation of the runway has open ground and a low surface roughness associated with the runway land use type for winds blowing from the southwest. The Costa Mesa meteorological monitoring station is located in an area surrounded by residential houses and low-lying commercial land use types. Theses land use types are associated with higher surface roughness lengths for the southwest sectors.

Given that the AERMOD model is sensitive to surface roughness, the John Wayne Airport meteorological monitoring station, which is sited to have similar land use types with corresponding similar surface roughness parameters, would be more representative of the surface characteristics at the HBEP site than the Costa Mesa meteorological monitoring station.

Selection of Meteorological Data for PSD Dispersion Modeling of the HBEP

Based on the analysis of the SCAQMD Costa Mesa pre-processed AERMET data and the John Wayne Airport meteorological data with the inclusion of the 1-minute ASOS data, the John Wayne Airport meteorological data would be representative of the HBEP site. This is because the most recent 5 years of meteorological data are publicly available, the data have undergone a comprehensive quality assurance program administered by the NWS, the data are greater than 90-percent complete on a quarterly basis prior to data substitution, the wind rose is similar to expected winds for the coastal project location, and the surface characteristics surrounding the monitoring site are more representative than other nearby monitoring sites of the HBEP for the predominant wind directions. Therefore, the John Wayne Airport meteorological data processed with AERMET, and the inclusion of the 1-minute ASOS data with AERMINUTE, would be adequate for PSD permit modeling of the HBEP.

In addition, the surface characteristics used to process the John Wayne Airport meteorological data may result in more conservative short term concentrations as a result of the smaller roughness lengths compared to the Costa Mesa meteorological monitoring station. The smaller roughness length in the processed data would result in less turbulent conditions. The less turbulent conditions would not allow the plume to disperse as quickly, thus resulting in possible higher impacts.

References

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Attachment 2
Proposed Source Inventory for Performing an SCAQMD Competing Source Analysis

HBEP
Competing Sources Emissions Inventory
Sources Requested by SCAQMD

Point Sources

Source Number	Source Description	Easting (X) (m)	Northing (Y) (m)	Base Elevation (m)	Stack Height (m)	Temperature (K)	Exit Velocity (m/s)	Stack Diameter (m)	NO_2 (lb/hr)
1	HBEP Stack 1	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
2	HBEP Stack 2	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
3	HBEP Stack 3	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
4	HBEP Stack 4	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
5	Existing HBGS Boilers 1 and 2	409274	3723095	3.7	200.0	202	25.9	20.6	34.3
6	Orange Co San District Fountain Valley 1730101	412962	3728359	8.0	24.3	1500	4.5	7.3	5.2
7	OCSFV 1730102	412914	3728328	7.7	25.0	395	23.1	1.8	0.1
8	OCSFV 1730103	412935	3728401	8.0	62.0	500	58.7	2.5	7.8
9	OCSFV 1730104	412942	3728391	8.0	62.0	500	58.7	2.5	7.8
10	OCSFV 1730105	412939	3728396	8.0	62.0	500	58.7	2.5	7.8
11	Orange Co San District Huntington 2911001	411071	3722313	1.6	25.0	395	24.4	1.8	0.6
12	OCSHB 2911002	411096	3722214	1.6	24.3	1500	4.5	2.2	0.9
13	OCSHB 2911003	411240	3722455	1.6	59.0	600	75.0	2.5	6.9
14	OCSHB 2911004	411248	3722455	1.6	59.0	600	75.0	2.5	6.9
15	OCSHB 2911005	411255	3722455	1.6	59.0	600	75.0	2.5	6.9
16	OCSHB 2911006	411263	3722455	1.6	59.0	600	75.0	2.5	6.9
17	OCSHB 2911007	411270	3722455	1.6	59.0	600	75.0	2.5	6.9
18	Beta Offshore 16607301	395222	3716431	0.0	60.0	730	102.0	1.0	15.0
19	Beta 16607302	395222	3716431	0.0	60.0	693	98.3	1.0	15.0
20	Beta 16607303	395222	3716431	0.0	60.0	593	79.5	1.0	15.0
21	Beta 16607304	394082	3717932	0.0	60.0	734	94.2	1.0	15.0
22	Beta 16607305	394082	3717932	0.0	60.0	772	114.0	1.0	15.0
23	Beta 16607306	394082	3717932	0.0	60.0	590	69.1	1.0	15.0
24	Beta 16607307	395265	3716554	0.0	60.0	749	129.2	2.0	2.9
25	Beta 16607308	395265	3716554	0.0	60.0	748	125.0	2.0	2.5
26	Beta 16607309	395265	3716554	0.0	60.0	759	123.0	2.0	2.8
27	Beta 16607310	395265	3716554	0.0	60.0	749	266.5	2.5	20.0
28	Beta 16607311	395265	3716554	0.0	60.0	745	266.0	2.5	19.7
29	Beta 16607312	395265	3716554	0.0	60.0	743	267.0	2.5	19.7
30	Beta 16607313	395265	3716554	0.0	75.0	376	27.4	1.7	81.6

HBEP
Competing Sources Emissions Inventory
Sources Requested by SCAQMD

Shipping Lanes Volume Sources

Source Number	Source Description	Easting (X) (m)	Northing (Y) (m)	Base Elevation (m)	Release Height (m)	Init. Horizontal Dimension (m)	Initial Vert. Dimension (m)	NO_2 (lb/hr)
69	OGV 774401	402983	3708740	0	0	0.014	186.0	23.3
70	OGV 774402	402183	3708740	0	0	0.014	186.0	23.3
71	OGV 774403	401383	3708740	0	0	0.014	186.0	23.3
72	OGV 774404	400583	3708740	0	0	0.014	186.0	23.3
73	OGV 774405	399783	3708740	0	0	0.014	186.0	23.3
74	OGV 774406	402983	3707940	0	0	0.014	186.0	23.3
75	OGV 774407	402183	3707940	0	0	0.014	186.0	23.3
76	OGV 774408	401383	3707940	0	0	0.014	186.0	23.3
77	OGV 774409	400583	3707940	0	0	0.014	186.0	23.3
78	OGV 774410	399783	3707940	0	0	0.014	186.0	23.3
79	OGV 774411	402983	3707140	0	0	0.014	186.0	23.3
80	OGV 774412	402183	3707140	0	0	0.014	186.0	23.3
81	OGV 774413	401383	3707140	0	0	0.014	186.0	23.3
82	OGV 774414	400583	3707140	0	0	0.014	186.0	23.3
83	OGV 774415	399783	3707140	0	0	0.014	186.0	23.3
84	OGV 774416	402983	3706340	0	0	0.014	186.0	23.3
85	OGV 774417	402183	3706340	0	0	0.014	186.0	23.3
86	OGV 774418	401383	3706340	0	0	0.014	186.0	23.3
87	OGV 774419	400583	3706340	0	0	0.014	186.0	23.3
88	OGV 774420	399783	3706340	0	0	0.014	186.0	23.3
89	OGV 774421	402983	3705540	0	0	0.014	186.0	23.3
90	OGV 774422	402183	3705540	0	0	0.014	186.0	23.3
91	OGV 774423	401383	3705540	0	0	0.014	186.0	23.3
92	OGV 774424	400583	3705540	0	0	0.014	186.0	23.3
93	OGV 774425	399783	3705540	0	0	0.014	186.0	23.3
94	OGV 774301	402983	3704740	0	0	0.046	186.0	23.3
95	OGV 774302	402183	3704740	0	0	0.046	186.0	23.3
96	OGV 774303	401383	3704740	0	0	0.046	186.0	23.3
97	OGV 774304	400583	3704740	0	0	0.046	186.0	23.3
98	OGV 774305	399783	3704740	0	0	0.046	186.0	23.3
99	OGV 774306	402983	3703940	0	0	0.046	186.0	23.3
100	OGV 774307	402183	3703940	0	0	0.046	186.0	23.3
101	OGV 774308	401383	3703940	0	0	0.046	186.0	23.3
102	OGV 774309	400583	3703940	0	0	0.046	186.0	23.3
103	OGV 774310	399783	3703940	0	0	0.046	186.0	23.3
104	OGV 774311	402983	3703140	0	0	0.046	186.0	23.3
105	OGV 774312	402183	3703140	0	0	0.046	186.0	23.3
106	OGV 774313	401383	3703140	0	0	0.046	186.0	23.3
107	OGV 774314	400583	3703140	0	0	0.046	186.0	23.3
108	OGV 774315	399783	3703140	0	0	0.046	186.0	23.3
109	OGV 774316	402983	3702340	0	0	0.046	186.0	23.3
110	OGV 774317	402183	3702340	0	0	0.046	186.0	23.3
111	OGV 774318	401383	3702340	0	0	0.046	186.0	23.3
112	OGV 774319	400583	3702340	0	0	0.046	186.0	23.3
113	OGV 774320	399783	3702340	0	0	0.046	186.0	23.3
114	OGV 774321	402983	3701540	0	0	0.046	186.0	23.3
115	OGV 774322	402183	3701540	0	0	0.046	186.0	23.3
116	OGV 774323	401383	3701540	0	0	0.046	186.0	23.3
117	OGV 774324	400583	3701540	0	0	0.046	186.0	23.3
118	OGV 774325	399783	3701540	0	0	0.046	186.0	23.3
119	OGV 774201	402983	3700740	0	0	0.080	186.0	23.3
120	OGV 774202	402183	3700740	0	0	0.080	186.0	23.3
121	OGV 774203	401383	3700740	0	0	0.080	186.0	23.3
122	OGV 774204	400583	3700740	0	0	0.080	186.0	23.3
123	OGV 774205	399783	3700740	0	0	0.080	186.0	23.3
124	OGV 774206	402983	3699940	0	0	0.080	186.0	23.3
125	OGV 774207	402183	3699940	0	0	0.080	186.0	23.3
126	OGV 774208	401383	3699940	0	0	0.080	186.0	23.3
127	OGV 774209	400583	3699940	0	0	0.080	186.0	23.3
128	OGV 774210	399783	3699940	0	0	0.080	186.0	23.3
129	OGV 774211	402983	3699140	0	0	0.080	186.0	23.3
130	OGV 774212	402183	3699140	0	0	0.080	186.0	23.3
131	OGV 774213	401383	3699140	0	0	0.080	186.0	23.3
132	OGV 774214	400583	3699140	0	0	0.080	186.0	23.3
133	OGV 774215	399783	3699140	0	0	0.080	186.0	23.3
134	OGV 774216	402983	3698340	0	0	0.080	186.0	23.3
135	OGV 774217	402183	3698340	0	0	0.080	186.0	23.3
136	OGV 774218	401383	3698340	0	0	0.080	186.0	23.3

HBEP
Competing Sources Emissions Inventory
Sources Requested by SCAQMD

Shipping Lanes Volume Sources

Source Number	Source Description	Easting (X) (m)	Northing (Y) (m)	Base Elevation (m)	Release Height (m)	Init. Horizontal Dimension (m)	Initial Vert. Dimension (m)	NO_2 (lb/hr)
137	OGV 774219	400583	3698340	0	0	0.080	186.0	23.3
138	OGV 774220	399783	3698340	0	0	0.080	186.0	23.3
139	OGV 774221	402983	3697540	0	0	0.080	186.0	23.3
140	OGV 774222	402183	3697540	0	0	0.080	186.0	23.3
141	OGV 774223	401383	3697540	0	0	0.080	186.0	23.3
142	OGV 774224	400583	3697540	0	0	0.080	186.0	23.3
143	OGV 774225	399783	3697540	0	0	0.080	186.0	23.3
144	OGV 764601	398983	3716740	0	0	0.034	186.0	23.3
145	OGV 764602	398183	3716740	0	0	0.034	186.0	23.3
146	OGV 764603	397383	3716740	0	0	0.034	186.0	23.3
147	OGV 764604	396583	3716740	0	0	0.034	186.0	23.3
148	OGV 764605	395783	3716740	0	0	0.034	186.0	23.3
149	OGV 764606	398983	3715940	0	0	0.034	186.0	23.3
150	OGV 764607	398183	3715940	0	0	0.034	186.0	23.3
151	OGV 764608	397383	3715940	0	0	0.034	186.0	23.3
152	OGV 764609	396583	3715940	0	0	0.034	186.0	23.3
153	OGV 764610	395783	3715940	0	0	0.034	186.0	23.3
154	OGV 764611	398983	3715140	0	0	0.034	186.0	23.3
155	OGV 764612	398183	3715140	0	0	0.034	186.0	23.3
156	OGV 764613	397383	3715140	0	0	0.034	186.0	23.3
157	OGV 764614	396583	3715140	0	0	0.034	186.0	23.3
158	OGV 764615	395783	3715140	0	0	0.034	186.0	23.3
159	OGV 764616	398983	3714340	0	0	0.034	186.0	23.3
160	OGV 764617	398183	3714340	0	0	0.034	186.0	23.3
161	OGV 764618	397383	3714340	0	0	0.034	186.0	23.3
162	OGV 764619	396583	3714340	0	0	0.034	186.0	23.3
163	OGV 764620	395783	3714340	0	0	0.034	186.0	23.3
164	OGV 764621	398983	3713540	0	0	0.034	186.0	23.3
165	OGV 764622	398183	3713540	0	0	0.034	186.0	23.3
166	OGV 764623	397383	3713540	0	0	0.034	186.0	23.3
167	OGV 764624	396583	3713540	0	0	0.034	186.0	23.3
168	OGV 764625	395783	3713540	0	0	0.034	186.0	23.3
169	OGV 764501	398983	3712740	0	0	0.046	186.0	23.3
170	OGV 764502	398183	3712740	0	0	0.046	186.0	23.3
171	OGV 764503	397383	3712740	0	0	0.046	186.0	23.3
172	OGV 764504	396583	3712740	0	0	0.046	186.0	23.3
173	OGV 764505	395783	3712740	0	0	0.046	186.0	23.3
174	OGV 764506	398983	3711940	0	0	0.046	186.0	23.3
175	OGV 764507	398183	3711940	0	0	0.046	186.0	23.3
176	OGV 764508	397383	3711940	0	0	0.046	186.0	23.3
177	OGV 764509	396583	3711940	0	0	0.046	186.0	23.3
178	OGV 764510	395783	3711940	0	0	0.046	186.0	23.3
179	OGV 764511	398983	3711140	0	0	0.046	186.0	23.3
180	OGV 764512	398183	3711140	0	0	0.046	186.0	23.3
181	OGV 764513	397383	3711140	0	0	0.046	186.0	23.3
182	OGV 764514	396583	3711140	0	0	0.046	186.0	23.3
183	OGV 764515	395783	3711140	0	0	0.046	186.0	23.3
184	OGV 764516	398983	3710340	0	0	0.046	186.0	23.3
185	OGV 764517	398183	3710340	0	0	0.046	186.0	23.3
186	OGV 764518	397383	3710340	0	0	0.046	186.0	23.3
187	OGV 764519	396583	3710340	0	0	0.046	186.0	23.3
188	OGV 764520	395783	3710340	0	0	0.046	186.0	23.3
189	OGV 764521	398983	3709540	0	0	0.046	186.0	23.3
190	OGV 764522	398183	3709540	0	0	0.046	186.0	23.3
191	OGV 764523	397383	3709540	0	0	0.046	186.0	23.3
192	OGV 764524	396583	3709540	0	0	0.046	186.0	23.3
193	OGV 764525	395783	3709540	0	0	0.046	186.0	23.3
194	OGV 764401	398983	3708740	0	0	0.046	186.0	23.3
195	OGV 764402	398183	3708740	0	0	0.046	186.0	23.3
196	OGV 764403	397383	3708740	0	0	0.046	186.0	23.3
197	OGV 764404	396583	3708740	0	0	0.046	186.0	23.3
198	OGV 764405	395783	3708740	0	0	0.046	186.0	23.3
199	OGV 764406	398983	3707940	0	0	0.046	186.0	23.3
200	OGV 764407	398183	3707940	0	0	0.046	186.0	23.3
201	OGV 764408	397383	3707940	0	0	0.046	186.0	23.3
202	OGV 764409	396583	3707940	0	0	0.046	186.0	23.3
203	OGV 764410	395783	3707940	0	0	0.046	186.0	23.3
204	OGV 764411	398983	3707140	0	0	0.046	186.0	23.3

HBEP
Competing Sources Emissions Inventory
Sources Requested by SCAQMD

Shipping Lanes Volume Sources

Source Number	Source Description	Easting (X) (m)	Northing (Y) (m)	Base Elevation (m)	Release Height (m)	Init. Horizontal Dimension (m)	Initial Vert. Dimension (m)	NO_2 (lb/hr)
205	OGV 764412	398183	3707140	0	0	0.046	186.0	23.3
206	OGV 764413	397383	3707140	0	0	0.046	186.0	23.3
207	OGV 764414	396583	3707140	0	0	0.046	186.0	23.3
208	OGV 764415	395783	3707140	0	0	0.046	186.0	23.3
209	OGV 764416	398983	3706340	0	0	0.046	186.0	23.3
210	OGV 764417	398183	3706340	0	0	0.046	186.0	23.3
211	OGV 764418	397383	3706340	0	0	0.046	186.0	23.3
212	OGV 764419	396583	3706340	0	0	0.046	186.0	23.3
213	OGV 764420	395783	3706340	0	0	0.046	186.0	23.3
214	OGV 764421	398983	3705540	0	0	0.046	186.0	23.3
215	OGV 764422	398183	3705540	0	0	0.046	186.0	23.3
216	OGV 764423	397383	3705540	0	0	0.046	186.0	23.3
217	OGV 764424	396583	3705540	0	0	0.046	186.0	23.3
218	OGV 764425	395783	3705540	0	0	0.046	186.0	23.3
219	OGV 764301	398983	3704740	0	0	0.046	186.0	23.3
220	OGV 764302	398183	3704740	0	0	0.046	186.0	23.3
221	OGV 764303	397383	3704740	0	0	0.046	186.0	23.3
222	OGV 764304	396583	3704740	0	0	0.046	186.0	23.3
223	OGV 764305	395783	3704740	0	0	0.046	186.0	23.3
224	OGV 764306	398983	3703940	0	0	0.046	186.0	23.3
225	OGV 764307	398183	3703940	0	0	0.046	186.0	23.3
226	OGV 764308	397383	3703940	0	0	0.046	186.0	23.3
227	OGV 764309	396583	3703940	0	0	0.046	186.0	23.3
228	OGV 764310	395783	3703940	0	0	0.046	186.0	23.3
229	OGV 764311	398983	3703140	0	0	0.046	186.0	23.3
230	OGV 764312	398183	3703140	0	0	0.046	186.0	23.3
231	OGV 764313	397383	3703140	0	0	0.046	186.0	23.3
232	OGV 764314	396583	3703140	0	0	0.046	186.0	23.3
233	OGV 764315	395783	3703140	0	0	0.046	186.0	23.3
234	OGV 764316	398983	3702340	0	0	0.046	186.0	23.3
235	OGV 764317	398183	3702340	0	0	0.046	186.0	23.3
236	OGV 764318	397383	3702340	0	0	0.046	186.0	23.3
237	OGV 764319	396583	3702340	0	0	0.046	186.0	23.3
238	OGV 764320	395783	3702340	0	0	0.046	186.0	23.3
239	OGV 764321	398983	3701540	0	0	0.046	186.0	23.3
240	OGV 764322	398183	3701540	0	0	0.046	186.0	23.3
241	OGV 764323	397383	3701540	0	0	0.046	186.0	23.3
242	OGV 764324	396583	3701540	0	0	0.046	186.0	23.3
243	OGV 764325	395783	3701540	0	0	0.046	186.0	23.3
244	OGV 764201	398983	3700740	0	0	0.046	186.0	23.3
245	OGV 764202	398183	3700740	0	0	0.046	186.0	23.3
246	OGV 764203	397383	3700740	0	0	0.046	186.0	23.3
247	OGV 764204	396583	3700740	0	0	0.046	186.0	23.3
248	OGV 764205	395783	3700740	0	0	0.046	186.0	23.3
249	OGV 764206	398983	3699940	0	0	0.046	186.0	23.3
250	OGV 764207	398183	3699940	0	0	0.046	186.0	23.3
251	OGV 764208	397383	3699940	0	0	0.046	186.0	23.3
252	OGV 764209	396583	3699940	0	0	0.046	186.0	23.3
253	OGV 764210	395783	3699940	0	0	0.046	186.0	23.3
254	OGV 764211	398983	3699140	0	0	0.046	186.0	23.3
255	OGV 764212	398183	3699140	0	0	0.046	186.0	23.3
256	OGV 764213	397383	3699140	0	0	0.046	186.0	23.3
257	OGV 764214	396583	3699140	0	0	0.046	186.0	23.3
258	OGV 764215	395783	3699140	0	0	0.046	186.0	23.3
259	OGV 764216	398983	3698340	0	0	0.046	186.0	23.3
260	OGV 764217	398183	3698340	0	0	0.046	186.0	23.3
261	OGV 764218	397383	3698340	0	0	0.046	186.0	23.3
262	OGV 764219	396583	3698340	0	0	0.046	186.0	23.3
263	OGV 764220	395783	3698340	0	0	0.046	186.0	23.3
264	OGV 764221	398983	3697540	0	0	0.046	186.0	23.3
265	OGV 764222	398183	3697540	0	0	0.046	186.0	23.3
266	OGV 764223	397383	3697540	0	0	0.046	186.0	23.3
267	OGV 764224	396583	3697540	0	0	0.046	186.0	23.3
268	OGV 764225	395783	3697540	0	0	0.046	186.0	23.3
269	OGV 754801	394983	3724740	0	0	0.019	186.0	23.3
270	OGV 754802	394183	3724740	0	0	0.019	186.0	23.3
271	OGV 754803	393383	3724740	0	0	0.019	186.0	23.3
272	OGV 754804	392583	3724740	0	0	0.019	186.0	23.3

HBEP
Competing Sources Emissions Inventory
Sources Requested by SCAQMD

Shipping Lanes Volume Sources

Source Number	Source Description	Easting (X) (m)	Northing (Y) (m)	Base Elevation (m)	Release Height (m)	Init. Horizontal Dimension (m)	Initial Vert. Dimension (m)	NO_2 (lb/hr)
273	OGV 754805	391783	3724740	0	0	0.019	186.0	23.3
274	OGV 754806	394983	3723940	0	0	0.019	186.0	23.3
275	OGV 754807	394183	3723940	0	0	0.019	186.0	23.3
276	OGV 754808	393383	3723940	0	0	0.019	186.0	23.3
277	OGV 754809	392583	3723940	0	0	0.019	186.0	23.3
278	OGV 754810	391783	3723940	0	0	0.019	186.0	23.3
279	OGV 754811	394983	3723140	0	0	0.019	186.0	23.3
280	OGV 754812	394183	3723140	0	0	0.019	186.0	23.3
281	OGV 754813	393383	3723140	0	0	0.019	186.0	23.3
282	OGV 754814	392583	3723140	0	0	0.019	186.0	23.3
283	OGV 754815	391783	3723140	0	0	0.019	186.0	23.3
284	OGV 754816	394983	3722340	0	0	0.019	186.0	23.3
285	OGV 754817	394183	3722340	0	0	0.019	186.0	23.3
286	OGV 754818	393383	3722340	0	0	0.019	186.0	23.3
287	OGV 754819	392583	3722340	0	0	0.019	186.0	23.3
288	OGV 754820	391783	3722340	0	0	0.019	186.0	23.3
289	OGV 754821	394983	3721540	0	0	0.019	186.0	23.3
290	OGV 754822	394183	3721540	0	0	0.019	186.0	23.3
291	OGV 754823	393383	3721540	0	0	0.019	186.0	23.3
292	OGV 754824	392583	3721540	0	0	0.019	186.0	23.3
293	OGV 754825	391783	3721540	0	0	0.019	186.0	23.3
294	OGV 754701	394983	3720740	0	0	0.030	186.0	23.3
295	OGV 754702	394183	3720740	0	0	0.030	186.0	23.3
296	OGV 754703	393383	3720740	0	0	0.030	186.0	23.3
297	OGV 754704	392583	3720740	0	0	0.030	186.0	23.3
298	OGV 754705	391783	3720740	0	0	0.030	186.0	23.3
299	OGV 754706	394983	3719940	0	0	0.030	186.0	23.3
300	OGV 754707	394183	3719940	0	0	0.030	186.0	23.3
301	OGV 754708	393383	3719940	0	0	0.030	186.0	23.3
302	OGV 754709	392583	3719940	0	0	0.030	186.0	23.3
303	OGV 754710	391783	3719940	0	0	0.030	186.0	23.3
304	OGV 754711	394983	3719140	0	0	0.030	186.0	23.3
305	OGV 754712	394183	3719140	0	0	0.030	186.0	23.3
306	OGV 754713	393383	3719140	0	0	0.030	186.0	23.3
307	OGV 754714	392583	3719140	0	0	0.030	186.0	23.3
308	OGV 754715	391783	3719140	0	0	0.030	186.0	23.3
309	OGV 754716	394983	3718340	0	0	0.030	186.0	23.3
310	OGV 754717	394183	3718340	0	0	0.030	186.0	23.3
311	OGV 754718	393383	3718340	0	0	0.030	186.0	23.3
312	OGV 754719	392583	3718340	0	0	0.030	186.0	23.3
313	OGV 754720	391783	3718340	0	0	0.030	186.0	23.3
314	OGV 754721	394983	3717540	0	0	0.030	186.0	23.3
315	OGV 754722	394183	3717540	0	0	0.030	186.0	23.3
316	OGV 754723	393383	3717540	0	0	0.030	186.0	23.3
317	OGV 754724	392583	3717540	0	0	0.030	186.0	23.3
318	OGV 754725	391783	3717540	0	0	0.030	186.0	23.3
319	OGV 754601	394983	3716740	0	0	0.010	186.0	23.3
320	OGV 754602	394183	3716740	0	0	0.010	186.0	23.3
321	OGV 754603	393383	3716740	0	0	0.010	186.0	23.3
322	OGV 754604	392583	3716740	0	0	0.010	186.0	23.3
323	OGV 754605	391783	3716740	0	0	0.010	186.0	23.3
324	OGV 754606	394983	3715940	0	0	0.010	186.0	23.3
325	OGV 754607	394183	3715940	0	0	0.010	186.0	23.3
326	OGV 754608	393383	3715940	0	0	0.010	186.0	23.3
327	OGV 754609	392583	3715940	0	0	0.010	186.0	23.3
328	OGV 754610	391783	3715940	0	0	0.010	186.0	23.3
329	OGV 754611	394983	3715140	0	0	0.010	186.0	23.3
330	OGV 754612	394183	3715140	0	0	0.010	186.0	23.3
331	OGV 754613	393383	3715140	0	0	0.010	186.0	23.3
332	OGV 754614	392583	3715140	0	0	0.010	186.0	23.3
333	OGV 754615	391783	3715140	0	0	0.010	186.0	23.3
334	OGV 754616	394983	3714340	0	0	0.010	186.0	23.3
335	OGV 754617	394183	3714340	0	0	0.010	186.0	23.3
336	OGV 754618	393383	3714340	0	0	0.010	186.0	23.3
337	OGV 754619	392583	3714340	0	0	0.010	186.0	23.3
338	OGV 754620	391783	3714340	0	0	0.010	186.0	23.3
339	OGV 754621	394983	3713540	0	0	0.010	186.0	23.3
340	OGV 754622	394183	3713540	0	0	0.010	186.0	23.3

HBEP
Competing Sources Emissions Inventory
Sources Requested by SCAQMD

Shipping Lanes Volume Sources

Source Number	Source Description	Easting (X) (m)	Northing (Y) (m)	Base Elevation (m)	Release Height (m)	Init. Horizontal Dimension (m)	Initial Vert. Dimension (m)	NO_2 (lb/hr)
341	OGV 754623	393383	3713540	0	0	0.010	186.0	23.3
342	OGV 754624	392583	3713540	0	0	0.010	186.0	23.3
343	OGV 754625	391783	3713540	0	0	0.010	186.0	23.3
344	OGV 754501	394983	3712740	0	0	0.020	186.0	23.3
345	OGV 754502	394183	3712740	0	0	0.020	186.0	23.3
346	OGV 754503	393383	3712740	0	0	0.020	186.0	23.3
347	OGV 754504	392583	3712740	0	0	0.020	186.0	23.3
348	OGV 754505	391783	3712740	0	0	0.020	186.0	23.3
349	OGV 754506	394983	3711940	0	0	0.020	186.0	23.3
350	OGV 754507	394183	3711940	0	0	0.020	186.0	23.3
351	OGV 754508	393383	3711940	0	0	0.020	186.0	23.3
352	OGV 754509	392583	3711940	0	0	0.020	186.0	23.3
353	OGV 754510	391783	3711940	0	0	0.020	186.0	23.3
354	OGV 754511	394983	3711140	0	0	0.020	186.0	23.3
355	OGV 754512	394183	3711140	0	0	0.020	186.0	23.3
356	OGV 754513	393383	3711140	0	0	0.020	186.0	23.3
357	OGV 754514	392583	3711140	0	0	0.020	186.0	23.3
358	OGV 754515	391783	3711140	0	0	0.020	186.0	23.3
359	OGV 754516	394983	3710340	0	0	0.020	186.0	23.3
360	OGV 754517	394183	3710340	0	0	0.020	186.0	23.3
361	OGV 754518	393383	3710340	0	0	0.020	186.0	23.3
362	OGV 754519	392583	3710340	0	0	0.020	186.0	23.3
363	OGV 754520	391783	3710340	0	0	0.020	186.0	23.3
364	OGV 754521	394983	3709540	0	0	0.020	186.0	23.3
365	OGV 754522	394183	3709540	0	0	0.020	186.0	23.3
366	OGV 754523	393383	3709540	0	0	0.020	186.0	23.3
367	OGV 754524	392583	3709540	0	0	0.020	186.0	23.3
368	OGV 754525	391783	3709540	0	0	0.020	186.0	23.3
369	OGV 754401	394983	3708740	0	0	0.036	186.0	23.3
370	OGV 754402	394183	3708740	0	0	0.036	186.0	23.3
371	OGV 754403	393383	3708740	0	0	0.036	186.0	23.3
372	OGV 754404	392583	3708740	0	0	0.036	186.0	23.3
373	OGV 754405	391783	3708740	0	0	0.036	186.0	23.3
374	OGV 754406	394983	3707940	0	0	0.036	186.0	23.3
375	OGV 754407	394183	3707940	0	0	0.036	186.0	23.3
376	OGV 754408	393383	3707940	0	0	0.036	186.0	23.3
377	OGV 754409	392583	3707940	0	0	0.036	186.0	23.3
378	OGV 754410	391783	3707940	0	0	0.036	186.0	23.3
379	OGV 754411	394983	3707140	0	0	0.036	186.0	23.3
380	OGV 754412	394183	3707140	0	0	0.036	186.0	23.3
381	OGV 754413	393383	3707140	0	0	0.036	186.0	23.3
382	OGV 754414	392583	3707140	0	0	0.036	186.0	23.3
383	OGV 754415	391783	3707140	0	0	0.036	186.0	23.3
384	OGV 754416	394983	3706340	0	0	0.036	186.0	23.3
385	OGV 754417	394183	3706340	0	0	0.036	186.0	23.3
386	OGV 754418	393383	3706340	0	0	0.036	186.0	23.3
387	OGV 754419	392583	3706340	0	0	0.036	186.0	23.3
388	OGV 754420	391783	3706340	0	0	0.036	186.0	23.3
389	OGV 754421	394983	3705540	0	0	0.036	186.0	23.3
390	OGV 754422	394183	3705540	0	0	0.036	186.0	23.3
391	OGV 754423	393383	3705540	0	0	0.036	186.0	23.3
392	OGV 754424	392583	3705540	0	0	0.036	186.0	23.3
393	OGV 754425	391783	3705540	0	0	0.036	186.0	23.3
394	OGV 754301	394983	3704740	0	0	0.029	186.0	23.3
395	OGV 754302	394183	3704740	0	0	0.029	186.0	23.3
396	OGV 754303	393383	3704740	0	0	0.029	186.0	23.3
397	OGV 754304	392583	3704740	0	0	0.029	186.0	23.3
398	OGV 754305	391783	3704740	0	0	0.029	186.0	23.3
399	OGV 754306	394983	3703940	0	0	0.029	186.0	23.3
400	OGV 754307	394183	3703940	0	0	0.029	186.0	23.3
401	OGV 754308	393383	3703940	0	0	0.029	186.0	23.3
402	OGV 754309	392583	3703940	0	0	0.029	186.0	23.3
403	OGV 754310	391783	3703940	0	0	0.029	186.0	23.3
404	OGV 754311	394983	3703140	0	0	0.029	186.0	23.3
405	OGV 754312	394183	3703140	0	0	0.029	186.0	23.3
406	OGV 754313	393383	3703140	0	0	0.029	186.0	23.3
407	OGV 754314	392583	3703140	0	0	0.029	186.0	23.3
408	OGV 754315	391783	3703140	0	0	0.029	186.0	23.3

HBEP
Competing Sources Emissions Inventory
Sources Requested by SCAQMD

Shipping Lanes Volume Sources

Source Number	Source Description	Easting (X) (m)	Northing (Y) (m)	Base Elevation (m)	Release Height (m)	Init. Horizontal Dimension (m)	Initial Vert. Dimension (m)	NO_2 (lb/hr)
409	OGV 754316	394983	3702340	0	0	0.029	186.0	23.3
410	OGV 754317	394183	3702340	0	0	0.029	186.0	23.3
411	OGV 754318	393383	3702340	0	0	0.029	186.0	23.3
412	OGV 754319	392583	3702340	0	0	0.029	186.0	23.3
413	OGV 754320	391783	3702340	0	0	0.029	186.0	23.3
414	OGV 754321	394983	3701540	0	0	0.029	186.0	23.3
415	OGV 754322	394183	3701540	0	0	0.029	186.0	23.3
416	OGV 754323	393383	3701540	0	0	0.029	186.0	23.3
417	OGV 754324	392583	3701540	0	0	0.029	186.0	23.3
418	OGV 754325	391783	3701540	0	0	0.029	186.0	23.3
419	OGV 744801	390983	3724740	0	0	0.138	186.0	23.3
420	OGV 744802	390183	3724740	0	0	0.138	186.0	23.3
421	OGV 744803	389383	3724740	0	0	0.138	186.0	23.3
422	OGV 744804	388583	3724740	0	0	0.138	186.0	23.3
423	OGV 744805	387783	3724740	0	0	0.138	186.0	23.3
424	OGV 744806	390983	3723940	0	0	0.138	186.0	23.3
425	OGV 744807	390183	3723940	0	0	0.138	186.0	23.3
426	OGV 744808	389383	3723940	0	0	0.138	186.0	23.3
427	OGV 744809	388583	3723940	0	0	0.138	186.0	23.3
428	OGV 744810	387783	3723940	0	0	0.138	186.0	23.3
429	OGV 744811	390983	3723140	0	0	0.138	186.0	23.3
430	OGV 744812	390183	3723140	0	0	0.138	186.0	23.3
431	OGV 744813	389383	3723140	0	0	0.138	186.0	23.3
432	OGV 744814	388583	3723140	0	0	0.138	186.0	23.3
433	OGV 744815	387783	3723140	0	0	0.138	186.0	23.3
434	OGV 744816	390983	3722340	0	0	0.138	186.0	23.3
435	OGV 744817	390183	3722340	0	0	0.138	186.0	23.3
436	OGV 744818	389383	3722340	0	0	0.138	186.0	23.3
437	OGV 744819	388583	3722340	0	0	0.138	186.0	23.3
438	OGV 744820	387783	3722340	0	0	0.138	186.0	23.3
439	OGV 744821	390983	3721540	0	0	0.138	186.0	23.3
440	OGV 744822	390183	3721540	0	0	0.138	186.0	23.3
441	OGV 744823	389383	3721540	0	0	0.138	186.0	23.3
442	OGV 744824	388583	3721540	0	0	0.138	186.0	23.3
443	OGV 744825	387783	3721540	0	0	0.138	186.0	23.3
444	OGV 744701	390983	3720740	0	0	0.022	186.0	23.3
445	OGV 744702	390183	3720740	0	0	0.022	186.0	23.3
446	OGV 744703	389383	3720740	0	0	0.022	186.0	23.3
447	OGV 744704	388583	3720740	0	0	0.022	186.0	23.3
448	OGV 744705	387783	3720740	0	0	0.022	186.0	23.3
449	OGV 744706	390983	3719940	0	0	0.022	186.0	23.3
450	OGV 744707	390183	3719940	0	0	0.022	186.0	23.3
451	OGV 744708	389383	3719940	0	0	0.022	186.0	23.3
452	OGV 744709	388583	3719940	0	0	0.022	186.0	23.3
453	OGV 744710	387783	3719940	0	0	0.022	186.0	23.3
454	OGV 744711	390983	3719140	0	0	0.022	186.0	23.3
455	OGV 744712	390183	3719140	0	0	0.022	186.0	23.3
456	OGV 744713	389383	3719140	0	0	0.022	186.0	23.3
457	OGV 744714	388583	3719140	0	0	0.022	186.0	23.3
458	OGV 744715	387783	3719140	0	0	0.022	186.0	23.3
459	OGV 744716	390983	3718340	0	0	0.022	186.0	23.3
460	OGV 744717	390183	3718340	0	0	0.022	186.0	23.3
461	OGV 744718	389383	3718340	0	0	0.022	186.0	23.3
462	OGV 744719	388583	3718340	0	0	0.022	186.0	23.3
463	OGV 744720	387783	3718340	0	0	0.022	186.0	23.3
464	OGV 744721	390983	3717540	0	0	0.022	186.0	23.3
465	OGV 744722	390183	3717540	0	0	0.022	186.0	23.3
466	OGV 744723	389383	3717540	0	0	0.022	186.0	23.3
467	OGV 744724	388583	3717540	0	0	0.022	186.0	23.3
468	OGV 744725	387783	3717540	0	0	0.022	186.0	23.3
469	OGV 744601	390983	3716740	0	0	0.034	186.0	23.3
470	OGV 744602	390183	3716740	0	0	0.034	186.0	23.3
471	OGV 744603	389383	3716740	0	0	0.034	186.0	23.3
472	OGV 744604	388583	3716740	0	0	0.034	186.0	23.3
473	OGV 744605	387783	3716740	0	0	0.034	186.0	23.3
474	OGV 744606	390983	3715940	0	0	0.034	186.0	23.3
475	OGV 744607	390183	3715940	0	0	0.034	186.0	23.3
476	OGV 744608	389383	3715940	0	0	0.034	186.0	23.3

HBEP
Competing Sources Emissions Inventory
Sources Requested by SCAQMD

Shipping Lanes Volume Sources

Source Number	Source Description	Easting (X) (m)	Northing (Y) (m)	Base Elevation (m)	Release Height (m)	Init. Horizontal Dimension (m)	Initial Vert. Dimension (m)	NO_2 (lb/hr)
477	OGV 744609	388583	3715940	0	0	0.034	186.0	23.3
478	OGV 744610	387783	3715940	0	0	0.034	186.0	23.3
479	OGV 744611	390983	3715140	0	0	0.034	186.0	23.3
480	OGV 744612	390183	3715140	0	0	0.034	186.0	23.3
481	OGV 744613	389383	3715140	0	0	0.034	186.0	23.3
482	OGV 744614	388583	3715140	0	0	0.034	186.0	23.3
483	OGV 744615	387783	3715140	0	0	0.034	186.0	23.3
484	OGV 744616	390983	3714340	0	0	0.034	186.0	23.3
485	OGV 744617	390183	3714340	0	0	0.034	186.0	23.3
486	OGV 744618	389383	3714340	0	0	0.034	186.0	23.3
487	OGV 744619	388583	3714340	0	0	0.034	186.0	23.3
488	OGV 744620	387783	3714340	0	0	0.034	186.0	23.3
489	OGV 744621	390983	3713540	0	0	0.034	186.0	23.3
490	OGV 744622	390183	3713540	0	0	0.034	186.0	23.3
491	OGV 744623	389383	3713540	0	0	0.034	186.0	23.3
492	OGV 744624	388583	3713540	0	0	0.034	186.0	23.3
493	OGV 744625	387783	3713540	0	0	0.034	186.0	23.3
494	OGV 744501	390983	3712740	0	0	0.016	186.0	23.3
495	OGV 744502	390183	3712740	0	0	0.016	186.0	23.3
496	OGV 744503	389383	3712740	0	0	0.016	186.0	23.3
497	OGV 744504	388583	3712740	0	0	0.016	186.0	23.3
498	OGV 744505	387783	3712740	0	0	0.016	186.0	23.3
499	OGV 744506	390983	3711940	0	0	0.016	186.0	23.3
500	OGV 744507	390183	3711940	0	0	0.016	186.0	23.3
501	OGV 744508	389383	3711940	0	0	0.016	186.0	23.3
502	OGV 744509	388583	3711940	0	0	0.016	186.0	23.3
503	OGV 744510	387783	3711940	0	0	0.016	186.0	23.3
504	OGV 744511	390983	3711140	0	0	0.016	186.0	23.3
505	OGV 744512	390183	3711140	0	0	0.016	186.0	23.3
506	OGV 744513	389383	3711140	0	0	0.016	186.0	23.3
507	OGV 744514	388583	3711140	0	0	0.016	186.0	23.3
508	OGV 744515	387783	3711140	0	0	0.016	186.0	23.3
509	OGV 744516	390983	3710340	0	0	0.016	186.0	23.3
510	OGV 744517	390183	3710340	0	0	0.016	186.0	23.3
511	OGV 744518	389383	3710340	0	0	0.016	186.0	23.3
512	OGV 744519	388583	3710340	0	0	0.016	186.0	23.3
513	OGV 744520	387783	3710340	0	0	0.016	186.0	23.3
514	OGV 744521	390983	3709540	0	0	0.016	186.0	23.3
515	OGV 744522	390183	3709540	0	0	0.016	186.0	23.3
516	OGV 744523	389383	3709540	0	0	0.016	186.0	23.3
517	OGV 744524	388583	3709540	0	0	0.016	186.0	23.3
518	OGV 744525	387783	3709540	0	0	0.016	186.0	23.3
519	OGV 734801	386983	3724740	0	0	0.177	186.0	23.3
520	OGV 734802	386183	3724740	0	0	0.177	186.0	23.3
521	OGV 734803	385383	3724740	0	0	0.177	186.0	23.3
522	OGV 734804	384583	3724740	0	0	0.177	186.0	23.3
523	OGV 734805	383783	3724740	0	0	0.177	186.0	23.3
524	OGV 734806	386983	3723940	0	0	0.177	186.0	23.3
525	OGV 734807	386183	3723940	0	0	0.177	186.0	23.3
526	OGV 734808	385383	3723940	0	0	0.177	186.0	23.3
527	OGV 734809	384583	3723940	0	0	0.177	186.0	23.3
528	OGV 734810	383783	3723940	0	0	0.177	186.0	23.3
529	OGV 734811	386983	3723140	0	0	0.177	186.0	23.3
530	OGV 734812	386183	3723140	0	0	0.177	186.0	23.3
531	OGV 734813	385383	3723140	0	0	0.177	186.0	23.3
532	OGV 734814	384583	3723140	0	0	0.177	186.0	23.3
533	OGV 734815	383783	3723140	0	0	0.177	186.0	23.3
534	OGV 734816	386983	3722340	0	0	0.177	186.0	23.3
535	OGV 734817	386183	3722340	0	0	0.177	186.0	23.3
536	OGV 734818	385383	3722340	0	0	0.177	186.0	23.3
537	OGV 734819	384583	3722340	0	0	0.177	186.0	23.3
538	OGV 734820	383783	3722340	0	0	0.177	186.0	23.3
539	OGV 734821	386983	3721540	0	0	0.177	186.0	23.3
540	OGV 734822	386183	3721540	0	0	0.177	186.0	23.3
541	OGV 734823	385383	3721540	0	0	0.177	186.0	23.3
542	OGV 734824	384583	3721540	0	0	0.177	186.0	23.3
543	OGV 734825	383783	3721540	0	0	0.177	186.0	23.3
544	OGV 734701	386983	3720740	0	0	0.127	186.0	23.3

HBEP
Competing Sources Emissions Inventory
Sources Requested by SCAQMD

Shipping Lanes Volume Sources

Source Number	Source Description	Easting (X) (m)	Northing (Y) (m)	Base Elevation (m)	Release Height (m)	Init. Horizontal Dimension (m)	Initial Vert. Dimension (m)	NO_2 (lb/hr)
545	OGV 734702	386183	3720740	0	0	0.127	186.0	23.3
546	OGV 734703	385383	3720740	0	0	0.127	186.0	23.3
547	OGV 734704	384583	3720740	0	0	0.127	186.0	23.3
548	OGV 734705	383783	3720740	0	0	0.127	186.0	23.3
549	OGV 734706	386983	3719940	0	0	0.127	186.0	23.3
550	OGV 734707	386183	3719940	0	0	0.127	186.0	23.3
551	OGV 734708	385383	3719940	0	0	0.127	186.0	23.3
552	OGV 734709	384583	3719940	0	0	0.127	186.0	23.3
553	OGV 734710	383783	3719940	0	0	0.127	186.0	23.3
554	OGV 734711	386983	3719140	0	0	0.127	186.0	23.3
555	OGV 734712	386183	3719140	0	0	0.127	186.0	23.3
556	OGV 734713	385383	3719140	0	0	0.127	186.0	23.3
557	OGV 734714	384583	3719140	0	0	0.127	186.0	23.3
558	OGV 734715	383783	3719140	0	0	0.127	186.0	23.3
559	OGV 734716	386983	3718340	0	0	0.127	186.0	23.3
560	OGV 734717	386183	3718340	0	0	0.127	186.0	23.3
561	OGV 734718	385383	3718340	0	0	0.127	186.0	23.3
562	OGV 734719	384583	3718340	0	0	0.127	186.0	23.3
563	OGV 734720	383783	3718340	0	0	0.127	186.0	23.3
564	OGV 734721	386983	3717540	0	0	0.127	186.0	23.3
565	OGV 734722	386183	3717540	0	0	0.127	186.0	23.3
566	OGV 734723	385383	3717540	0	0	0.127	186.0	23.3
567	OGV 734724	384583	3717540	0	0	0.127	186.0	23.3
568	OGV 734725	383783	3717540	0	0	0.127	186.0	23.3
569	OGV 734601	386983	3716740	0	0	0.004	186.0	23.3
570	OGV 734602	386183	3716740	0	0	0.004	186.0	23.3
571	OGV 734603	385383	3716740	0	0	0.004	186.0	23.3
572	OGV 734604	384583	3716740	0	0	0.004	186.0	23.3
573	OGV 734605	383783	3716740	0	0	0.004	186.0	23.3
574	OGV 734606	386983	3715940	0	0	0.004	186.0	23.3
575	OGV 734607	386183	3715940	0	0	0.004	186.0	23.3
576	OGV 734608	385383	3715940	0	0	0.004	186.0	23.3
577	OGV 734609	384583	3715940	0	0	0.004	186.0	23.3
578	OGV 734610	383783	3715940	0	0	0.004	186.0	23.3
579	OGV 734611	386983	3715140	0	0	0.004	186.0	23.3
580	OGV 734612	386183	3715140	0	0	0.004	186.0	23.3
581	OGV 734613	385383	3715140	0	0	0.004	186.0	23.3
582	OGV 734614	384583	3715140	0	0	0.004	186.0	23.3
583	OGV 734615	383783	3715140	0	0	0.004	186.0	23.3
584	OGV 734616	386983	3714340	0	0	0.004	186.0	23.3
585	OGV 734617	386183	3714340	0	0	0.004	186.0	23.3
586	OGV 734618	385383	3714340	0	0	0.004	186.0	23.3
587	OGV 734619	384583	3714340	0	0	0.004	186.0	23.3
588	OGV 734620	383783	3714340	0	0	0.004	186.0	23.3
589	OGV 734621	386983	3713540	0	0	0.004	186.0	23.3
590	OGV 734622	386183	3713540	0	0	0.004	186.0	23.3
591	OGV 734623	385383	3713540	0	0	0.004	186.0	23.3
592	OGV 734624	384583	3713540	0	0	0.004	186.0	23.3
593	OGV 734625	383783	3713540	0	0	0.004	186.0	23.3

Attachment 3
Proposed Source Inventory for Performing a CEC Cumulative Impacts Analysis

Huntington Beach Energy Project
Attachment DR104-3R Table 1
Cumulative Modeling Parameters - Stack Parameters
October 2013

Point Sources

Facility	Source ID	Easting (X) (m)	Northing (Y) (m)	Base Elevation (m)	Stack Height (m)	Temperature (K)	Exit Velocity (m/s)	Stack Diameter (m)
HBEP (1-hr NO_2, CO)	Stack 1	409185	3723252	3.7	36.6	461	15.4	5.49
	Stack 2	409216	3723231	3.7	36.6	461	15.4	5.49
	Stack 3	409245	3723210	3.7	36.6	461	15.4	5.49
	Stack 4	409522	3723157	3.7	36.6	461	15.4	5.49
	Stack 5	409522	3723194	3.7	36.6	461	15.4	5.49
	Stack 6	409522	3723230	3.7	36.6	461	15.4	5.49
HBEP (SO_2, 24-hr PM_{10}, 24-hr $PM_{2.5}$)	Stack 1	409185	3723252	3.7	36.6	455	21.8	5.49
	Stack 2	409216	3723231	3.7	36.6	455	21.8	5.49
	Stack 3	409245	3723210	3.7	36.6	455	21.8	5.49
	Stack 4	409522	3723157	3.7	36.6	455	21.8	5.49
	Stack 5	409522	3723194	3.7	36.6	455	21.8	5.49
	Stack 6	409522	3723230	3.7	36.6	455	21.8	5.49
HBEP (annual NOx, annual PM_{10}, annual $PM_{2.5}$)	Stack 1	409185	3723252	3.7	36.6	460	16.7	5.49
	Stack 2	409216	3723231	3.7	36.6	460	16.7	5.49
	Stack 3	409245	3723210	3.7	36.6	460	16.7	5.49
	Stack 4	409522	3723157	3.7	36.6	460	16.7	5.49
	Stack 5	409522	3723194	3.7	36.6	460	16.7	5.49
	Stack 6	409522	3723230	3.7	36.6	460	16.7	5.49
OC Sanitation 1	OC11	412725	3728250	7.7	18.9	533	17.9	0.76
	OC12	412725	3728250	7.7	12.8	455	9.3	0.46
OC Sanitation 2	OC22	411100	3722400	1.6	8.5	587	33.9	0.39
Arlon Graphics	AG	414875	3730325	13.5	7.6	364	24.5	1.32

Huntington Beach Energy Project
Attachment DR104-3R Table 2
Cumulative Modeling Parameters - Emission Rates
October 2013

Emission Rates for 1-hr, 3-hr, 8-hr, and 24-hr Modeling

	1-hr NO_2		1-hr CO		8-hr CO		1-hr SO_2		3-hr SO_2		24-hr SO_2		24-hr PM_{10}		24-hr $PM_{2.5}$	
Source ID	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)
Stack 1	3.21	25.5	14.5	115	5.72	45.4	0.31	2.45	0.31	2.45	0.31	2.45	1.20	9.50	1.20	9.50
Stack 2	3.21	25.5	14.5	115	5.72	45.4	0.31	2.45	0.31	2.45	0.31	2.45	1.20	9.50	1.20	9.50
Stack 3	3.21	25.5	14.5	115	5.72	45.4	0.31	2.45	0.31	2.45	0.31	2.45	1.20	9.50	1.20	9.50
Stack 4	3.21	25.5	14.5	115	5.72	45.4	0.31	2.45	0.31	2.45	0.31	2.45	1.20	9.50	1.20	9.50
Stack 5	3.21	25.5	14.5	115	5.72	45.4	0.31	2.45	0.31	2.45	0.31	2.45	1.20	9.50	1.20	9.50
Stack 6	3.21	25.5	14.5	115	5.72	45.4	0.31	2.45	0.31	2.45	0.31	2.45	1.20	9.50	1.20	9.50
OC11	2.90	23.01	6.94	55.1	6.94	55.1	0.28	2.25	0.28	2.25	0.28	2.25	0.28	2.25	0.28	2.25
OC12	0.03	0.22	0.11	0.90	0.11	0.90	0.016	0.13	0.016	0.13	0.016	0.13	0.007	0.056	0.0071	0.056
OC22	-	-	-	-	2.60	20.6	-	-	0.15	1.19	0.019	0.15	0.041	0.32	0.041	0.32
AG	-	-	0.042	0.34	0.042	0.34	0.00026	0.0021	0.00026	0.0021	0.00026	0.0021	0.0021	0.017	0.0021	0.017

Emission Rates for Annual Modeling

	Annual NO_2		Annual PM_{10}		Annual $PM_{2.5}$	
Source ID	(g/s)	(tpy)	(g/s)	(tpy)	(g/s)	(tpy)
Stack 1	1.18	40.9	0.52	18.0	0.52	18.0
Stack 2	1.18	40.9	0.52	18.0	0.52	18.0
Stack 3	1.18	40.9	0.52	18.0	0.52	18.0
Stack 4	1.18	40.9	0.52	18.0	0.52	18.0
Stack 5	1.18	40.9	0.52	18.0	0.52	18.0
Stack 6	1.18	40.9	0.52	18.0	0.52	18.0
OC11	1.93	67.2	0.19	6.57	0.19	6.57
OC12	0.046	1.60	0.017	0.60	0.017	0.60
OC22	0.15	5.38	0.0049	0.17	0.0049	0.17
AG	-	-	0.0021	0.073	0.0021	0.073

Modeling Protocol Addendum

Dispersion Modeling Protocol for the Amended Huntington Beach Energy Project

Prepared for

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September 4, 2015

Submitted to

The California Energy Commission

Prepared by

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Addendum to the Air Dispersion Modeling Protocol

1.1 Introduction

AES Southland Development, LLC (AES) proposes to construct the Amended Huntington Beach Energy Project (HBEP or Project) at the existing AES Huntington Beach Generating Station (HBGS) site, located at 21730 Newland Street in Huntington Beach, California. The California Energy Commission (CEC) issued a license for the construction and operation of the HBEP on October 29, 2014. In November 2014, AES received notice from Southern California Edison (SCE) that it was shortlisted for a power purchase agreement (PPA). The power plant configuration selected by SCE for a PPA was different from the HBEP configuration licensed by the CEC. Therefore, AES is amending the HBEP's CEC license to be consistent with the SCE PPA.

The Amended HBEP will consist of one two-on-one combined-cycle power block and one simple-cycle power block with a net capacity of 844 megawatts. The combined-cycle power block will consist of two General Electric (GE) 7FA.05 natural-gas-fired combustion turbines, one steam turbine, and an air-cooled condenser. Each combustion turbine will be equipped with a heat recovery steam generator (HRSG). The HRSG will not be fitted with supplemental natural gas firing (duct firing). The turbines will use advanced combustion controls, dry low oxides of nitrogen (NO_X) burners, and selective catalytic reduction (SCR) to limit NO_X emissions to 2 parts per million by volume (ppmv). Emissions of carbon monoxide (CO) and volatile organic compounds (VOC) will be limited to 2 ppmv and 2 ppmv, respectively, through the use of advanced combustion controls, combined with the use of an oxidation catalyst. The combined-cycle power block of the Amended Project will also include a natural-gas-fired auxiliary boiler, used to decrease the startup duration and air emissions of the combined-cycle turbines. The auxiliary boiler will include ultra-low-NO_X burners and/or SCR to control NO_X emissions to 5 ppmv.

The Amended HBEP simple-cycle power block will consist of two GE LMS 100PB natural-gas-fired combustion turbines and two closed-loop cooling fin fan coolers. The turbines will use advanced combustion controls, dry low NO_X burners, and SCR to limit NO_X emissions to 2.5 ppmv. Emissions of CO and VOC will be limited to 4 ppmv and 2 ppmv, respectively, through the use of advanced combustion controls, combined with the use of an oxidation catalyst. Good combustion practices and burning pipeline-quality natural gas will minimize emissions of the remaining pollutants for both the simple-cycle and combined-cycle turbines.

The HBEP license will be amended by the CEC and permitted through the South Coast Air Quality Management District's (SCAQMD) New Source Review (NSR) process. Because the HBEP includes the use of steam to generate electricity, the Amended Project is also categorized as one of the 28 Prevention of Significant Deterioration (PSD) major source categories (40 Code of Federal Regulations [CFR] 52.21(b)(1)(i)). Therefore, the Amended Project is considered a new major source subject to PSD permitting requirements.

A dispersion modeling protocol was submitted to the CEC on May 5, 2015. This protocol, dated April 28, 2015, presented the proposed approach for evaluating the potential air quality and public health impacts associated with demolition, construction, commissioning, and operation of the Amended HBEP. This protocol addendum addresses the comments received from the CEC on June 2, 2015, and proposes augmented modeling methodology where appropriate.

1.2 Response to Comments

The following subsections present the protocol text (as submitted on May 5, 2015), the CEC's comments on the text, and AES's response to these comments. Note that the comments received are related to the proposed air quality impacts analysis, and that there are no similar comments regarding the proposed health risk assessment.

1.2.1 Comment 1

Page 1-1, paragraph 5 of the protocol currently reads as follows:

The existing HBGS Units 1 and 2 will be retired as part of the Amended Project. In the event that emissions from these existing units are required for modeling purposes, the maximum 2-year historical past actual emission rates will be calculated for the calendar years 2010 through 2014.

Comment: If the emissions from the existing units are required for modeling purposes, AES should consult with the District and Energy Commission to determine the emission rates to be modeled.

Response: The existing HBGS Units 1 and 2 will be retired one month after the combined-cycle combustion turbines are first fired. Therefore, operation of the existing HBGS Units 1 and 2 was not modeled as part of the air quality impacts analysis. However, at the request of the SCAQMD, their operation was included in the competing source assessment to demonstrate compliance with PSD regulations. The emission rates modeled in the competing source assessment were derived from each unit's permitted Potential to Emit, rather than the maximum 2-year historical past actual emission rates.

1.2.2 Comment 2

Page 2-2, 3rd paragraph under "Location" currently reads as follows:

Because the Costa Mesa monitoring station does not include PM_{10} and $PM_{2.5}$ monitoring equipment, the nearest representative location for PM_{10} and $PM_{2.5}$ was selected based on the surrounding terrain and a comparison of wind roses from the Long Beach, Anaheim, and Mission Viejo monitoring stations to the NWS John Wayne Airport monitoring station (SCAQMD, 2009). The nearest complex terrain is located approximately 5.5 miles east-southeast of the Project site, and the wind roses suggest a westerly flow inland toward the Mission Viejo monitoring station. Therefore, the Mission Viejo monitoring station was chosen as the most representative monitoring station for PM_{10} and $PM_{2.5}$.

Comment: In the Final Staff Assessment for the approved Huntington Beach Energy Project (TN# 202405), staff used Long Beach monitoring station as the most representative monitoring station for PM10 and PM2.5. The applicant should justify the change in monitoring stations compared to the station and data used in the earlier analysis. Energy Commission staff reserves the right to use background values from stations that we think are most representative of the project site.

Response: AES used particulate matter less than 10 microns in aerodynamic diameter (PM_{10}) and particulate matter less than 2.5 microns in aerodynamic diameter ($PM_{2.5}$) monitoring data from the Mission Viejo monitoring station in the Application for Certification (AFC; 12-AFC-02), and defended its continued use when commenting on the CEC's Preliminary Staff Assessment, Part B (TN# 201969). For the reasons noted in Section 2.2 of the protocol and these previous submissions, AES still believes that the Mission Viejo monitoring station is the most representative monitoring station for PM_{10} and $PM_{2.5}$. Additionally, background concentrations reported at the Long Beach monitoring station for the year 2013 are incomplete and, therefore, not recommended for use.

1.2.3 Comment 3

Page 4-1, Section 4.2.3 of the protocol currently reads as follows:

Processing of the meteorological data will be performed using the latest version of AERMET (Version 14134) according to the procedures outlined in EPA's Guideline on Air Quality Models (EPA, 2005). The 1-minute automated surface observational system data will be processed using the latest version of AERMINUTE (Version 14337), with a 0.5 meter per second minimum wind speed threshold, and used in conjunction with the five years of integrated surface hourly data and upper air sounding data described above.

Comment: If AES does not obtain the meteorological data from the District, please consult with the District regarding AERMET preprocessing requirements.

Response: AES submitted a separate dispersion modeling protocol to the SCAQMD on May 4, 2015, which presented the same methodology for preprocessing meteorological data. Submission of that protocol serves as AES's consultation with the SCAQMD. Additionally, SCAQMD staff indicated via personal correspondence that modeling for the Amended Project should be acceptable if it uses the same approach as for the AFC. The methodology proposed for processing meteorological data is consistent with the AFC.

1.2.4 Comment 4

Page 5-1, Section 5.2 of the protocol currently reads as follows:

Corresponding hourly ozone data from the North Long Beach monitoring station will be provided via e-mail by the SCAQMD, and

Page 6-6, Section 6.3.2.2 of the protocol currently reads as follows:
Corresponding hourly ozone data from the Costa Mesa monitoring station will be provided via e-mail by the SCAQMD.

Comment: AES proposes to use plume volume molar ratio method (PVMRM) in AERMOD, if necessary, for a refined 1-hour NO_2 modeling. The hourly ozone data as well as NO_2 background concentrations would be needed for the refined 1-hour NO_2 modeling.

Page 6-6 of the protocol states that both ozone and NO_2 background concentrations would be obtained from the Costa Mesa monitoring station (which is the nearest station to the project site) for evaluating PSD Class II project impacts. However, page 5-1 states that background ozone data would be obtained from the North Long Beach station (but does not mention the source of NO_2 background concentrations) for evaluating NO_2 project impacts. Thus, the protocol is not consistent regarding which station(s) would be used for the hourly background data if more refined modeling is required. Please confirm which station would be used for both NO_2 and ozone background data and explain more fully the basis for station selection.

Response: Background nitrogen dioxide (NO_2) and ozone data were obtained from the Costa Mesa monitoring station only. This station is most representative of the Amended Project site for the reasons described in Section 2.2 of the protocol.

Additionally, since the 98th percentile seasonal, hour-of-day NO_2 background concentrations and the hourly ozone data were unavailable from the SCAQMD, both datasets were processed following applicable U.S. Environmental Protection Agency (EPA) guidance.[1] Note that the 98th percentile seasonal, hour-of-day NO_2 background concentrations were only available for 2010 through 2012, whereas the hourly ozone data were available for 2010 through 2014 through the EPA's AirData database.[2]

1.2.5 Comment 5

Page 5-3, Section 5.5.3 of the protocol currently reads as follows:

As the existing HBGS Units 1 and 2 will not be in operation for more than 90 days after the first fire of the combined-cycle turbines, modeling of HBGS Units 1 and 2 will not be included in the ambient air quality impacts analysis.

Comment: If the existing HBGS Units 1 and 2 would operate in conjunction with the construction/demolition activities, commissioning or operation of the proposed units, please include them in the air quality impact analysis.

[1] U.S. Environmental Protection Agency (EPA). 2011. *Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-Hour NO_2 National Ambient Air Quality Standard*. EPA Office of Air Quality Planning and Standards. March 1.

[2] Accessible at http://www.epa.gov/airdata/.

Response: Based on the proposed schedule for demolition and construction, commissioning, and operation of the proposed units, two scenarios were selected for inclusion in the Amended HBEP overlap impacts analysis:

- Combined Cycle Power Block operation with simultaneous construction of the Simple Cycle Power Block
- Combined Cycle and Simple Cycle Power Block operation with simultaneous demolition of HBGS Units 1 and 2

Although other potential overlap scenarios were identified, they were not considered to result in the worst possible air quality impacts. For example, the existing HBGS Units 1 and 2 will operate concurrently with construction of the Combined Cycle Power Block. However, it is expected that operation of both proposed power blocks with concurrent demolition activities would result in larger impacts to air quality. Therefore, operation of the existing HBGS Units 1 and 2 were not modeled as part of the air quality impacts analysis.

1.2.6 Comment 6

Page 6-5, Section 6.3.2.1 of the protocol currently reads as follows:

It is anticipated that the 1-hour NO_2 SIL will be exceeded by operation of the Amended HBEP… Based on the determined significant impact radius and the location of the representative ambient monitor, AES proposes to include competing sources within a distance of 10 km of the significant impact radius in the analysis. AES proposes to use the competing source inventory of NOx emitting sources that was previously approved by the SCAQMD on October 8, 2013, which is included as Attachment 2, and

Page 8-1, Section 8 of the protocol currently reads as follows:

For this cumulative impact analysis, AES proposes to use the list of sources submitted to the CEC on January 17, 2013, which is included as Attachment 3.

Comment: The competing source inventory would be included in a refined Tier 2 analysis for the Class II area analysis for the District. Per Energy Commission requirements, a cumulative impacts analysis would combine the impacts from the Amended project with other stationary emission sources within a 6-mile radius that have received construction permits but are not yet operational or are in the permitting process. The list of cumulative/competing sources approved in 2013 might be outdated. Please consult with the District and Energy Commission to provide a most recent list of cumulative/competing sources.

Response: On June 16, 2015, AES requested a list of projects that are within a 6-mile radius of the Amended HBEP and are either currently in the permitting process, undergoing California Environmental Quality Act (CEQA) review, or recently received a Permit to Construct (PTC) from the SCAQMD. This request was made through the SCAQMD's Public Records Request process and, once completed, will serve as the list of sources for modeling cumulative impacts per the CEC's requirements.

Similar to the response to Comment 3 above, SCAQMD staff indicated via personal correspondence that modeling for the Amended Project should be acceptable if it uses the same approach as for the AFC. Therefore, consistent with the AFC, AES used the previous 1-hour NO_2 competing source inventory for demonstrating compliance with the PSD regulations.

1.2.7 Comment 7

Page 6-5, Section 6.3.2.2 of the protocol currently reads as follows:

Emergency equipment will not be included in the 1-hour NO_2 competing source analysis.

Comment: Energy Commission staff reserves the right to determine whether or how the emergency equipment would be included in the 1-hour NO_2 analysis.

Response: Consistent with previous modeling efforts, AES will not include emergency equipment in the 1-hour pollutant averaging periods as it is unlikely that their testing would coincide with a startup at the

Amended HBEP. However, emergency equipment will be included in other short-term pollutant averaging periods, as well as annual pollutant averaging periods. AES will clearly delineate in the PTA and/or subsequent submissions the averaging periods and pollutants for which the emergency equipment is being modeled.

1.2.8 Comment 8

Page 8-1, Section 8, 3rd paragraph of the protocol currently reads as follows:

The cumulative air quality impacts analysis will be performed using the model settings and receptor grid outlined in Section 4, Topography and Meteorology, and Section 5, Dispersion Modeling Approach. The Amended HBEP fence line for the cumulative sources will not be included in the modeling analysis.

Comment: In general, the project fence line would be included in the dispersion modeling. On the other hand, the information regarding the fence line for cumulative sources may not be available, thus may not be included in cumulative modeling analysis. Please explain whether the Amended HBEP fence line or the cumulative sources' fence line would or would not be included in the modeling analysis.

Response: The fence lines for cumulative sources were not included in the modeling analysis. However, the Amended HBEP fence line was included in the modeling analysis as the ambient air boundary, as described in Section 5.4 of the protocol.

Appendix 5.2A
Survey Report and Site Photographs for Plains All American Tank Farm

Huntington Beach Energy Project
Biological Reconnaissance Survey for Plains All American Tank Farm

PREPARED FOR: AES Southland Development

PREPARED BY: Melissa Fowler/CH2M HILL

DATE: September 2, 2015

Introduction

Melissa Fowler (Biologist, CH2M HILL) conducted a reconnaissance survey for special-status plants, special-status wildlife, and nesting birds at the Plains All American Tank Farm for AES Southland Development (AES) Amended Huntington Beach Energy Project (HBEP) on July 10, 2015. As part of the surveys, other potential environmental issues were noted, as appropriate.

Location and Background

The Amended HBEP is an 844-megawatt (MW) (net) electrical generating facility that will replace, and be constructed on the site of, the AES Huntington Beach Generating Station (HBGS), an existing and operating power plant in Huntington Beach, California. It will be a combination of natural-gas-fired, combined-cycle and simple-cycle turbine technologies to provide high-efficiency, fast-start and responsive generation to a critical location for local area electrical reliability. The Amended HBEP will consist of a 644 MW (net) two-on-one combined cycle gas turbine (CCGT) with General Electric (GE) Frame 7FA.05 gas turbines, two Heat Recovery Steam Generators (HRSG), a steam turbine generator (STG), an air-cooled condenser, and related ancillary equipment; and two GE LMS 100 PB simple cycle gas turbine (SCGT) generators, each with a nominal capacity of 100 MWs. As part of the fast start, flexible design of the CCGT power block, the project will use a natural gas fired auxiliary boiler to provide start-up steam. Each power block will have a set of natural gas compressors. Other equipment and facilities to be constructed and shared by both power blocks include water treatment facilities, emergency services, and administration and maintenance buildings. The Amended HBEP will be constructed on 30 acres, which includes the 28.6 acres of the existing licensed HBEP within the existing HBGS plus 1.4 acres the Project Owner is acquiring from SCE that is contiguous to the licensed HBEP site and immediately adjacent to the footprint of the existing Huntington Beach Generating Station (HBGS). As part of Amended HBEP, the Project Owner will initiate a lot line adjustment with SCE and coordinate this with the City of Huntington Beach for inclusion of the additional 1.4 acres into the legal HBEP parcel. In addition, construction of the Amended HBEP may require the use of an additional 20 acres beyond the 1.9 acres identified in the Final Decision at the former Plains All American Tank Farm site located adjacent to the HBEP site for construction laydown and construction worker parking. This technical memorandum summarizes the survey methodology, results, and conclusion of the Plains All American Tank Farm biological reconnaissance survey.

Survey Methods

The Amended HBEP was reviewed for sensitive biological resources including United States Fish and Wildlife Service (USFWS) designated critical habitat (USFWS, 2015a), special-status plant and wildlife species, and sensitive vegetation communities (California Department of Fish and Wildlife [CDFW], 2003, 2009a). Lists of potential special-status species were queried from USFWS (USFWS, 2015a, 2015b, 2015c, 2015d), and the California Natural Diversity Database (CNDDB) (CDFW, 2015). A 10-mile query was used for CNDDB and USFWS. The results of these queries and other environmental analyses are presented in the HBEP Petition to Amend (PTA), which was reviewed prior to conducting the pre-construction surveys.

Conventional survey protocols, including guidelines provided by the USFWS, California Department of Fish and Wildlife (CDFW), were reviewed and implemented where appropriate (USFWS, 1996) (CDFW, 2009b). The Plains All American Tank Farm site was surveyed for suitable habitat for special-status wildlife and nesting birds.

Special-status Plants

As stated in *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* (CDFW, 2009b), botanical surveys should only be conducted when:

- "Natural (or naturalized) vegetation occurs on the site, and it is unknown if special status plant species or natural communities occur on the site, and the project has the potential for direct or indirect effects on vegetation; or
- Special status plants or natural communities have historically been identified on the project site; or
- Special status plants or natural communities occur on sites with similar physical and biological properties as the project site."

Since none of the above criteria were met for the Plains All American Tank Farm, special-status plants surveys were not conducted for site.

Special-status Wildlife

The potential for special-status wildlife to occur in the Plains All American Tank Farm was assessed based on historical data and presence or lack of suitable habitat. The surveys focused on direct wildlife observations and observations of wildlife signs, including burrows, scat, tracks, remains, and other distinguishing indicators.

Nesting Birds

The potential for special-status bird species and raptors was assessed based on historical data and presence or lack of suitable habitat. Surveys were conducted during the nesting bird season (generally February 1 through August 31) and surveys for nesting birds were limited to the Plains All American Tank Farm plus habitat features (e.g., trees, shrubs, and human-made structures) in the immediate vicinity.

Survey Results

Survey conditions are presented in Table 1, followed by survey results. Photographs are provided in the Attachment.

TABLE 1
Weather Conditions

Date	Time (24-hour)	Project Location	Temperature (°F)	Wind (mph)	Cloud Cover (%)	Precipitation (None, Light, Moderate, Heavy)	Comments
7/10/2015	1000-1130	Huntington Beach, CA	70	5	70	None	Good visibility (10.0 miles); 61% humidity

Notes:

% = percent
°F = degrees Fahrenheit
mph = miles per hour

The Plains All American Tank Farm is located east of the HBEP site and site photographs are provided in the Attachment. The majority of the internal Plains All American Tank Farm is devoid of vegetation. Vegetation is located on the northern, eastern, and southern fence line and consists primarily of landscape vegetation and non-native plant species. Several mature trees, such as eucalyptus (*Eucalyptus* ssp.) and pine (*Pinus* ssp.), surround the external fence line. The majority of the onsite perimeter vegetation will be left in place, excluding the onsite vegetation that will need to be removed for the new entrance at the intersection of Magnolia and Banning. The entire parcel right up to Magnolia is Plains All American Tank Farm property and does not include any public property. Wildlife species observed during the site visit included American crow (*Corvus brachyrhynchos*), Anna's hummingbird (*Calypte anna*), barn swallow (*Hirundo rustica*), black phoebe (*Sayornis nigricans*), bushtit (*Psaltriparus minimus*), California ground squirrel (*Otospermophilus beecheyi*), Cassin's kingbird (*Tyrannus vociferans*), common side-blotched lizard (*Uta stansburiana*), house finch (*Haemorhous mexicanus*), house sparrow (*Passer domesticus*), lesser goldfinch (*Spinus psaltria*), turkey vulture (*Cathartes aura*), and western gull (*Larus occidentalis*).

Special-status Plants

Surveys for special-status plants were not conducted because there are no natural habitats located within the Plains All American Tank Farm.

Special-status Wildlife

No special-status wildlife species or sign of special-status wildlife were observed within the Plains All American Tank Farm. Although occurrence records for several species have been documented within 10 miles of the Plains All American Tank Farm (see Section 5.2.2 of the HBEP PTA), the developed project site does not provide suitable habitat for special-status wildlife species.

Nesting Birds

No bird nests or nesting behaviors were observed in the Plains All American Tank Farm during the pre-construction survey. There are several mature trees within the site that provide suitable habitat for nesting birds; therefore, preconstruction surveys are recommended prior to work being initiated onsite.

Conclusion

No natural vegetation or habitat is present on the Plains All America Tank Farm site. There are no project features that would support special-status plants and the project site does not provide suitable habitat for any special-status wildlife species. Potential minor and less-than-significant impacts are expected due to temporary noise disturbance during demolition and construction activities associated with Amended HBEP.

References

California Department of Fish and Wildlife (CDFW). 2003. *List of California Terrestrial Natural Communities Recognized by the California Natural Diversity Database (CNDDB).* Wildlife and Habitat Data Analysis Branch, Vegetation Classification and Mapping Program.

California Department of Fish and Wildlife (CDFW). 2009a. *List of California Vegetation Alliances.* Biogeographic Data Branch, Vegetation Classification and Mapping Program.

California Department of Fish and Wildlife (CDFW). 2009b. *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities.* Sacramento, California. http://www.dfg.ca.gov/bdb/pdfs/guideplt.pdf.

California Department of Fish and Wildlife (CDFW). 2015. *California Natural Diversity Database (CNDDB). RareFind5.* Electronic database. http://www.dfg.ca.gov/biogeodata/cnddb/mapsanddata.asp. Sacramento, California.

United States Fish and Wildlife Service (USFWS). 1996. *Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed, and Candidate Plants.* September 23.

United States Fish and Wildlife Service (USFWS). 2014a. Critical Habitat for Threatened and Endangered Species GIS Database.

United States Fish and Wildlife Service (USFWS). 2014b. Candidate Species in California based on published population data. http://ecos.fws.gov/tess_public/pub/stateListingIndividual.jsp?state=CA&status=candidate.

United States Fish and Wildlife Service (USFWS). 2015c. Species proposed for listing in California based on published population data.
http://ecos.fws.gov/tess_public/pub/stateListingIndividual.jsp?state=CA&status=proposed.

United States Fish and Wildlife Service (USFWS). 2015d. Threatened and endangered species listings and occurrences for California. http://ecos.fws.gov/tess_public/pub/stateListingAndOccurrenceIndividual.jsp?state=CA&s8fid=112761032792&s8fid=112762573902.

Attachment
Representative Photographs

Photograph 1. *Photograph of the access road off of Magnolia Street, facing west. Taken: 7/10/2015.*

Photograph 2. *Photograph of the Plains All American Tank Farm site from the northeast corner, facing west. Taken: 7/10/2015.*

Photograph 3. *Photograph of the Plains All American Tank Farm site from the northeast corner, facing south. Taken: 7/10/2015.*

Photograph 4 *Photograph of the Plains All American Tank Farm site, facing west-southwest. Taken: 7/10/2015.*

Photograph 5. *Example of the perimeter vegetation located within the Plains All American Tank Farm, facing southeast. Taken: 7/10/2015.*

Photograph 6. *Photograph of the Plains All American Tank Farm site from the southeast corner, facing south. Taken: 7/10/2015.*

Photograph 7. *Photograph of the Plains All American Tank Farm site from the southwest corner, facing northwest. Taken: 7/10/2015.*

Photograph 8. *Photograph of the Plains All American Tank Farm site, facing south. Taken: 7/10/2015.*

Appendix 5.9A
Supplemental Sensitive Receptors

Amended Huntington Beach Energy Project
Appendix 5.9A
Supplemental Sensitive Receptors Within 6 Miles
September 2015

Name	Type	Address
Huntington Beach KinderCare	Daycare	19342 Beach Blvd, Huntington Beach, CA 92648
Margy's Daycare	Daycare	9151 Adams Ave, Huntington Beach, CA 92646
Milana LangoKids Studio	Daycare	3400 Irvine Ave, Newport Beach, CA 92660
Parliament Tutors	Daycare	1601 W Balboa Blvd, Newport Beach, CA 92663
Ayoub (Orange County Critical Care)	Hospital	11180 Warner Ave, Fountain Valley, CA 92708
Coastal Surgery Center Inc	Hospital	17672 Beach Blvd, Huntington Beach, CA 92647
Lindora Medical Clinic	Hospital	211 E 17th St, Costa Mesa, CA 92627
Memorialcare Medical Group	Hospital	11420 Warner Ave, Fountain Valley, CA 92708
Newport Bay Surgery Center LLC	Hospital	3333 West Coast Hwy # 100, Newport Beach, CA 92663
Pediatric Office	Hospital	1190 Baker St #103 Costa Mesa, CA 92626, United States
Academy of Radio Broadcasting	School	16052 Beach Blvd # 263, Huntington Beach, CA 92647
Adams Elementary School	School	2850 Clubhouse Rd, Costa Mesa, CA 92626
Back Bay High School	School	390 Monte Vista Ave, Costa Mesa, CA 92627
California Elementary School	School	3232 California St, Costa Mesa, CA 92626
College of Automotive Management	School	3000 W MacArthur Blvd, Santa Ana, CA 92704
College Park Elementary School	School	2380 Notre Dame Rd, Costa Mesa, CA 92626
College View Elementary School	School	6582 Lennox Dr, Huntington Beach, CA 92647
Costa Mesa High School	School	2650 Fairview Rd, Costa Mesa, CA 92626
Davis Magnet School	School	1050 Arlington Dr, Costa Mesa, CA 92626
Duggan Institute of Dentistry	School	20311 SW Acacia St, Newport Beach, CA 92660
Eastbluff Elementary School	School	2627 Vista Del Oro, Newport Beach, CA 92660
El Dorado Preschool	School	9430 Warner Ave, Fountain Valley, CA 92708
ESF Educ & Scientific Fun	School	17011 Beach Blvd #900, Huntington Beach, CA 92647
Estancia High School	School	2323 Placentia Ave, Costa Mesa, CA 92627
Everett A. Rhea Elementary School	School	661 Hamilton St, Costa Mesa, CA 92627
Horace Ensign Intermediate School	School	2000 Cliff Dr, Newport Beach, CA 92663
Huntington Beach Adult School	School	17231 Gothard St, Huntington Beach, CA 92647
John F. Kennedy University	School	3390 Harbor Blvd #150, Costa Mesa, CA 92626

Amended Huntington Beach Energy Project
Appendix 5.9A
Supplemental Sensitive Receptors Within 6 Miles
September 2015

Name	Type	Address
Kaiser Elementary School	School	2130 Santa Ana Ave, Costa Mesa, CA 92627
Killybrooke Elementary School	School	3155 Killybrooke Ln, Costa Mesa, CA 92626
LePort School Fountain Valley	School	9790 Finch Ave, Fountain Valley, CA 92708
LePort School Huntington Pier	School	721 Utica Ave, Huntington Beach, CA 92648
National University	School	3390 Harbor Blvd, Costa Mesa, CA 92626
Newport Elementary School	School	1327 W Balboa Blvd, Newport Beach, CA 92661
Newport Harbor High School	School	600 Irvine Ave, Newport Beach, CA 92663
Newport Heights Elementary	School	300 E 15th St, Newport Beach, CA 92663
Newport-Mesa Unified School District	School	2985 Bear St, Costa Mesa, CA 92626
Paularino Elementary School	School	1060 Paularino Ave, Costa Mesa, CA 92626
Public Elementary School	School	Fountain Valley, CA 92708
Samuel E Talbert Middle School	School	9101 Brabham Dr, Huntington Beach, CA 92646
St Bonaventure School	School	16390 Springdale St, Huntington Beach, CA 92647
TeWinkle Intermediate School	School	3224 California St, Costa Mesa, CA 92626
Thorpe Elementary School	School	2450 W Alton Ave, Santa Ana, CA 92704
Valley Day Preschool and Day Care	School	17415 Magnolia St, Fountain Valley, CA 92708
Victoria Elementary School	School	1025 Victoria St, Costa Mesa, CA 92627
Whittier Law School	School	3333 Harbor Blvd, Costa Mesa, CA 92626
William E. Kettler School	School	8750 Dorsett Dr, Huntington Beach, CA 92646
William Howard Taft University	School	3700 S Susan St #200, Santa Ana, CA 92704
Woodland Elementary School	School	2025 Garden Ln, Costa Mesa, CA 92627
Alternative Living Placements	Senior Facility	18892 Mount Walton Cir, Fountain Valley, CA 92708
Alzheimer's Family Services Center	Senior Facility	9451 Indianapolis Ave, Huntington Beach, CA 92646
Ashling's Residential Villa	Senior Facility	362 E 20th St, Costa Mesa, CA 92627
Beach Homes	Senior Facility	2575 Columbia Dr, Costa Mesa, CA 92626
Carmel Retirement Village	Senior Facility	17077 San Mateo St, Fountain Valley, CA 92708
Coast New Horizon	Senior Facility	824 Presidio Dr, Costa Mesa, CA 92626
Costa Mesa Senior Center	Senior Facility	695 W 19th St, Costa Mesa, CA 92627

Amended Huntington Beach Energy Project
Appendix 5.9A
Supplemental Sensitive Receptors Within 6 Miles
September 2015

Name	Type	Address
Costa Neuporte	Senior Facility	2283 Fairview Rd, Costa Mesa, CA 92627
Country Gardens Terrace II	Senior Facility	830 Saint Clair St, Costa Mesa, CA 92626
Elderone Assisted Living	Senior Facility	2400 W Coast Hwy Ste 8, Newport Beach, CA 92663
Family Choice Senior Care	Senior Facility	22201 Cape May Ln, Huntington Beach, CA 92646
Five Star Senior Living Facilities	Senior Facility	501 13th St Unit #A, Huntington Beach, CA 92648
Fountain Valley Senior Care	Senior Facility	9479 Ellis Ave, Fountain Valley, CA 92708
Good Hands Home Care & Adult Services	Senior Facility	18674 San Felipe St, Fountain Valley, CA 92708
Granny's Garden	Senior Facility	9691 Ellis Ave, Fountain Valley, CA 92708
Huntington Beach Elder Care	Senior Facility	9401 Nautilus Dr, Huntington Beach, CA 92646
Huntington Terrace	Senior Facility	18800 Florida St, Huntington Beach, CA 92648
Intensicare Medical Group	Senior Facility	18225 Brookhurst St, Fountain Valley, CA 92708
Leah Loving Elderly Care Inc	Senior Facility	17321 Ward St, Fountain Valley, CA 92708
Los Tiempos Senior Living	Senior Facility	17935 Los Tiempos St, Fountain Valley, CA 92708
Newport Senior Living	Senior Facility	425 Riverside Ave, Newport Beach, CA 92663
Newport Senior Living III	Senior Facility	2412 Holly Ln, Newport Beach, CA 92663
Newport Senior Living II	Senior Facility	260 E 16th St, Costa Mesa, CA 92627
Oceanside Senior Home	Senior Facility	9511 Landfall Dr, Huntington Beach, CA 92646
Seaside Terrace Retirement	Senior Facility	9925 La Alameda, Fountain Valley, CA 92708
Silverado Newport Mesa Memory Care Community	Senior Facility	350 W Bay St, Costa Mesa, CA 92627
Sr Living Loc 333 Sunrise	Senior Facility	7401 Yorktown Ave, Huntington Beach, CA 92648
The Heathers-Luxury Residential Care for Elderly	Senior Facility	1565 Wintergreen Pl, Costa Mesa, CA 92626
Vintage Newport	Senior Facility	393 Hospital Rd, Newport Beach, CA 92663
Vintage Newport East	Senior Facility	4000 Hilaria Way, Newport Beach, CA 92663
Vivante on the Coast	Senior Facility	1640 Monrovia Ave, Costa Mesa, CA 92627

Appendix 5.9B
Demolition and Construction Health Risk Assessment Information

APPENDIX 5.9B

Demolition and Construction Health Risk Assessment Information

Tables presented in this Appendix are as follows:

Figures presented in this Appendix are as follows:

Amended Huntington Beach Energy Project
Table 5.9B.1
Demolition and Construction HRA Stack Parameters
September 2015

Point Sources

Source ID	Stack Release Type (Beta)	Easting (X) (m)	Northing (Y) (m)	Base Elevation (m)	Stack Height (m)	Temperature (K)	Exit Velocity (m/s)	Stack Diameter (m)
EAST01	Horizontal	409425	3723150	3.66	4.60	533	18.0	0.127
EAST02	Horizontal	409450	3723150	3.66	4.60	533	18.0	0.127
EAST03	Horizontal	409400	3723175	3.66	4.60	533	18.0	0.127
EAST04	Horizontal	409425	3723175	3.66	4.60	533	18.0	0.127
EAST05	Horizontal	409450	3723175	3.66	4.60	533	18.0	0.127
EAST06	Horizontal	409475	3723175	3.66	4.60	533	18.0	0.127
EAST07	Horizontal	409500	3723175	3.66	4.60	533	18.0	0.127
EAST08	Horizontal	409525	3723175	3.66	4.60	533	18.0	0.127
EAST09	Horizontal	409550	3723175	3.66	4.60	533	18.0	0.127
EAST10	Horizontal	409375	3723200	3.66	4.60	533	18.0	0.127
EAST11	Horizontal	409400	3723200	3.66	4.60	533	18.0	0.127
EAST12	Horizontal	409425	3723200	3.66	4.60	533	18.0	0.127
EAST13	Horizontal	409450	3723200	3.66	4.60	533	18.0	0.127
EAST14	Horizontal	409475	3723200	3.66	4.60	533	18.0	0.127
EAST15	Horizontal	409500	3723200	3.66	4.60	533	18.0	0.127
EAST16	Horizontal	409525	3723200	3.66	4.60	533	18.0	0.127
EAST17	Horizontal	409550	3723200	3.66	4.60	533	18.0	0.127
EAST18	Horizontal	409400	3723225	3.66	4.60	533	18.0	0.127
EAST19	Horizontal	409425	3723225	3.66	4.60	533	18.0	0.127
EAST20	Horizontal	409450	3723225	3.66	4.60	533	18.0	0.127
EAST21	Horizontal	409475	3723225	3.66	4.60	533	18.0	0.127
EAST22	Horizontal	409500	3723225	3.66	4.60	533	18.0	0.127
EAST23	Horizontal	409525	3723225	3.66	4.60	533	18.0	0.127
EAST24	Horizontal	409550	3723225	3.66	4.60	533	18.0	0.127
EAST25	Horizontal	409400	3723250	3.66	4.60	533	18.0	0.127
EAST26	Horizontal	409425	3723250	3.66	4.60	533	18.0	0.127
EAST27	Horizontal	409450	3723250	3.66	4.60	533	18.0	0.127
EAST28	Horizontal	409475	3723250	3.66	4.60	533	18.0	0.127
EAST29	Horizontal	409500	3723250	3.66	4.60	533	18.0	0.127
EAST30	Horizontal	409525	3723250	3.66	4.60	533	18.0	0.127
EAST31	Horizontal	409550	3723250	3.66	4.60	533	18.0	0.127
EAST32	Horizontal	409425	3723275	3.66	4.60	533	18.0	0.127
EAST33	Horizontal	409450	3723275	3.66	4.60	533	18.0	0.127
EAST34	Horizontal	409475	3723275	3.66	4.60	533	18.0	0.127
EAST35	Horizontal	409500	3723275	3.66	4.60	533	18.0	0.127
EAST36	Horizontal	409525	3723275	3.66	4.60	533	18.0	0.127
EAST37	Horizontal	409550	3723275	3.66	4.60	533	18.0	0.127
EAST38	Horizontal	409475	3723300	3.66	4.60	533	18.0	0.127
EAST39	Horizontal	409500	3723300	3.66	4.60	533	18.0	0.127
EAST40	Horizontal	409525	3723300	3.66	4.60	533	18.0	0.127
EAST41	Horizontal	409550	3723300	3.66	4.60	533	18.0	0.127

Amended Huntington Beach Energy Project
Table 5.9B.1
Demolition and Construction HRA Stack Parameters
September 2015

Point Sources

Source ID	Stack Release Type (Beta)	Easting (X) (m)	Northing (Y) (m)	Base Elevation (m)	Stack Height (m)	Temperature (K)	Exit Velocity (m/s)	Stack Diameter (m)
WEST01	Horizontal	409175	3723285	3.66	4.60	533	18.0	0.127
WEST02	Horizontal	409195	3723271	3.66	4.60	533	18.0	0.127
WEST03	Horizontal	409216	3723256	3.66	4.60	533	18.0	0.127
WEST04	Horizontal	409236	3723242	3.66	4.60	533	18.0	0.127
WEST05	Horizontal	409257	3723228	3.66	4.60	533	18.0	0.127
WEST06	Horizontal	409277	3723213	3.66	4.60	533	18.0	0.127
WEST07	Horizontal	409161	3723265	3.66	4.60	533	18.0	0.127
WEST08	Horizontal	409181	3723250	3.66	4.60	533	18.0	0.127
WEST09	Horizontal	409202	3723236	3.66	4.60	533	18.0	0.127
WEST10	Horizontal	409222	3723222	3.66	4.60	533	18.0	0.127
WEST11	Horizontal	409243	3723207	3.66	4.60	533	18.0	0.127
WEST12	Horizontal	409263	3723193	3.66	4.60	533	18.0	0.127
WEST13	Horizontal	409146	3723244	3.66	4.60	533	18.0	0.127
WEST14	Horizontal	409167	3723230	3.66	4.60	533	18.0	0.127
WEST15	Horizontal	409187	3723215	3.66	4.60	533	18.0	0.127
WEST16	Horizontal	409208	3723201	3.66	4.60	533	18.0	0.127
WEST17	Horizontal	409228	3723187	3.66	4.60	533	18.0	0.127
WEST18	Horizontal	409249	3723172	3.66	4.60	533	18.0	0.127
WEST19	Horizontal	409132	3723224	3.66	4.60	533	18.0	0.127
WEST20	Horizontal	409152	3723209	3.66	4.60	533	18.0	0.127
WEST21	Horizontal	409173	3723195	3.66	4.60	533	18.0	0.127
WEST22	Horizontal	409193	3723181	3.66	4.60	533	18.0	0.127
WEST23	Horizontal	409214	3723166	3.66	4.60	533	18.0	0.127
WEST24	Horizontal	409234	3723152	3.66	4.60	533	18.0	0.127
WEST25	Horizontal	409118	3723203	3.66	4.60	533	18.0	0.127
WEST26	Horizontal	409138	3723189	3.66	4.60	533	18.0	0.127
WEST27	Horizontal	409159	3723174	3.66	4.60	533	18.0	0.127
WEST28	Horizontal	409179	3723160	3.66	4.60	533	18.0	0.127
WEST29	Horizontal	409200	3723146	3.66	4.60	533	18.0	0.127
WEST30	Horizontal	409220	3723131	3.66	4.60	533	18.0	0.127
WEST31	Horizontal	409103	3723183	3.66	4.60	533	18.0	0.127
WEST32	Horizontal	409124	3723168	3.66	4.60	533	18.0	0.127
WEST33	Horizontal	409144	3723154	3.66	4.60	533	18.0	0.127
WEST34	Horizontal	409165	3723140	3.66	4.60	533	18.0	0.127
WEST35	Horizontal	409185	3723125	3.66	4.60	533	18.0	0.127
WEST36	Horizontal	409206	3723111	3.66	4.60	533	18.0	0.127

Amended Huntington Beach Energy Project
Table 5.9B.1
Demolition and Construction HRA Stack Parameters
September 2015

Point Sources

Source ID	Stack Release Type (Beta)	Easting (X) (m)	Northing (Y) (m)	Base Elevation (m)	Stack Height (m)	Temperature (K)	Exit Velocity (m/s)	Stack Diameter (m)
SOUTH01	Horizontal	409294	3723203	3.66	4.60	533	18.0	0.127
SOUTH02	Horizontal	409314	3723189	3.66	4.60	533	18.0	0.127
SOUTH03	Horizontal	409335	3723174	3.66	4.60	533	18.0	0.127
SOUTH04	Horizontal	409355	3723160	3.66	4.60	533	18.0	0.127
SOUTH05	Horizontal	409376	3723146	3.66	4.60	533	18.0	0.127
SOUTH06	Horizontal	409280	3723183	3.66	4.60	533	18.0	0.127
SOUTH07	Horizontal	409300	3723168	3.66	4.60	533	18.0	0.127
SOUTH08	Horizontal	409321	3723154	3.66	4.60	533	18.0	0.127
SOUTH09	Horizontal	409341	3723140	3.66	4.60	533	18.0	0.127
SOUTH10	Horizontal	409362	3723125	3.66	4.60	533	18.0	0.127
SOUTH11	Horizontal	409265	3723162	3.66	4.60	533	18.0	0.127
SOUTH12	Horizontal	409286	3723148	3.66	4.60	533	18.0	0.127
SOUTH13	Horizontal	409306	3723133	3.66	4.60	533	18.0	0.127
SOUTH14	Horizontal	409327	3723119	3.66	4.60	533	18.0	0.127
SOUTH15	Horizontal	409347	3723105	3.66	4.60	533	18.0	0.127
SOUTH16	Horizontal	409251	3723142	3.66	4.60	533	18.0	0.127
SOUTH17	Horizontal	409271	3723127	3.66	4.60	533	18.0	0.127
SOUTH18	Horizontal	409292	3723113	3.66	4.60	533	18.0	0.127
SOUTH19	Horizontal	409312	3723099	3.66	4.60	533	18.0	0.127
SOUTH20	Horizontal	409333	3723084	3.66	4.60	533	18.0	0.127
SOUTH21	Horizontal	409237	3723121	3.66	4.60	533	18.0	0.127
SOUTH22	Horizontal	409257	3723107	3.66	4.60	533	18.0	0.127
SOUTH23	Horizontal	409278	3723092	3.66	4.60	533	18.0	0.127
SOUTH24	Horizontal	409298	3723078	3.66	4.60	533	18.0	0.127
SOUTH25	Horizontal	409319	3723064	3.66	4.60	533	18.0	0.127
SOUTH26	Horizontal	409222	3723101	3.66	4.60	533	18.0	0.127
SOUTH27	Horizontal	409243	3723086	3.66	4.60	533	18.0	0.127
SOUTH28	Horizontal	409263	3723072	3.66	4.60	533	18.0	0.127
SOUTH29	Horizontal	409284	3723058	3.66	4.60	533	18.0	0.127
SOUTH30	Horizontal	409304	3723043	3.66	4.60	533	18.0	0.127

Amended Huntington Beach Energy Project
Table 5.9B.2
Demolition and Construction HRA Emission Rates
September 2015

Emission Rates for Construction HRA Modeling

	Diesel Particulate Matter	
Source Group ID [a]	(g/s)	(lb/yr) [b]
EAST	1.96E-04	13.6
WEST	4.03E-05	2.80
SOUTH	7.37E-05	5.13

[a] The emission rate for each source group is the total for all sources in that group.
[b] Emission rates are the total emissions for demolition and construction divided by 10 years.

Amended Huntington Beach Energy Project
Table 5.9B.3
Cancer Impacts due to Diesel Particulate Matter
Demolition and Construction Health Risk Assessment
September 2015

Modeled Concentrations
Maximum annual impact of annualized project emissions

PMI	0.01027	$\mu g/m^3$	Diesel PM
MEIR	0.00832	$\mu g/m^3$	Diesel PM
Sensitive	0.00095	$\mu g/m^3$	Diesel PM
MEIW	0.01027	$\mu g/m^3$	Diesel PM

Demolition and Construction HRA per the 2015 OEHHA Guidance
Residential Calculation Procedure for Cancer Risks

PMI

Year	0 (3rd tri)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Dose (mg/kg/day)	3.56E-06	1.07E-05	1.07E-05	8.49E-06	8.49E-06	8.49E-06	8.49E-06	8.49E-06	8.49E-06	7.35E-06	7.35E-06	7.35E-06	7.35E-06	7.35E-06	7.35E-06	7.35E-06	3.30E-06	3.30E-06	3.30E-06	3.30E-06	3.30E-06	3.30E-06	3.30E-06	3.30E-06	3.30E-06	3.30E-06	3.30E-06	3.30E-06	3.30E-06	3.30E-06	3.30E-06
Risk	1.19E-07	1.44E-06	1.44E-06	2.88E-07	2.88E-07	2.88E-07	2.88E-07	2.88E-07	2.88E-07	2.49E-07	2.49E-07	2.49E-07	2.49E-07	2.49E-07	2.49E-07	2.49E-07	3.79E-08	3.79E-08	3.79E-08	3.79E-08	3.79E-08	3.79E-08	3.79E-08	3.79E-08	3.79E-08	3.79E-08	3.79E-08	3.79E-08	3.79E-08	3.79E-08	3.79E-08
Rolling 10-yr Risk											5.22E-06	3.91E-06	2.73E-06	2.69E-06	2.65E-06	2.61E-06	2.36E-06	2.11E-06	1.86E-06	1.65E-06	1.44E-06	1.22E-06	1.01E-06	8.02E-07	5.90E-07	3.79E-07	3.79E-07	3.79E-07	3.79E-07	3.79E-07	3.79E-07
Risk per Million											5.22	3.91	2.73	2.69	2.65	2.61	2.36	2.11	1.86	1.65	1.44	1.22	1.01	0.80	0.59	0.38	0.38	0.38	0.38	0.38	0.38

MEIR

Year	0 (3rd tri)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Dose (mg/kg/day)	2.88E-06	8.71E-06	8.71E-06	6.88E-06	6.88E-06	6.88E-06	6.88E-06	6.88E-06	6.88E-06	5.95E-06	5.95E-06	5.95E-06	5.95E-06	5.95E-06	5.95E-06	5.95E-06	2.68E-06	2.68E-06	2.68E-06	2.68E-06	2.68E-06	2.68E-06	2.68E-06	2.68E-06	2.68E-06	2.68E-06	2.68E-06	2.68E-06	2.68E-06	2.68E-06	2.68E-06
Risk	9.63E-08	1.16E-06	1.16E-06	2.33E-07	2.33E-07	2.33E-07	2.33E-07	2.33E-07	2.33E-07	2.02E-07	2.02E-07	2.02E-07	2.02E-07	2.02E-07	2.02E-07	2.02E-07	3.07E-08	3.07E-08	3.07E-08	3.07E-08	3.07E-08	3.07E-08	3.07E-08	3.07E-08	3.07E-08	3.07E-08	3.07E-08	3.07E-08	3.07E-08	3.07E-08	3.07E-08
Rolling 10-yr Risk											4.23E-06	3.17E-06	2.21E-06	2.18E-06	2.15E-06	2.11E-06	1.91E-06	1.71E-06	1.51E-06	1.33E-06	1.16E-06	9.92E-07	8.21E-07	6.50E-07	4.78E-07	3.07E-07	3.07E-07	3.07E-07	3.07E-07	3.07E-07	3.07E-07
Risk per Million											4.23	3.17	2.21	2.18	2.15	2.11	1.91	1.71	1.51	1.33	1.16	0.99	0.82	0.65	0.48	0.31	0.31	0.31	0.31	0.31	0.31

Sensitive

Year	0 (3rd tri)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Dose (mg/kg/day)	3.29E-07	9.94E-07	9.94E-07	7.85E-07	7.85E-07	7.85E-07	7.85E-07	7.85E-07	7.85E-07	6.79E-07	6.79E-07	6.79E-07	6.79E-07	6.79E-07	6.79E-07	6.79E-07	3.06E-07	3.06E-07	3.06E-07	3.06E-07	3.06E-07	3.06E-07	3.06E-07	3.06E-07	3.06E-07	3.06E-07	3.06E-07	3.06E-07	3.06E-07	3.06E-07	3.06E-07
Risk	1.10E-08	1.33E-07	1.33E-07	2.67E-08	2.67E-08	2.67E-08	2.67E-08	2.67E-08	2.67E-08	2.31E-08	2.31E-08	2.31E-08	2.31E-08	2.31E-08	2.31E-08	2.31E-08	3.50E-09	3.50E-09	3.50E-09	3.50E-09	3.50E-09	3.50E-09	3.50E-09	3.50E-09	3.50E-09	3.50E-09	3.50E-09	3.50E-09	3.50E-09	3.50E-09	3.50E-09
Rolling 10-yr Risk											4.83E-07	3.62E-07	2.52E-07	2.49E-07	2.45E-07	2.41E-07	2.18E-07	1.95E-07	1.72E-07	1.52E-07	1.33E-07	1.13E-07	9.37E-08	7.42E-08	5.46E-08	3.50E-08	3.50E-08	3.50E-08	3.50E-08	3.50E-08	3.50E-08
Risk per Million											0.48	0.36	0.25	0.25	0.24	0.24	0.22	0.20	0.17	0.15	0.13	0.11	0.09	0.07	0.05	0.04	0.04	0.04	0.04	0.04	0.04

Worker Calculation Procedure for Cancer Risks

MEIW

Year	16	17	18	19	20	21	22	23	24	25
Dose (mg/kg/day)	1.61E-06	1.61E-06	1.61E-06	1.61E-06	1.61E-06	1.61E-06	1.61E-06	1.61E-06	1.61E-06	1.61E-06
Risk	2.52E-08	2.52E-08	2.52E-08	2.52E-08	2.52E-08	2.52E-08	2.52E-08	2.52E-08	2.52E-08	2.52E-08
Rolling 10-yr Risk										2.52E-07
Risk per Million										0.25

Amended Huntington Beach Energy Project
Table 5.9B.4
Chronic Impacts due to Diesel Particulate Matter
Demolition and Construction Health Risk Assessment
September 2015

Demolition and Construction HRA per the 2015 OEHHA Guidance
Calculation Procedure for Chronic Hazard Index

Receptor Type	Pollutant	Maximum Annual Modeled Concentration (µg/m^3)	REL (µg/m^3)	Chronic Hazard Index
PMI	Diesel PM	0.01027	5	0.0021
MEIR	Diesel PM	0.00832	5	0.0017
Sensitive	Diesel PM	0.00095	5	0.00019
MEIW	Diesel PM	0.01027	5	0.0021

Amended Huntington Beach Energy Project
Table 5.9B.5
Residential Constants for Cancer Risk
Demolition and Construction Health Risk Assessment
September 2015

Dose Constants

Year	0 (3rd tri)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
BR/BW	361	1090	1090	861	861	861	861	861	861	745	745	745	745	745	745	745	335	335	335	335	335	335	335	335	335	335	335	335	335	335	335
A	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
EF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Conversion	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001

Risk Constants

Year	0 (3rd tri)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
CPF (Diesel PM)	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
ASF	10	10	10	3	3	3	3	3	3	3	3	3	3	3	3	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
ED	0.25	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
AT	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70
FAH	0.85	0.85	0.85	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73

A. <u>Equation 5.4.1.1</u>: $\boxed{\text{Dose-air} = C_{air} \times \{BR/BW\} \times A \times EF \times 10^{-6}}$

1. Dose-air = Dose through inhalation (mg/kg/d)
2. C_{air} = Concentration in air ($\mu g/m^3$)
3. {BR/BW} = Daily Breathing rate normalized to body weight (L/kg body weight - day)
4. A = Inhalation absorption factor (unitless)
5. EF = Exposure frequency (unitless), days/365 days
6. 10^{-6} = Micrograms to milligrams conversion, liters to cubic meters conversion

a: Recommended default values for EQ 5.4.1.1:

1. {BR/BW} = Daily breathing rates by age groupings, see As supplemental information, the assessor may wish to evaluate the inhalation dose by using the mean point estimates in Table 5.6 to provide a range of breathing rates for cancer risk assessment to the risk manager.
2. Table (point estimates) and Table 5.7 (parametric model distributions for Tier III stochastic risk assessment). For Tier 1 residential estimates, use 95th percentile breathing rates in Table 5.6.
3. A = 1
4. EF = 0.96 (350 days/365 days in a year for a resident)

A. <u>Equation 8.2.4 A</u>: $\boxed{RISK_{inh\text{-}res} = DOSE_{air} \times CPF \times ASF \times ED/AT \times FAH}$

7. $RISK_{inh\text{-}res}$ = Residential inhalation cancer risk
8. $DOSE_{air}$ = Daily inhalation dose (mg/kg-day)
9. CPF = Inhalation cancer potency factor ($mg/kg\text{-}day^{-1}$)
10. ASF = Age sensitivity factor for a specified age group (unitless)
11. ED = Exposure duration (in years) for a specified age group
12. AT = Averaging time for lifetime cancer risk (years)
13. FAH = Fraction of time spent at home (unitless)

a: Recommended default values for EQ 8.2.4 A:

5. $DOSE_{air}$ = Calculated for each age group from Eq. 5.4.1
6. CPF = Substance-specific (see Table 7.1)
7. ASF = See Section 8.2.1
8. ED = 0.25 years for 3rd trimester, 2 years for 0<2, 7 years for 2<9, 14 years for 2<16, 14 years for 16<30, 54 years for 16-70
9. AT = 70 years*
10. FAH = See Table 8.4

Amended Huntington Beach Energy Project
Table 5.9B.6
Worker Constants for Cancer Risk
Demolition and Construction Health Risk Assessment
September 2015

Dose Constants

Year	16	17	18	19	20	21	22	23	24	25
WAF	1	1	1	1	1	1	1	1	1	1
BR/BW	230	230	230	230	230	230	230	230	230	230
A	1	1	1	1	1	1	1	1	1	1
EF	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68
Conversion	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001

Risk Constants

Year	16	17	18	19	20	21	22	23	24	25
CPF (Diesel PM)	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
ASF	1	1	1	1	1	1	1	1	1	1
ED	1	1	1	1	1	1	1	1	1	1
AT	70	70	70	70	70	70	70	70	70	70

A. Equation 5.4.1.2 A: $\boxed{\text{Dose-air} = (C_{air} \times \text{WAF}) \times \{\text{BR/BW}\} \times A \times \text{EF} \times 10^{-6}}$

1. Dose-air = Dose through inhalation (mg/kg/d)
2. C_{air} = Annual average concentration in air (μg/m^3)
3. WAF = Worker air concentration adjustment factor (unitless)
4. {BR/BW} = Eight-hour breathing rate normalized to body weight (L/kg body weight - day)
5. A = Inhalation absorption factor (unitless)
6. EF = Exposure frequency (unitless), days/365 days)
7. 10^{-6} = Micrograms to milligrams conversion, Liters to cubic meters conversion

a: Recommended default values for EQ 5.4.1.2 A:

1. WAF = See EQ. 5.4.1.2 B for formula to calculate WAF, or App. M for refined post-processing modeling to calculate WAF.
2. {BR/BW} = For workers, use age16-70 year, 95th percentile, moderate intensity 8-hour point estimate breathing rates (see Table 5.8). No worker breathing rate distributions exist for stochastic risk assessment.
3. A = 1
4. EF = 0.68 (250 days / 365 days). Equivalent to working 5 days/week, 50 weeks/year.

b: Assumption for EQ 5.4.1.2 A:

1. The fraction of chemical absorbed (A) through the lungs is the same fraction absorbed in the study on which the cancer potency factor is based.
2. The source emits during the daylight hours. Calculate WAF (EQ 5.4.1.2 B) if a special post-processing modeling run described in App. M was not completed. For nighttime emissions and exposure scenarios, see Appendix N.

B. Equation 5.4.1.2 B: $\boxed{\text{WAF} = (H_{res} / H_{source}) \times (D_{res} / D_{source}) \times \text{DF}}$

1. WAF = Worker adjustment factor (unitless)
2. H_{res} = Number of hours per day the annual average residential air

concentration is based on (always 24 hours)

3. H_{source} = Number of hours the source operates per day
4. D_{res} = Number of days per week the annual average residential air concentration is based on (always 7 days)
5. D_{source} = Number of days the emitting source operates per week
6. DF = Discount factor, for when the offsite worker's schedule partially overlaps the source's emission schedule

b: Recommended default values for EQ 5.4.1.2 B:

1. DF = 1 for offsite worker's schedule occurring within the source's emission schedule. A site-specific survey may be used to adjust the DF using EQ 5.4.1.2 C.

C. Equation 5.4.1.2 C:

$$DF = (H_{coincident} / H_{worker}) \times (D_{coincident} / D_{worker})$$

1. $H_{coincident}$ = Number of hours per day the offsite worker's schedule and the source's emission schedule coincide
2. H_{worker} = Number of hours the offsite worker works per day
3. $D_{coincident}$ = Number of days per week the offsite worker's schedule and the source's emission schedule coincide
4. D_{worker} = Number of days the offsite worker works per week

B. Equation 8.2.4 B:

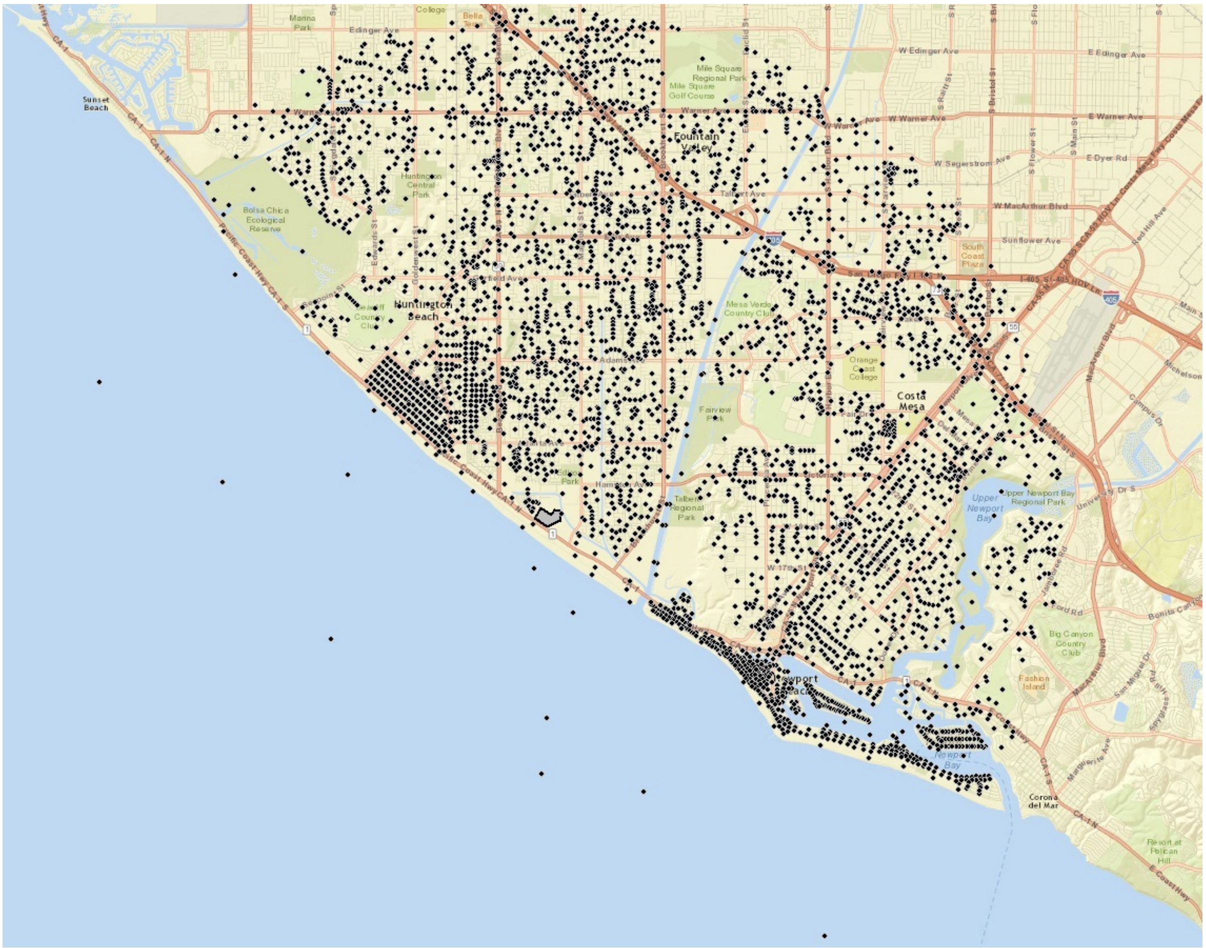
$$RISK_{inh\text{-}work} = DOSE_{air} \times CPF \times ASF \times ED/AT$$

1. $RISK_{inh\text{-}work}$ = Worker inhalation cancer risk

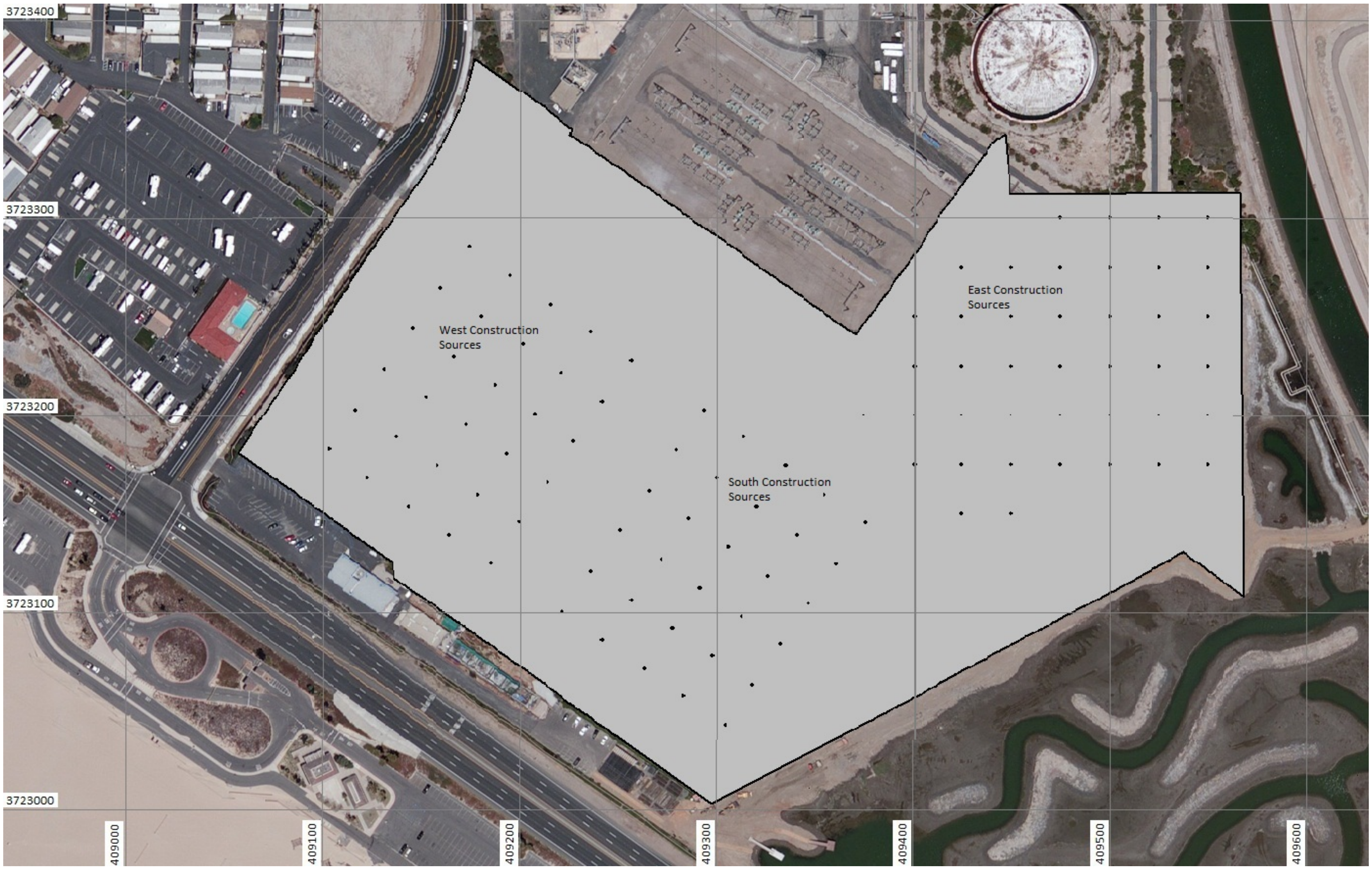
a: Recommended default values for EQ 8.2.4 B:

1. $DOSE_{air}$ = Calculated for workers in Eq. 5.4.1.2
2. CPF = Substance specific (see Table 7.1)
3. ASF = 1 for working age 16-70 yrs (See Section 8.2.1)
4. ED = 25 years
5. AT = 70 yrs for lifetime cancer risk

Amended Huntington Beach Energy Project
Figure 5.9B-1
Census and Sensitive Receptor Grid for Amended HBEP HRA Modeling
September 2015



Amended Huntington Beach Energy Project
Figure 5.9B-2
AERMOD Demolition and Construction HRA Setup
September 2015



Appendix 5.10A
Estimates of Construction Personnel

Appendix 5.10A

Demolition and Construction Workforce by Trade by Month, Demolition of Peaker and Tanks, Plains All American Tank Farm, and 2x1 7FA.05 Power Block

Demoliton - Peaker and Tanks	Month-Year																																																				WORKER MONTHS
	2016												2017												2018												2019												2020				
CRAFT	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	
Carpenters																																																					0
Laborers	25	25	25	25	10	10	10																																														130
Teamsters	10	10	10	10	4	4	4																																														52
Electricians																																																					0
Iron Workers																																																					0
Millwrights	6	6	6	6																																																	24
Boilermakers																																																					0
Plumbers																																																					0
Pipefitters																																																					0
Oilers / Mechanics	2	2	2	2																																																	8
Operating Engineers	18	18	18	18	6	6	6																																														90
TOTAL CRAFT LABOR	61	61	61	61																																																	244
TOTAL SUPERVISION	4	4	4	4	2	2	2																																														22
TOTAL MANPOWER	65	65	65	65	2	2	2																																														266

a	Month-Year																																																				WORKER MONTHS
	2016												2017												2018												2019												2020				
CRAFT	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	
Carpenters/Cement Finishers														4	4	4																																					12
Laborers													8	8	8	4	4																																				32
Teamsters													4	4	4	2	2																																				16
Electricians																																																					0
Iron Workers																																																					0
Millwrights																																																					0
Boilermakers																																																					0
Pipefitters																																																					0
Insulation Workers																																																					0
Operating Engineers													9	9	9	7	7																																				41
Sheetmetal Workers																																																					0
Painters															2	2	2																																				6
TOTAL CRAFT LABOR													21	25	27	19	15																																				107
TOTAL SUPERVISION													1	1	1	1	1																																				5
TOTAL MANPOWER													22	26	28	20	16																																				112

CONSTRUCTION - HUNTINGTON BEACH 2x1	Month-Year																																																				WORKER MONTHS
	2016												2017												2018												2019												2020				
CRAFT	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	
Piling Crew																								8	8	8	8																										32
Carpenters																								8	14	16	18	20	20	20	24	24	24	24	22	18	15	13	12														292
Laborers																								8	12	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	4	4	2	414
Teamsters																								2	4	4	4	5	5	6	7	7	7	7	7	7	7	7	7	7	7	7	7	7	5	5	5	3					146
Electricians																								16	18	24	24	24	28	34	36	48	54	54	54	60	60	60	60	60	60	60	54	54	52	48	36	24	6	4	4	2	1,118
Ironworkers																								8	10	10	12	12	12	12	12	12	14	14	14	14	14	14	14	10	8												216
Millwrights																															4	6	8	12	12	12	12	12	12	12	12	12	12	12	10	8	6	4	4	2	2	2	188
Boilermakers																															8	10	12	20	36	48	48	48	48	48	48	48	48	48	48	48	40	36					690
Plumbers																																						2	2	2	2	2	2	2	2	2	2	2	2				24
Pipefitters																								11	15	20	22	24	30	38	48	48	54	58	58	58	58	58	58	58	58	58	58	58	58	58	50	48	22	4	4	4	1,196
Insulation workers																																								8	10	12	30	30	30	24	18	12					174
Operating Enginneers																								6	8	10	10	12	12	12	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	2	2	2	2	330
Oilers / Mechanics																								1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2									31
Cement Finishers																								2	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4														60
Masons																																																					0
Sheetrockers																																										2	4	4	4	4	2	2					22
Roofers																																						2	2	2	2	2	2										12
Sheetmetal Workers																																																					0
Sprinkler Fitters																																							4	4	4	4	4	4	4	4	4	3					39
Painters																																								2	4	4	6	6	8	8	6	4					48
I & C - Control Room																																			6	7	8	8	8	8	8	8	8	8	8	8	8	7	2	3	3	3	119
TOTAL CRAFT LABOR																																																					0
TOTAL SUPERVISION (GENERAL FOREMEN)																								3	4	4	4	4	5	5	6	7	7	7	7	7	7	7	7	9	9	9	9	9	9	9	9	9	2	2	2	2	180
TOTAL STAFFING																		4	9	9	10	12	14	23	23	23	23	25	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	24	18.2	18	18	853
TOTAL WORKFORCE POWER																		4	9	9	10	12	14	96	120	139	146	147	163	178	210	227	245	261	282	297	295	297	300	292	294	290	306	304	298	286	246	214	80	39.2	39	35	6,184
TOTAL WORKFORCE POWER - DEMOLITION + CONSTRUCTION	65	65	65	65	2	2	2	0	0	0	0	0	22	26	28	20	16	4	9	9	10	12	14	96	120	139	146	147	163	178	210	227	245	261	282	297	295	297	300	292	294	290	306	304	298	286	246	214	80	39	39	35	6,562

Appendix 5.10A
Construction Workforce by Trade by Month, 2 LMS 100 Simple-Cycle Power Block

	Month-Year																				WORKER MONTHS
	2022								2023												
CRAFT	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	
Carpenters/Cement Finishers	1	4	7	11	13	11	13	14	13	13	9	4	4	4	2	2	2	1	1	0	128
Laborers	3	3	4	11	15	31	30	30	25	15	7	4	4	4	3	3	3	2	2	2	197
Teamsters	1	3	5	7	10	6	6	5	4	4	3	2	1	1	1	1	1	1	1	0	62
Electricians	1	3	4	5	7	8	15	25	32	32	35	33	13	12	10	10	10	5	5	5	260
Iron Workers	0	3	5	31	29	31	31	29	25	22	19	17	8	8	3	3	3	0	0	0	267
Millwrights	0	0	0	7	8	13	25	35	37	38	30	14	10	9	1	1	1	1	1	1	230
Boilermakers	0	0	0	0	0	14	14	14	14	14	14	11	11	11	11	11	11	0	0	0	150
Pipefitters	0	0	0	3	6	9	9	16	35	11	6	4	2	2	1	1	1	0	0	0	106
Insulation Workers	0	0	0	0	0	0	0	5	8	8	17	4	3	3	0	0	0	0	0	0	48
Operating Engineers	1	3	7	7	7	13	13	11	9	4	1	1	1	1	1	1	1	1	1	0	83
Sheetmetal Workers	0	0	0		0	3	6	7	8	7	6	5	2	2	1	1	1	0	0	0	49
Painters	0	0	0	0	0	4	8	8	8	5	4	2	2	2	2	2	2	0	0	0	49
TOTAL CRAFT LABOR	7	19	32	82	95	143	170	199	218	173	151	101	61	59	36	36	36	11	11	8	1,629
TOTAL SUPERVISION	5	8	12	10	16	15	15	15	13	13	15	16	16	16	6	6	6	6	6	6	209
TOTAL WORKFORCE POWER	12	27	44	92	111	158	185	214	231	186	166	117	77	75	42	42	42	17	17	14	1,838

Appendix 5.13A
Simulations of the Licensed HBEP and Amended HBEP (11x17 versions)

Simulated view toward project site from Huntington State Beach with the licensed HBEP in place.

Figure 5.13-2.A. KOP 1 - View Toward HBEP from Huntington State Beach - Licensed Project

AES Amended Huntington Beach Energy Project

Huntington Beach, California

Simulated view toward project site from Huntington State Beach with the Amended HBEP in place.

Figure 5.13-2.B. KOP 1 - View Toward HBEP from Huntington State Beach - Amended Project

AES Amended Huntington Beach Energy Project

Huntington Beach, California

Simulated view toward project site from Huntington Beach Pier with the licensed HBEP in place.

Figure 5.13-3.A. KOP 2 - View Toward HBEP from Huntington Beach Pier – Licensed Project

AES Amended Huntington Beach Energy Project

Huntington Beach, California

Simulated view toward project site from Huntington Beach Pier with the Amended HBEP in place.

Figure 5.13-3.B. KOP 2 - View Toward HBEP from Huntington Beach Pier – Amended Project

AES Amended Huntington Beach Energy Project

Huntington Beach, California

Simulated view toward project site from Edison Park with the licensed HBEP in place.

Figure 5.13-4.A. KOP 3 – View Toward HBEP from Edison Park – Licensed Project

AES Amended Huntington Beach Energy Project

Huntington Beach, California

Simulated view toward project site from Edison Park with the Amended HBEP in place.

Figure 5.13-4.B. KOP 3 - View Toward HBEP from Edison Park – Amended Project

AES Amended Huntington Beach Energy Project

Huntington Beach, California

Simulated view toward project site from Magnolia Street with the licensed HBEP in place.

Figure 5.13-5.A. KOP 4 - View Toward HBEP from Magnolia Street – Licensed Project

AES Amended Huntington Beach Energy Project

Huntington Beach, California

ch2m

Simulated view toward project site from Magnolia Street with the Amended HBEP in place.

Figure 5.13-5.B. KOP 4 - View Toward HBEP from Magnolia Street – Amended Project

AES Amended Huntington Beach Energy Project

Huntington Beach, California

Simulated view toward project site from Huntington By-The-Sea RV Park with the licensed HBEP in place.

Figure 5.13-6.A. KOP 5 - View Toward HBEP from Huntington By-The-Sea RV Park – Licensed Project
AES Amended Huntington Beach Energy Project
Huntington Beach, California

ch2m

Simulated view toward project site from Huntington By-The-Sea RV Park with the Amended HBEP in place.

Figure 5.13-6.B. KOP 5 - View Toward HBEP from Huntington By-The-Sea RV Park – Amended Project
AES Amended Huntington Beach Energy Project
Huntington Beach, California

Simulated view toward project site from Pacific Coast Highway with the licensed HBEP in place.

Figure 5.13-7.A. KOP 6 - View Toward HBEP from Pacific Coast Highway – Licensed Project

AES Amended Huntington Beach Energy Project

Huntington Beach, California

ch2m.

Simulated view toward project site from Pacific Coast Highway with the Amended HBEP in place.

Figure 5.13-7.B. KOP 6 - View Toward HBEP from Pacific Coast Highway – Amended Project

AES Amended Huntington Beach Energy Project

Huntington Beach, California

ch2m

Simulated view toward project site from Huntington Shorecliffs Mobile Home Park with the licensed HBEP in place.

Figure 5.13-8.A. KOP 7 - View Toward HBEP from Huntington Shorecliffs Mobile Home Park – Licensed Project
AES Amended Huntington Beach Energy Project
Huntington Beach, California

Simulated view toward project site from Huntington Shorecliffs Mobile Home Park with the Amended HBEP in place.

Figure 5.13-8.B. KOP 7 - View Toward HBEP from Huntington Shorecliffs Mobile Home Park – Amended Project
AES Amended Huntington Beach Energy Project
Huntington Beach, California