Appendix 5.1F
Dispersion Modeling Protocol

Dispersion Modeling Protocol for the Redondo Beach Energy Project

Prepared for

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South Coast Air Quality Management District and the California Energy Commission

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Acronyms and Abbreviations

$\mu g/m^3$	microgram(s) per cubic meter
AES	AES Southland Development, LLC
AFC	Application for Certification
AQRV	air quality-related values
CAAQS	California Ambient Air Quality Standards
CEC	California Energy Commission
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CH_4	methane
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
GHG	greenhouse gas
GRP	General Reporting Protocol
H_2S	hydrogen sulfide
H_2SO_4	sulfuric acid
HARP	Hotspots Analysis Reporting Program
HI	hazard index
HRA	health risk assessment
HRSG	heat recovery steam generator
lb	pound(s)
MICR	maximum individual cancer risk
MPSA	Mitsubishi Power Systems Americas
MW	megawatt(s)
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NO_2	nitrogen dioxide
NO_x	oxides of nitrogen
NSR	New Source Review
OEHHA	Office of Environmental Health Hazard Assessment
PM_{10}	particulate matter less than 10 microns in diameter
$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
ppm	parts per million
ppmv	parts per million by volume
PSD	Prevention of Significant Deterioration
PTE	potential to emit

PVMRM	plume volume molar ratio method
Q/D	emissions/distance
RBEP	Redondo Beach Energy Project
REL	Reference Exposure Level
SCAQMD	South Coast Air Quality Management District
SIL	significant impact levels
SO_2	sulfur dioxide
SO_x	sulfur oxides
TAC	toxic air contaminants
TCR	The Climate Registry
tpy	ton(s) per year
VOC	volatile organic compound

SECTION 1

Introduction

AES Southland Development, LLC, (AES) proposes to construct the Redondo Beach Energy Project (RBEP or project) at the existing AES Redondo Beach Generating Station site at 1100 North Harbor Drive, Redondo Beach, CA 90277 (see Figure 1-1). RBEP will consist of one three-on-one natural-gas-fired combined-cycle power block with a nominal generating capacity of 495 megawatts (MW)[1] and maximum generating capacity of 529 MW.[2] The power block will consist of three Mitsubishi Power Systems Americas (MPSA) 501DA combustion turbines, one steam turbine, 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 firing). The turbines will use dry low NO_x (oxides of nitrogen) burners and selective catalytic reduction to limit NO_x 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 an oxidation catalyst. Best combustion practices and burning pipeline-quality natural gas will minimize emissions of the remaining pollutants.

Two electric fire pumps, connected to two independent power feeds from the Southern California Edison distribution system, will be used to provide onsite fire protection; therefore, the fire pumps will not be included in the modeling analysis for RBEP. RBEP will reuse existing onsite potable water, natural gas, stormwater, process wastewater, sanitary pipelines, and electrical transmission facilities. No offsite linear developments are proposed as part of the project.

The existing Redondo Beach Generating Station currently has four operating generating units (Units 5–8) and one auxiliary boiler (Boiler No. 17). The operating units, the retired units 1–4, auxiliary boiler No. 17, and the main administrative building will be demolished as part of the project. Because the existing Redondo Beach Generating Station units will be retired and removed as part of the project, the maximum 2 year historical past actual emissions from these units between calendar years 2006 and 2011 will be subtracted from the potential to emit (PTE) for RBEP.

RBEP will be permitted through the California Energy Commission (CEC) Application for Certification (AFC) licensing process and the South Coast Air Quality Management District (SCAQMD) New Source Review (NSR) permitting process. Because RBEP includes the use of steam to generate electricity, the 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 project is subject to PSD permitting requirements if the net emission increase 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 net increase of 100,000 tpy.

Despite the netting analysis, the resulting PTE is still expected to exceed the 100,000 tpy threshold for greenhouse gases (see Section 3.3). 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. Therefore, the PSD modeling results will be submitted to the SCAQMD as part of the permitting process.

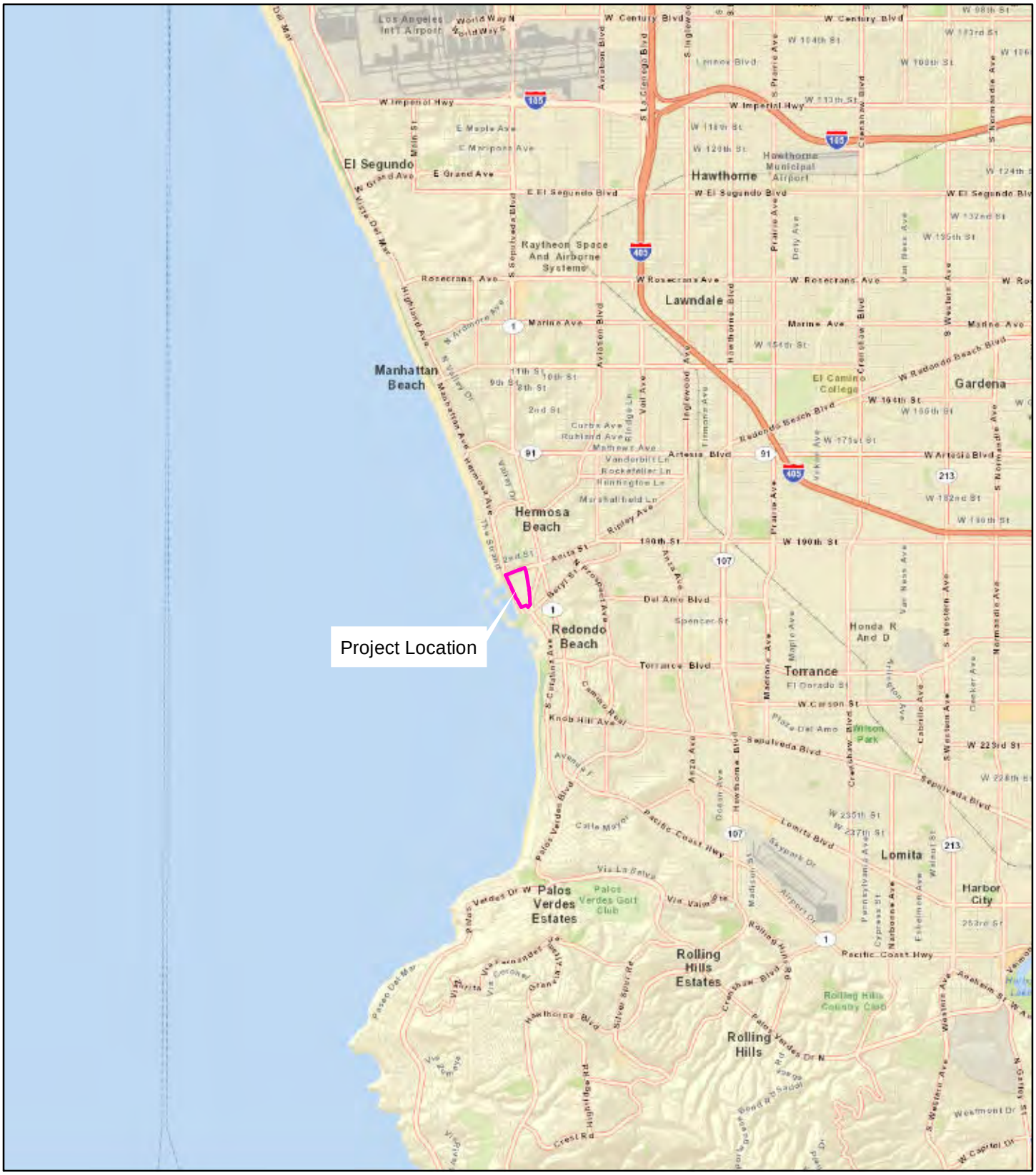
Dispersion modeling will be conducted to demonstrate that the project will neither cause a new violation of a state or federal ambient air quality standard nor make an existing violation significantly worse for nitrogen dioxide (NO_2), CO, particulate matter less than 10 microns in diameter (PM_{10}), particulate matter less than 2.5 microns in diameter ($PM_{2.5}$), and sulfur dioxide (SO_2). AES intends to submit an air quality impact analysis to both the SCAQMD and CEC that evaluates the impacts from RBEP 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

[1] Referenced to site ambient average temperature conditions of 63.3°F dry bulb and 58.5°F wet bulb temperature

[2] Referenced to site minimum winter ambient temperature conditions of 33°F dry bulb and 30.5°F deg wet bulb temperature

health risks associated with the operation of the proposed project will be performed. Although VOC and GHG emissions are included in the following discussion, AES does not intend to model VOC or GHG emissions as part of the air quality impacts analysis as there is no State or Federal standard for either pollutant.

The following discussion presents the methodology proposed for evaluating the potential air quality and public health impacts associated with RBEP demolition, construction, commissioning, and operation activities.



0 1 2 4 Miles

N

Legend

Redondo Beach Energy Project

FIGURE 1-1
Regional Location Map
AES Redondo Beach Energy Project
Redondo Beach, California

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SECTION 2

Existing Setting

2.1 Area Classifications

RBEP will be located in Los Angeles County, California. The County is in attainment for all federal National Ambient Air Quality Standards (NAAQS) with the exception of ozone, PM_{10}, $PM_{2.5}$, and lead. The county is in attainment for all California Ambient Air Quality Standards (CAAQS) with the exception of ozone, NO_2, PM_{10}, $PM_{2.5}$, and lead. The area classifications for each of the pollutants are included in Table 2-1.

TABLE 2-1
State and Federal Air Quality Designations for Los Angeles County, California

Pollutant	State Designation	Federal Designation
Ozone	1-Hour: Non-attainment (Extreme) 8-Hour: Non-attainment	1-Hour: N/A 8-Hour: Non-attainment
CO	1-Hour: Attainment 8-Hour: Attainment	1-Hour: Attainment 8-Hour: Attainment
NO_2	1-Hour: Non-attainment Annual: Non-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: Non-attainment Annual: Non-attainment	24-Hour: Non-attainment Annual: N/A
$PM_{2.5}$	24-Hour: N/A Annual: Non-attainment	24-Hour: Non-attainment Annual: Non-attainment
Lead	Non-attainment	Non-attainment
H_2S, Sulfates	Unclassified, Attainment	No federal standard, No federal standard

Source: California Air Resources Board (ARB), 2011; U.S. Environmental Protection Agency (EPA), 2011a.
N/A = Not Applicable
H_2S = hydrogen sulfide

2.2 Background Concentrations

Several monitoring sites are located near the RBEP site, including monitoring sites in the cities of Los Angeles, Compton, and Long Beach. The monitoring site in Compton was relocated from the Lynwood location in 2008 and a new monitoring site in Long Beach (EPA ID06-037-4006) was commissioned in 2010. Therefore, the three closest ARB-certified monitoring sites relative to the RBEP site with three or more years of data available are located approximately 7.2 miles north-northwest of the project site near the Los Angeles International Airport (LAX); approximately 11.3-miles to the east-northeast of the project site in Compton; and approximately 11.9 miles to the east-southeast of the project site in Long Beach (South Coastal Los Angeles County 1). The two other Long Beach monitoring stations (South Coastal Los Angeles County Station 2 and EPA Long Beach AQS ID:06-037-4006) are also ARB-certified monitoring sites located near the project site. The South Coastal Los Angeles County 2 monitoring station is approximately 13.2 miles to the southeast of the project site in Los Angeles County and the EPA Long Beach AQS ID:06-037-4006 site recently established in 2010 is approximately 10.6 miles to the southeast of the project site.

Table 2-2 lists the pollutants monitored at each of the monitoring stations.

TABLE 2-2
Summary of the Nearest Monitoring Stations and the Pollutants Monitored at Each Station

Monitoring Location	Ozone	NO_2	CO	SO_2	PM_{10}	$PM_{2.5}$	Lead
South Coastal Los Angeles County 1 (Long Beach)	X	X	X	X	X	X	X
South Coastal Los Angeles County 2 (South Long Beach)	NA	NA	NA	NA	X	X	X
Southwest Coastal Los Angeles County (LAX)	X	X	X	X	X	NA	X
South Central Los Angeles County (Compton)	X	X	X	NA	NA	X	X
EPA Long Beach AQS ID:06-037-4006 (Long Beach)	X	X	X	X	NA	NA	NA

X = Pollutant monitored at this location.
NA = Pollutant was 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 is representative: (1) location, (2) data quality, and (3) data currentness. These criteria are defined and apply to the 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 nearest monitoring station relative to the project site is the LAX monitoring station. This site is located approximately 7.2 miles north-northwest of the project site and the surrounding land use and proximity to the ocean are similar at both locations and no significant terrain features are in the vicinity of either the plant site or monitoring site that would significantly affect the representativeness of the winds or monitored background concentrations. In addition, the LAX monitoring site measures each of the pollutants required in the air quality impact analysis, with the exception of $PM_{2.5}$. A meteorological data set has also been collected at the LAX monitoring station and, although the wind rose at LAX indicates the site may not be directly downwind for all meteorological conditions, the meteorological data set is considered representative of the project site (see Section 4). Based on the information above, the ambient data collected at LAX is reasonably expected to be indicative of near-field background conditions at the project site and these data are proposed for this analysis. However, since $PM_{2.5}$ is not currently monitored at the LAX site, the data collected at the next closest monitoring station (Compton) will be used. The Compton site is considered acceptable because the site is relatively close to the RBEP site, is located in an urban area downwind of the project site, and the values are comparable to the other background monitoring station options located in Long Beach.

- **Data quality:** Data must be collected and equipment must be operated in accordance with the requirements of 40 CFR Part 58, Appendices A and B, and PSD monitoring guidance.

  The SCAQMD, ARB, and EPA ambient air quality data summaries will be used as the primary sources of data. Therefore, the data at each of the monitoring stations listed in Table 2-2 will meet the data quality requirements of 40 CFR Part 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 maximum ambient background concentrations from the period 2008 – 2010 will be combined with the modeled design concentrations and used for comparison to the ambient air quality standards. Therefore, the data at each of the monitoring stations listed in Table 2-2, with the exception of the recently established site in Long Beach (EPA Long Beach AQS ID:06-037-4006), represent the three most recent years of data available.

Based on the criteria presented above, the three most recent years of background NO_2, CO, SO_2, PM_{10}, and ozone data from the LAX monitoring station will be used. For $PM_{2.5}$, the monitoring data from the Compton monitoring station will be used since it is the nearest $PM_{2.5}$ monitor to the site, is downwind of the RBEP site, and represents a comparable estimate of the background $PM_{2.5}$ concentrations compared to the other monitoring locations in the vicinity of the project. A summary of the background concentrations for 2008 through 2010 are presented in Table 2-3.

TABLE 2-3
Background Air Concentrations (2008–2010)[a]

		2008		2009		2010		Maximum
Pollutant	**Averaging Time**	**ppm**	**µg/m³**	**ppm**	**µg/m³**	**ppm**	**µg/m³**	**µg/m³**
NO_2	1-hour (max)	0.09	169	0.08	150.5	0.076	142.6	169
	1-hour (98th percentile)	0.076	143	0.07	132	0.061	115	143
	Annual[b]	0.0143	26.9	0.0159	29.9	0.0121	22.8	29.9
O_3	1-hour	0.086	169	0.077	151	0.089	175	175
	8-hour	0.075	147	0.07	137	0.07	137	147
SO_2	1-hour (max)	0.02	52.4	0.02	52.4	0.0259	67.8	67.8
	1-hour (99th percentile)	0.015	39.3	0.012	31.4	0.016	41.9	41.9
	3-hour[c]	0.0123	32.2	0.0133	34.8	0.0148	38.7	38.7
	24-hour	0.005	13.1	0.006	15.7	0.0035	9.2	15.7
CO	1-hour	4	4,581	2	2,290	3	3,436	4,581
	8-hour	2.5	2,863	1.9	2,176	2.2	2,519	2,863
PM_{10}	24-hour	-	50	-	52	-	37	52
	Annual	-	25.6	-	25.4	-	20.6	25.6
$PM_{2.5}$	24-hour (98th percentile)	--	36.5	--	37.7	-	31.8	37.7
	Annual	-	15.5	-	14.7	-	12.5	15.5
Lead	Monthly	--	0.01	--	0.01	-	0.01	0.01
	Quarterly	-	0.01	-	0.01	-	0.01	0.01

[a] The SCAQMD, ARB, and EPA ambient air quality data summaries were used as reference.
[b] Annual Arithmetic Mean
[c] EPA Secondary Standard
ppm = parts per million
µg/m³ = micrograms per cubic meter

SECTION 3

Methodology for Estimating Project-Related Emissions

3.1 Construction

Onsite construction activities will consist of installing three new combined-cycle gas turbines, various auxiliary equipment, and administrative structures. RBEP will reuse existing onsite potable water, natural gas, stormwater, process wastewater, sanitary pipelines, and electrical transmission facilities to the maximum extent possible; however, some modification and interconnection of the RBEP facility into these systems will require construction activity. RBEP construction is anticipated to take approximately 28 to 30 months, starting in first quarter 2016 and finishing in third quarter 2018.

The demolition of the Redondo Beach Generating Station Units 5–8, auxiliary boiler No. 17, and non-operational Units 1–4 will follow the construction of the new generating units. The demolition of all units will begin after the RBEP facility is built and online, and continue for approximately 24 months. Demolition of the existing units will include an organized, top down, dismantling of the existing boiler units, generators, and stacks. The existing foundations will remain largely intact at the conclusion of the demolition activities and most of the demolition debris will be transported to an offsite location for recycling.

Approximately 17 acres have been allocated onsite for laydown, storage, and parking during the construction and demolition activities. These areas include the parking lot and the open areas formerly occupied by the fuel storage tanks on the southeast end of the site.

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 RBEP construction; and (3) fugitive dust from demolition activities such as the top-down removal of the boilers, stacks, and loading of haul trucks with recyclable materials and debris.

The following criteria pollutant emissions will be calculated: NO_x, sulfur oxides (SO_x), VOC, 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 2011.1.1 or newer), which incorporates OFFROAD2007 and portions of EPA's AP-42 (ENVIRON, 2011; SCAQMD et al., 2011). Vehicle exhaust emissions for both paved and unpaved roads will be estimated using EMFAC2007 (version 2.3) emission factors, as consistent with the CalEEMod methodology.[3]

Construction equipment GHG emissions will be estimated using emission factors from The Climate Registry (TCR) General Reporting Protocol (GRP, version 1.1) (TCR, 2008) and fuel consumption rates from OFFROAD2007. Vehicle emissions (trucks and worker commutes) will be estimated using emission factors from TCR GRP (version 1.1) (TCR, 2008) and fuel economy values from EMFAC2007 (version 2.3). The Council on Environmental Quality (CEQ) has provided draft guidance suggesting that quantities of direct GHG emissions equal to or greater than 25,000 metric tons of carbon dioxide equivalent (CO_2e) on an annual basis are meaningful and should be quantified and disclosed for project evaluations within the National Environmental Policy Act (NEPA) framework (CEQ, 2010). While this is not a NEPA evaluation, this threshold will be used as a guide for assessing whether GHG emissions from construction activities may be meaningful.

[3] 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, 2011). 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.

3.2 Commissioning

During the commissioning of RBEP, the MPSA 501DAs will initially 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 due to reduced loads during commissioning. Therefore, emission calculations for commissioning activities will be limited to NO_x, CO, and VOC. 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 NO_x, SO_x, CO, VOC, PM_{10}, and $PM_{2.5}$ to the atmosphere from the RBEP will occur from combustion of natural gas in each of the identical 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 will be conducted at 70, 80, 90 and 100 percent load at 33, 63, and 106 degrees Fahrenheit. In addition to the normal operating load/temperature scenarios, emission estimates and an air quality impact analysis will also be conducted for startup and shutdown events. As previously noted, the proposed project will include two electric fire pumps. Therefore, there will be no direct emissions of NO_x, CO, VOC, PM_{10}, $PM_{2.5}$, and SO_x from the emergency fire pumps.

An estimate of the annual RBEP PTE criteria pollutant emissions and past actual emissions from 2006 through 2011 are presented in Table 3-1. The PTE estimates are based on preliminary engineering data, 5,000 hours of base load operation without duct burner firing per turbine per year, 1,200 hours of base load operation with duct burner firing per turbine per year, and 624 startups and shutdowns per turbine per year.

TABLE 3-1
Annual Facility Emission Estimates (tons per year)

	Facility Emission Totals – Tons Per Year (Estimate)					
Facility	**NO_2**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**	**VOC**	**CO**
Existing Units (Past Actual)	65	3	40	7	31	1,200
RBEP (PTE)*	123	6	54	54	66	140
Net Increase	58	3	14	47	35	-1,060

*Assumes three MPSA 501DA gas turbines operating 6,200 hours per year per turbine and 624 startups/shutdowns per turbine per year.

Combustion of natural gas in the turbines will also result in emissions of the following GHGs: carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). Therefore, GHG emissions for normal facility operations will be calculated based on the maximum fuel usage predicted for RBEP and emission factors contained in the TCR GRP (version 1.1) (TCR, 2008). GHG emissions will be calculated for comparison to the PSD significance thresholds but will not be included in the dispersion modeling impact analysis.

Criteria pollutant emissions and GHG emissions from RBEP operational worker commutes and material deliveries will also be calculated. Criteria pollutant emissions will be estimated using emission factors from EMFAC2007 (version 2.3). GHG emissions will be estimated using emission factors from TCR GRP (version 1.1) (TCR, 2008) and fuel economy values from EMFAC2007 (version 2.3). Criteria pollutant and GHG emissions from RBEP operational worker commutes and material deliveries will be calculated for CEC informational purposes but will not be included in the dispersion modeling impact analysis.

SECTION 4

Topography and Meteorology

4.1 Topography

The RBEP site is located near sea level on the California coast, in the city of Redondo Beach. The project site is bounded to the north by residential areas, to the east by a storage facility and office buildings, to the south by mixed use residential and commercial areas, and to the west by King Harbor marina and the Pacific Ocean. The project site is located on a gently sloping coastal terrace above the King Harbor marina and the topography of the site ranges from approximately 3 to 20 feet above mean sea level. The nearest complex terrain (terrain exceeding stack height) in relation to the proposed project is approximately 0.75 mile east of the project site. The area with the highest elevation within a 6-mile radius of the site is located approximately 7.5 miles south of the site on the Palos Verdes Peninsula.

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.

Three SCAQMD meteorological data collection sites were identified in proximity to the proposed project; LAX, Compton, and Long Beach. Of the three locations, the LAX site was selected as the most representative based on the following factors:

- The monitoring site is the closest of the three to the proposed project (approximately 7.2 miles to the north-northwest of the RBEP site).
- The proximity to the ocean and the orientation of the coastline is similar for both locations.
- There are no complex terrain features between the two locations.
- The land uses surrounding the monitoring site and the RBEP site are similar (both are categorized as medium density residential with open water to the west).

Therefore, the monitoring station is considered representative of the RBEP site and the meteorological data collected at the LAX monitoring station will be used to model the ambient air quality impacts. The meteorological data used for this analysis have been compiled by SCAQMD and include the period of January 1, 2005, through December 31, 2007. A wind rose for the LAX monitoring station is presented in Figure 4-1. Because of the representativeness of the meteorological station and the involvement of the SCAQMD in developing the meteorological data set, three years of monitored data have been considered adequate for this modeling analysis.

4.2.2 Upper Air Data

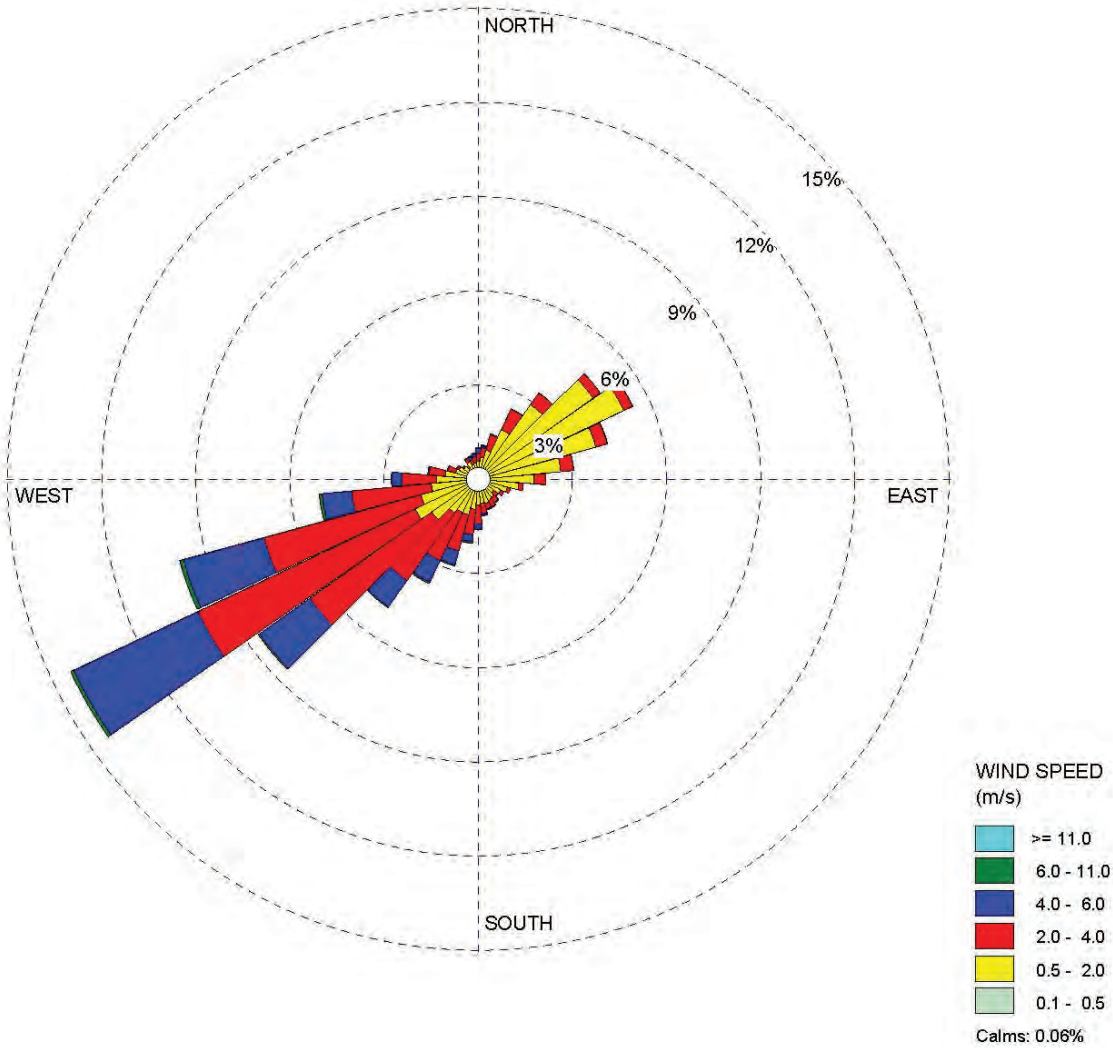
Twice-daily National Climatic Data Center soundings from the San Diego Miramar National Weather Service station (Station #03190) were coupled with the LAX surface data by the SCAQMD to create the AERMET meteorological data set.

4.2.3 AERMET Pre-Processing

The SCAQMD preprocessed the meteorological data with the AERMET preprocessor. The processed data are readily available on the SCAQMD website for download and use. SCAQMD model guidance recommends use of the nearest station to the project site.

WIND ROSE PLOT:
laxh

DISPLAY:
Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
	2005-2007 **Jan 1 - Dec 31** **00:00 - 23:00**	MODELER:	
	CALM WINDS: **0.06%**	TOTAL COUNT: **26181 hrs.**	
	AVG. WIND SPEED: **2.29 m/s**	DATE: **2/1/2009**	PROJECT NO.:

WRPLOT View - Lakes Environmental Software

FIGURE 4-1
SCAQMD LAX Meteorological Station Wind Rose
AES Redondo Beach Energy Project
Redondo Beach, California

CH2MHILL.

SECTION 5

Dispersion Modeling Approach

5.1 Model Selection

The EPA approved AERMOD (Version 12060 or most recent version) dispersion model will be used to evaluate the air quality emissions from RBEP. The AERMOD model 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

The AERMOD model will be used with regulatory default options as recommended in the EPA Guideline on Air Quality Models (EPA, 2005). The following supporting pre-processing programs for AERMOD will also be used:

- BPIP-Prime (Version 04274)
- AERMAP (Version 11103)

The technical options to be selected for the AERMOD model include the following:

- Regulatory default control options
- Receptor elevations and controlling hill heights obtained from AERMAP output

SCAQMD modeling guidance recommends running AERMOD with the non-default FLAT option (which assumes that all receptors and emission sources have the same elevation) for receptors with elevations below stack base (SCAQMD, 2012). However, recent correspondence with SCAQMD staff further clarified that the FLAT option is intended for locations with drainage or gravity flows which would typically occur in mountain valley settings. Based on the additional guidance and the proposed location of RBEP on a coastal plain where onshore and offshore wind flows occur, it is concluded that the FLAT option is not required for this analysis.

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 6.0, Air Quality Impact Analysis, the default ratio of 0.75 NO_2/NO_x will be applied to annual predicted impacts and 0.8 for 1-hour predicted impacts to determine NO_2 concentrations (EPA, 2010; EPA, 2011b).

If predicted 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, 2011b, CAPCOA, 2011). Corresponding hourly ozone data from the LAX monitoring station will be obtained from the SCAQMD website.

5.3 Land Use / Classification

AERMOD will be run in urban dispersion mode because land use within 3 km of the RBEP site is primarily classified as urban (Auer Method). A population of 9,862,049 will be used in AERMOD, as recommended by the SCAQMD for projects in Los Angeles County (SCAQMD, 2012).

5.4 Receptor Network

The base modeling 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 project's site boundary at spacing that increases with distance from the origin. The project's property boundary will be used as the ambient air

boundary. Property boundary receptors will be placed at 30-meter intervals. Beyond the 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 Universal Transverse Mercator North American Datum 1983 (NAD83), Zone 11 coordinate system.

The base receptor grid will be extended if predicted concentration gradients are increasing 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 project will be accounted for by assigning base elevations to each receptor. National Elevation Dataset files from the United States 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 RBEP construction site will be represented as a set of volume sources and area sources in the modeling analysis. The exhaust emissions will be modeled as a set of volume sources with a plume centerline height of 4.6 meters, and the wind-blown and fugitive dust emissions will be modeled as an area source assuming an average release height of 1 meter. As discussed in Section 6.0, Air Quality Impact Analysis, predicted concentrations of NO_x, CO, PM_{10}, $PM_{2.5}$, and SO_x from onsite construction-related activities will be combined with the ambient background concentrations and compared to the ambient air quality standards.

5.5.2 Commissioning

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 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 due to reduced loads during commissioning.

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 expected for the combustion turbines will yield the highest ground-level concentrations.

5.6 Building Wake Downwash and Good Engineering Practice

AERMOD can account for building downwash and cavity zone effects. The proposed RBEP stack locations, heights, building locations, and dimensions will be input to BPIP-PRIME. The first step of BPIP-PRIME determines and reports on whether or not 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.

A screening BPIP-PRIME analysis will also be conducted to evaluate if the existing Redondo Beach Generating Station structures influence the RBEP sources prior to demolition. If it is determined that the existing structures influence downwash, the existing structures will also be included in the commissioning and operational air quality impact assessment.

SECTION 6

Air Quality Impacts Analysis

As described above, RBEP will require an ambient air quality analysis for pollutants for which there would be an increase in emissions. The sections below summarize the approach to address the requirements applicable to each reviewing agency and highlight 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 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 Rule 1304(a)(2), RBEP will be exempt from this rule because RBEP is a replacement of existing electric utility steam boilers with combined cycle gas turbines with no increase in energy output rating. Therefore, a comparison of potential impacts on Regulation 1303, Appendix A-2 significant change in air quality thresholds is not required as part of this air quality impacts analysis.

Per 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 tons/year of PM_{10} or 40 tons/year of NO_x; and the location of the source, relative to the closest boundary of a specified Federal Class I area, is within 28 kilometers. Net emissions of NO_x will exceed the emissions threshold but the distance to the nearest Class I area is approximately 53 kilometers. Therefore, a visibility analysis is not required.

6.1.2 Rule 1401

This rule specifies limits for maximum individual cancer risk (MICR), cancer burden, and noncancer acute and chronic hazard index (HI) from new permit units, relocations, or modifications to existing permit units that emit toxic air contaminants listed in Rule 1401, Table I. RBEP will be subject to the Rule 1401 new source review requirements. Therefore, a health risk assessment (HRA) will be completed as part of the air quality impacts analysis for RBEP. The procedure for evaluating the potential impacts is discussed in Section 7.0, Human Health Risk Assessment.

6.1.3 Rule 2005

SCAQMD Rule 2005 sets forth pre-construction review requirements for new facilities subject to the requirements of the RECLAIM program, for modifications to RECLAIM facilities, and for facilities that increase their allocation to a level greater than their starting allocation plus non-tradable credits. The existing AES Redondo Beach Generating Station facility is currently subject to the RECLAIM requirements, and, as shown in Table 6-1, the proposed project will also exceed the major NO_2 modification threshold of 1 pound (lb)/day. Therefore, Rule 2005 requires an ambient air quality analysis to demonstrate RBEP will not cause a significant increase in the air quality concentration of NO_2 as specified in Rule 2005, Appendix A.

TABLE 6-1
Rule 2005 Emissions Levels That Trigger Dispersion Modeling Requirement

Pollutant	Estimated PTE – Past Actual (tpy)	Major Source Threshold	Major Modification Threshold	Exceeds Threshold? (Yes/No)
NO_x	58	10	1 lb/day	Yes
SO_2	3	100	40 tpy	No

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 most recent 3 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 Project (Per Emission Unit)

Averaging Period/ Pollutant	Significant Change in Air Quality Concentration[a] (µg/m^3)	National Ambient Air Quality Standard (µg/m^3)	California Ambient Air Quality Standards (µg/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

6.2 Prevention of Significant Deterioration

SCAQMD Regulation XVII sets forth pre-construction 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, and shall apply to pre-construction review of new or modified stationary sources that emit more than 100 tpy of federal attainment air contaminants. As discussed in Section 2.0, Existing Setting, CO, NO_2, and SO_2 are classified as federal attainment pollutants. Therefore, the estimated RBEP 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 Rule 1703. Based on the estimate emissions and attainment designations, NO_x is the only attainment pollutant from RBEP 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 RBEP. Therefore, emissions of asbestos, beryllium, mercury, sulfur compounds, vinyl chloride, fluoride, and lead are expected to be negligible.

TABLE 6-3
PSD Emissions Levels That Trigger Dispersion Modeling Requirements

Pollutant	Estimated PTE – Past Actual (tpy)	Significant Emission Increase Threshold[a] (tpy)	Exceeds Threshold? (Yes/No)
CO	-1,060	100	No
NO_x	58	40	Yes
SO_2	3	40	No
VOC[b]	35	40	No
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

TABLE 6-3
PSD Emissions Levels That Trigger Dispersion Modeling Requirements

Pollutant	Estimated PTE – Past Actual (tpy)	Significant Emission Increase Threshold[a] (tpy)	Exceeds Threshold? (Yes/No)
Sulfuric Acid Mist	Negligible	7	No
Hydrogen Sulfide	Negligible	10	No
Total Reduced Sulfur (including H_2S)	Negligible	10	No
Reduced Sulfur Compounds (including H_2S)	Negligible	10	No

[a]The PSD significance level is listed here for reference.

[b]Modeling is not required for VOCs.

A dispersion modeling analysis will be conducted to demonstrate that RBEP will not cause or contribute to a violation of the NAAQS or CAAQS and will not exceed the PSD Class II Increment Standards for NO_2. To demonstrate compliance with the standards, RBEP will be modeled in two tiers. A description of each tier is presented below.

6.2.1.1 Tier 1 Analysis

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 impacts are significant, a Tier 2 refined analysis will be conducted.

6.2.1.2 Tier 2 Analysis

The refined tier 2 analysis will include a comparison to the ambient air quality standards and allowable increments as follows:

- For pollutants with concentrations greater than the respective SIL, a significant impact radius will be defined.
- The modeled design concentrations will be determined and compared to the respective NAAQS, CAAQS, and Class II Increments. These concentrations will include contributions from the facility, nearby sources, and ambient background concentrations.
- SCAQMD will be contacted to identify nearby sources, if any, that need to be included in the refined analysis.

Table 6-4 summarizes the Class II modeling significance levels, Class II PSD increments, and the significant monitoring concentration levels. Currently no ambient air quality data are collected at the existing Redondo Beach Generating Station. If modeling results for RBEP 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 RBEP construction and that alternate background levels listed in Table 2-3 be used for permit modeling.

TABLE 6-4
PSD Air Quality Impact Standards Applicable to the Project

Averaging Period/ Pollutant	Significance Impact Level ($\mu g/m^3$)	Class II PSD Increment ($\mu g/m^3$)	Significant Monitoring Concentrations ($\mu g/m^3$)
NO_2 (1-hour)	7.52	NS	NS
NO_2 (Annual)	1	25	14

NS = No standard

6.2.1.3 Class I Area Analysis

In addition to addressing RBEP's impacts within the near field (i.e., Class II impacts), a Class I impact analysis is required to demonstrate that RBEP will not cause or contribute to an exceedance of the Class I SIL or Increment Standards (Table 6-5) and will not adversely affect air quality-related values (AQRVs). In order to evaluate the potential impacts on Class I areas near the RBEP site, all Class I areas within 300 km of RBEP were identified. Based on this survey, the San Gabriel Wilderness, which is approximately 53 km from the RBEP site, was identified as the nearest Class I areas. Figure 6-1 shows the locations and distances to the Class I areas within 300 km of RBEP.

Federal Class I area air quality guidance (FLAG 2010) allows an emissions/distance (Q/D) factor of 10 to be used as a screening criteria 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. The combined annual emissions of NO_x, SO_2, H_2SO_4 and PM_{10} based on the 24-hour maximum allowable emissions will be approximately340 tpy. Therefore the maximum Q/D for the project will be approximately 6.4 ton/km-year (i.e., 340 tpy/53 km) which is below the FLAG 2010 guidance 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 thresholds, 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 RBEP site. AERMOD maximum modeled impacts of NO_x will be compared to the applicable SILs. If modeled impacts are below the SILs, then the project would be considered to have negligent impact at the more distant Class I areas. If impacts are above the SILs in the direction of the Class I areas, the 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 Increment Standards Applicable to the Project

Averaging Period/ Pollutant	Significance Impact Level ($\mu g/m^3$)	PSD Increment ($\mu g/m^3$)
NO_2 (1-hour)	NS	NS
NO_2 (Annual)	0.1	2.5
CO (1-hour)	NS	NS
CO (8-hour)	NS	NS

NS = No standard

6.3 California Energy Commission Air Dispersion Analysis

The sections below summarize the requirements and modeling assessment to be submitted to the CEC.

6.3.1 Construction Emissions Impact Assessment

The RBEP construction site will be represented as a set of volume sources and an area source in the modeling analysis. The exhaust emissions will be modeled as a set of volume sources with a plume centerline height of 4.6 meters, and the wind-blown and fugitive dust emissions will be modeled as an area source assuming an average release height of 1 meter. Modeled concentrations of NO_x, CO, PM_{10}, $PM_{2.5}$, and SO_x from construction activities related to RBEP will be combined with the ambient background concentrations and compared to the ambient air quality standards. If the predicted NO_2 concentrations exceed the ambient air quality standards assuming a 100 percent conversion of NOx to NO_2, the NO_2 to NOx ratios developed as a function of downwind distance will be applied consistent with the SCAQMD Localized Significance Threshold Methodology (SCAQMD, 2003).

6.3.2 Commissioning Emissions Impact Assessment

The short-term concentrations of NO_2 and CO (i.e., the 1- and 8-hour impacts) from RBEP commissioning activities will be combined with the ambient background concentrations and compared to the short-term ambient air quality standards. Because the commissioning phase is only expected to occur over a short period, annual impacts will not be evaluated for the RBEP commissioning phase. Furthermore, because commissioning activities only occur once in the life of the project and are expected to be less than one year in duration, the impacts will not be compared to the 1-hr federal NO_2 NAAQS, which is a 3-year average of a 98th percentile daily maxima concentration standard.

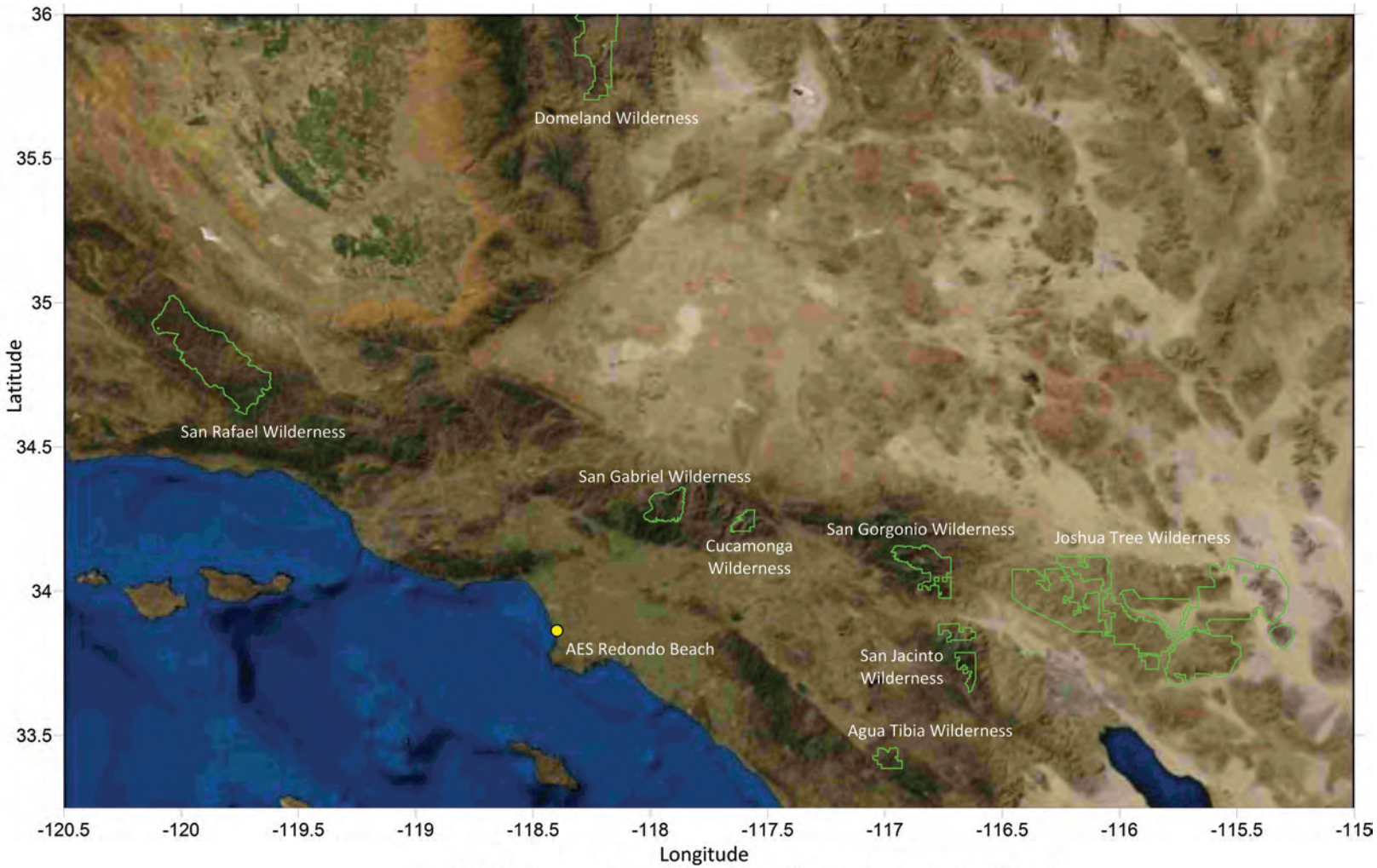
6.3.3 Operational Emissions NAAQS and CAAQS Impact Assessment

The maximum modeled concentrations from the refined analysis 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 most recent 3 years of ambient monitoring data identified in Section 2.0, Existing Setting, will be used as the background concentration.

6.3.4 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-hour standard.



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
133.0	56.4	206.0	179.7	53.4	135.1	150.3	147.9

FIGURE 6-1
Distance to Nearby Class I Areas
AES Redondo Beach Energy Project
Redondo Beach, California

CH2MHILL.

SECTION 7

Human Health Risk Assessment

A human HRA will be performed to evaluate the potential cancer, chronic, and acute health impacts related to RBEP. The HRA will follow the latest version of the *Air Toxics Hot Spots Program Risk Assessment Guidelines* (Office of Environmental Health Hazard Assessment [OEHHA], 2003), SCAQMD guidance documents (SCAQMD, 2011), and the EPA *Guideline on Air Quality Models* (EPA, 2005). In addition, for predicted cancer risks for residential receptors where the inhalation pathway is the dominant exposure pathway for cancer risks, the Derived (Adjusted) Method outlined in the ARB *Recommended Interim Risk Management Policy for Inhalation-based Residential Cancer Risk*, (ARB, 2003) will be used for the cancer risk evaluation.

Toxic air contaminants (TAC) from the turbines will be included in the HRA. Turbine emissions will be estimated assuming that all three 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 5,000 hours of base load operation without duct burner firing, 1,200 hours of base load operation with duct burner firing, and 624 startups and shutdowns per turbine per year. Ammonia emissions associated with potential ammonia slip from the selective catalytic reduction system will be calculated based on a permit limit maximum of 5 ppmv, dry at 15 percent oxygen. An offsite consequence analysis for ammonia will be conducted for RBEP as part of a separate analysis.

The construction activity would be finite and best available emission control techniques would be used throughout the construction and demolition periods to control emissions. Therefore, an HRA for construction emissions associated with RBEP will not be conducted for this project.

7.1 Model Selection

The HRA modeling for the normal RBEP operations will be conducted using the ARB *Hotspots Analysis Reporting Program* (HARP, version 1.4f), along with the ARB HARP file converter (version 1), and AERMOD. The HARP file converter converts the AERMOD output files to files compatible with the HARP modeling system. 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 regulations (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. A unit emission rate (1 gram per second) will be used to model each source, as outlined in the HARP converter program manual.

7.2 Evaluation of Impacts

Cancer risks will be evaluated for each source and RBEP 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 will be estimated using a conservative assumption of 70-year continuous exposure duration for residential receptors and a 40-year, 5-day week, 8-hours-per-day exposure duration for commercial/industrial receptors. In addition, for predicted cancer risks for residential receptors where the inhalation pathway is the dominant pathway of cancer risks, the Derived (Adjusted) Method in HARP will be used for the cancer risk evaluation, based on the *Recommended Interim Risk Management Policy for Inhalation-Based Residential Cancer Risk* (ARB, 2003). To assess chronic and acute non-cancer exposures, annual and 1-hour TAC ground-level concentrations will be compared with the Reference Exposure Levels (RELs) developed by OEHHA to obtain a chronic or acute hazard index.

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 OEHHA guidelines (OEHHA, 2003). 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, 2011).

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 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 hazard index of 1.0
- Acute hazard index of 1.0

Predicted cancer risk and hazard indices less than the thresholds will be considered an acceptable increase in risk associated with RBEP.

SECTION 8

Cumulative Impacts Analysis

Per CEC requirements, a cumulative air quality modeling impacts analysis for RBEP's typical operating mode will be conducted as part of the AFC process. Impacts from the 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 CEQA permitting process). The stationary emission sources included in the cumulative impacts assessment will be limited to new or modified sources 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.

The sources to be included in the cumulative impact analysis will be determined by consulting the SCAQMD and CEC. The applicant will work with the SCAQMD and CEC staffs to identify those new air pollution sources within the 6-mile radius surrounding HRBEP, which is centered approximately at 371,000 meters (East); 3,746,500 meters (North) (UTM, NAD83, zone 11).

The cumulative air quality impact analysis will be performed using the model settings and refined receptor grid outlined in Section 4.0, Topography and Meteorology, and Section 5.0, Dispersion Modeling Approach. The 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 impact assessment. The maximum modeled concentrations from the refined 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 $PM_{2.5}$. The highest ambient concentration from the most recent 3 years of ambient monitoring data will be used as the background concentration.

SECTION 9

Presentation of Results

The results of the air dispersion modeling analyses for RBEP will be presented to each reviewing agency as follows:

- A description of modeling methodologies and input data.
- A summary of the results in tabular form.
- Modeling files used by AERMOD will be provided with the application on compact disk.
- Any significant deviations from the methodology proposed in this protocol will be presented.

SECTION 10

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