DOCKETED

Docket Number:	13-AFC-01
Project Title:	Alamitos Energy Center
TN #:	201620-19
Document Title:	AEC AFC 5.9 Public Health
Description:	Previously TN# 201495-18
Filer:	Tiffani Winter
Organization:	CH2M Hill
Submitter Role:	Applicant Consultant
Submission Date:	2/3/2014 12:47:11 PM
Docketed Date:	2/3/2014

5.9 Public Health

This section describes and evaluates the public health effects of the Alamitos Energy Center (AEC). Section 5.9.1 describes the project setting and Section 5.9.2 discusses the affected environment. Section 5.9.3 presents the analysis of the public health effects of the AEC. Section 5.9.4 evaluates any potential cumulative effects to public health, and Section 5.9.5 addresses proposed mitigation measures that would avoid or minimize any adverse impacts. Section 5.9.6 describes the laws, ordinances, regulations, and standards (LORS) that apply to the project. Section 5.9.7 presents agency contacts and Section 5.9.8 identifies the permits and permit schedule related to public health. Section 5.9.9 provides the references used to prepare this section.

5.9.1 Setting

AES Southland Development, LLC (AES-SLD) proposes to construct, own, and operate the AEC—a natural-gas-fired, air-cooled, combined-cycle, electrical generating facility in Long Beach, Los Angeles County, California. The proposed AEC will have a net generating capacity of 1,936 megawatts (MW) and gross generating capacity of 1,995 MW.[1] The AEC will replace and be constructed on the site of the existing Alamitos Generating Station.

The AEC will consist of four 3-on-1 combined-cycle gas turbine power blocks with twelve natural-gas-fired combustion turbine generators (CTG), twelve heat recovery steam generators (HRSG), four steam turbine generators (STG), four air-cooled condensers, and related ancillary equipment. The AEC will use air-cooled condensers for cooling, completely eliminating the existing ocean water once-through-cooling system. The AEC will use potable water provided by the City of Long Beach Water Department (LBWD) for construction, operational process, and sanitary uses but at substantially lower volumes than the existing Alamitos Generating Station has historically used. This water will be supplied through existing onsite potable water lines.

The AEC will interconnect to the existing Southern California Edison (SCE) 230-kilovolt switchyard adjacent to the north side of the property. Natural gas will be supplied to the AEC via the existing offsite 30-inch-diameter pipeline owned and operated by Southern California Gas Company that currently serves the Alamitos Generating Station. Existing water treatment facilities, emergency services, and administration and maintenance buildings will be reused for the AEC. The AEC will require relocation of the natural gas metering facilities and construction of a new natural gas compressor building within the existing Alamitos Generating Station site footprint. Stormwater will be discharged to two retention basins and then ultimately to the San Gabriel River via existing stormwater outfalls.

The AEC will include a new 1,000-foot process/sanitary wastewater pipeline to the first point of interconnection with the existing LBWD sewer system and will eliminate the current practice of treatment and discharge of process/sanitary wastewater to the San Gabriel River. The project may also require upgrading approximately 4,000 feet of the existing offsite LBWD sewer line downstream of the first point of interconnection, therefore, this possible offsite improvement to the LBWD system is also analyzed in this AFC. The total length of the new pipeline (1,000 feet) and the upgraded pipeline (4,000 feet) is approximately 5,000 feet.

To provide fast-starting and stopping, flexible generating resources, the AEC will be configured and deployed as a multi-stage generating (MSG) facility. The MSG configuration will allow the AEC to generate power across a wide and flexible operating range. The AEC can serve both peak and intermediate loads with the added capabilities of rapid startup, significant turndown capability (ability to turn down to a low load), and fast ramp rates (30 percent per minute when operating above minimum gas turbine turndown capacity). As

[1] Referenced to site ambient average temperature conditions of 65.3 degrees Fahrenheit (°F) dry bulb and 62.7°F wet bulb temperature without evaporative cooler operation.

California's intermittent renewable energy portfolio continues to grow, operating in either load following or partial shutdown mode will become necessary to maintain electrical grid reliability, thus placing an increased importance upon the rapid startup, high turndown, steep ramp rate, and superior heat rate of the MSG configuration employed at the AEC.

By using proven combined-cycle technology, the AEC can also run as a baseload facility, if needed, providing greater reliability to meet resource adequacy needs for the southern California electrical system. As an in-basin generating asset, the AEC will provide local generating capacity, voltage support, and reactive power that are essential for transmission system reliability. The AEC will be able to provide system stability by providing reactive power, voltage support, frequency stability, and rotating mass in the heart of the critical Western Los Angeles local reliability area. By being in the load center, the AEC also helps to avoid potential transmission line overloads and can provide reliable local energy supplies when electricity from more distant generating resources is unavailable.

The AEC's combustion turbines and associated equipment will include the use of best available control technology to limit emissions of criteria pollutants and hazardous air pollutants. By being able to deliver flexible operating characteristics across a wide range of generating capacity, at a relatively consistent and superior heat rate, the AEC will help lower the overall greenhouse gas emissions resulting from electrical generation in southern California and allow for smoother integration of intermittent renewable resources.

Existing Alamitos Generating Station Units 1–6 are currently in operation. All six operating units and retired Unit 7 will be demolished as part of the proposed project. Construction and demolition activities at the project site are anticipated to last 139 months, from first quarter 2016 until third quarter 2027. The project will commence with the demolition of retired Unit 7 and other ancillary structures to make room for the construction of AEC Blocks 1 and 2. The demolition of Unit 7 will commence in the first quarter of 2016. The construction of Block 1 is scheduled to commence in the third quarter of 2016 and construction of Block 2 is scheduled to commence in the fourth quarter of 2016. The demolition of existing Units 5 and 6 will make space for the construction of AEC Block 3. AEC Block 3 construction is scheduled to commence in the first quarter of 2020 and will be completed in the second quarter of 2022. The demolition of existing Units 3 and 4 will make space for the construction of AEC Block 4. AEC Block 4 construction is scheduled to commence in the second quarter of 2023 and will be completed in the fourth quarter of 2025. The demolition of remaining existing units is scheduled to commence in the third quarter of 2025.

Construction of the AEC will require the use of onsite laydown areas (approximately 8 acres dispersed throughout the existing site) and an approximately 10-acre laydown area located adjacent to the existing site. The adjacent 10-acre laydown area will be shared with another project being developed by the Applicant (Huntington Beach Energy Project [HBEP] 12-AFC-02). Due to the timing for commencement of construction for these two projects, the adjacent laydown area will already be in use for equipment storage before AEC construction begins.

5.9.1.1 Project Overview as it Relates to Public Health

Each of the AEC's four 3-on-1 natural-gas-fired combined-cycle power blocks will consist of three Mitsubishi Power Systems Americas (MPSA) 501DA CTGs, one STG, and an air-cooled condenser. Each CTG will be equipped with an HRSG. The CTGs will use 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) will be limited to 2 ppmv and volatile organic compounds (VOC) to 1 ppmv through the use of best combustion practices and the use of an oxidation catalyst. Best combustion practices and the use of pipeline-quality natural gas will minimize emissions of the remaining pollutants.

Two electric fire pumps, connected to two independent power feeds from the SCE distribution system, will be used to provide onsite fire protection. Because the electric fire pumps will not be a source of air emissions, they were not included in the air quality or health analyses for the AEC.

This section presents the methodology and results of the human health risk assessment (HRA) that was conducted to assess the potential public health impacts and exposure associated with airborne emissions from the proposed construction and routine operation of the AEC. The quantities of hazardous materials proposed to be stored onsite, a description of their uses, and the potential concerns regarding these materials are presented in Section 5.5, Hazardous Materials Handling. A discussion of the potential concerns associated with electromagnetic field exposure is presented in Section 3.0, Transmission System Engineering.

5.9.2 Affected Environment

Based on the Environmental Data Resources (EDR) *Offsite Receptor Report* (EDR, 2013), approximately 585,495 residents live within a 6-mile radius of the AEC. Per California Energy Commission (CEC) siting regulation Appendix B (g)(9)(E)(i), 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. Sensitive receptors within a 6-mile radius of the project site identified in the EDR *Offsite Receptor Report* include:

- 644 preschool/daycare centers
- 23 nursing homes
- 172 schools
- 751 hospitals, clinics, and/or pharmacies
- 8 colleges
- 1 arena
- 2 prisons

The EDR *Offsite Receptor Report*, which includes a figure and list of the sensitive receptors located within a 6-mile radius of the project site, is presented in Appendix 5.9A. A supplemental list of sensitive receptors within a 6-mile radius of the project site was also developed based on an internet data search (Yahoo, 2013) and aerial imagery (GoogleEarth, 2013). The supplemental list is provided in Appendix 5.9B. With this additional survey, 8 schools/preschools/daycares and 37 senior care facilities were identified within a 6-mile radius of the project site. Figures 5.9-1A and 5.9-1B include the sensitive receptors within 6 miles of the site, as identified in Appendices 5.9A and 5.9B. The closest sensitive receptor is the Rosie the Riveter Charter High School, a privately owned and operated school located on the Alamitos Generating Station site, approximately 656 feet (200 meters) from the nearest proposed stack location. The closest sensitive receptor outside the AEC property is Kettering Elementary, which is approximately 2,297 feet (700 meters) northwest of the nearest proposed stack location. Apart from the Rosie the Riveter Charter High School and Kettering Elementary, there are no other schools within approximately 0.5 mile of the AEC project site.

The nearest residents are located approximately 1,148 feet (350 meters) west of the proposed stack locations along E. Eliot Street and approximately 2,051 feet (625 meters) east of the proposed stack locations along El Dorado Drive. The nearest businesses are located approximately 820 feet (250 meters) east of the AEC site.

Per CEC siting regulation Appendix B (g)(9)(c), a search of available health studies concerning the potentially affected populations within a 6-mile radius is required. In October 1997, the 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 Southern California Air Basin (SCAB). The results of the MATES II study estimated that the excess lifetime carcinogenic risk from exposures to airborne TACs in the SCAB 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 SCAB. 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. Approximately 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 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 SCAB by accounting for an estimated 94 percent of the overall carcinogenic risk. DPM emissions alone account for 84 percent of the carcinogenic risk. Overall, the general trend in risk exposure has been decreasing with the estimated carcinogenic risk from exposure to airborne toxics reduced to 1,200 in 1 million. The MATES III study found that non-diesel risk has been lowered from the earlier MATES II estimates by 50 percent.

As a follow-on to the MATES II and III studies, SCAQMD announced it is commencing the fourth MATES study (MATES IV). Although the outcome of this study is not available for inclusion in this assessment (the draft MATES IV report is expected in late 2013), the MATES IV study will include 1 year of monitoring of ambient TAC concentrations at monitoring sites within the SCAB that will be used to predict carcinogenic risk near airports, freeways, rail yards, busy intersections, and warehouse operations.[2]

5.9.3 Environmental Analysis

5.9.3.1 Air Toxics Exposure Assessment (Operation Impacts)

Human health risks potentially associated with hazardous substance emissions from the proposed operation of the AEC, which includes compounds on the list of Office of Environmental Health Hazard Assessment (OEHHA) TACs and U.S. Environmental Protection Agency (EPA) hazardous air pollutants (HAP), were evaluated. The HRA was conducted in accordance with SCAQMD Rules 212 and 1401 and the following guidance:

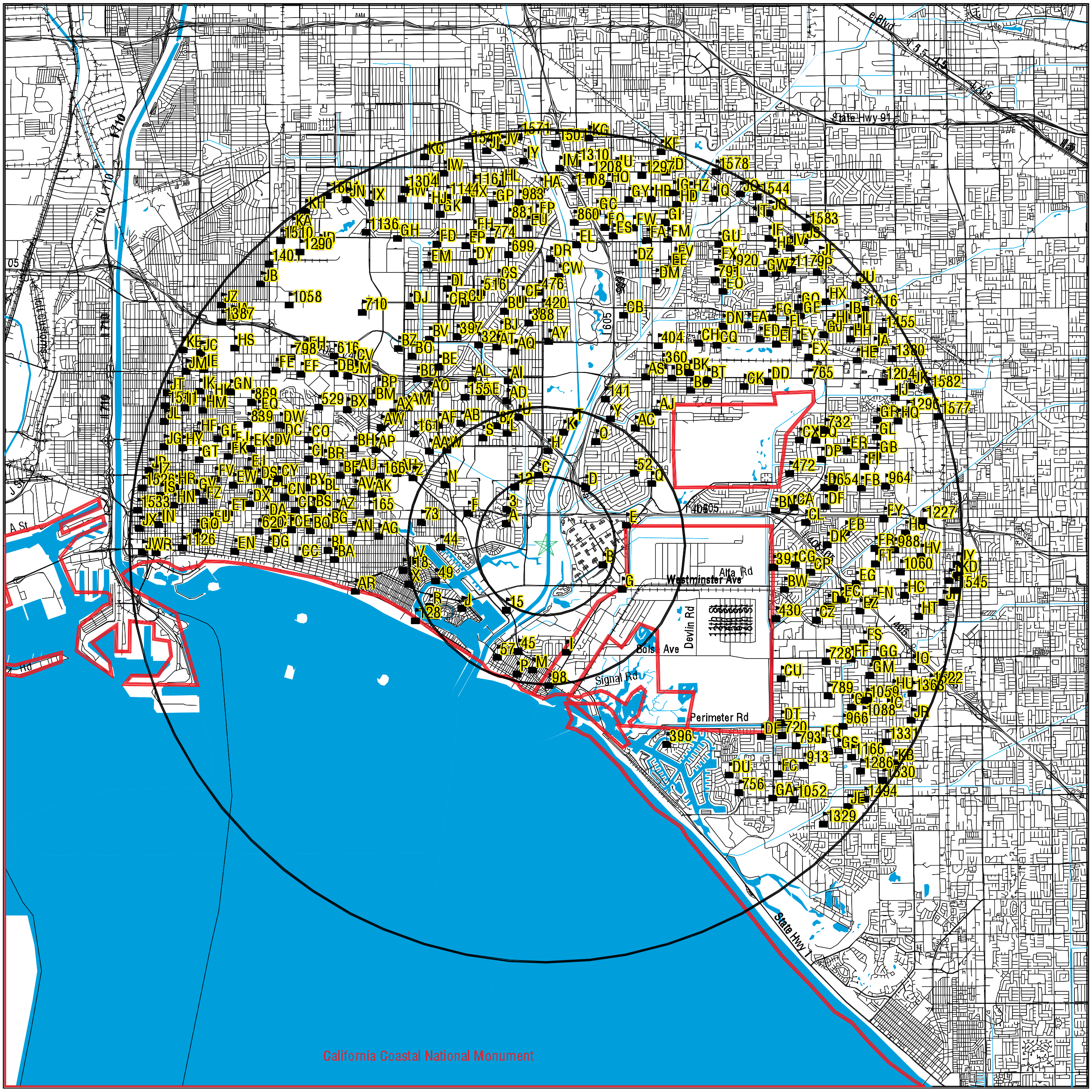
- *Air Toxics Hot Spots Program Risk Assessment Guidelines* (OEHHA, 2003)
- *Supplemental Guidelines for Preparing Risk Assessments for the Air Toxics "Hot Spots" Information and Assessment Act (AB2588)* (SCAQMD, 2011a)
- California Air Resources Board (ARB) *Recommended Interim Risk Management Policy for Inhalation-based Residential Cancer Risk* (ARB, 2003)
- *Guideline on Air Quality Models* (EPA, 2005)
- *Dispersion Modeling Protocol for the Alamitos Energy Center* (CH2M HILL, 2013)

The HRA modeling was conducted using the ARB Hotspots Analysis Reporting Program (HARP, Version 1.4f), along with the ARB HARP On-ramp program (Version 1.0). The HARP On-ramp program was used to import the American Meteorological Society / EPA Regulatory Model (AERMOD) air dispersion modeling results into the HARP Risk Module.

The HRA process requires four general steps to estimate health impacts: (1) identify and quantify project-generated emissions; (2) evaluate pollutant transport (air dispersion modeling) to estimate ground-level TAC concentrations at each receptor location; (3) assess human exposure; and (4) use a risk characterization model to estimate the potential health risk at each receptor location. The following sections describe in detail the methods used in this HRA.

[2] Information regarding the MATES IV study is available online at http://www.aqmd.gov/prdas/MatesIV/MatesIV.html.

RECEPTOR MAP - 3668921.1s

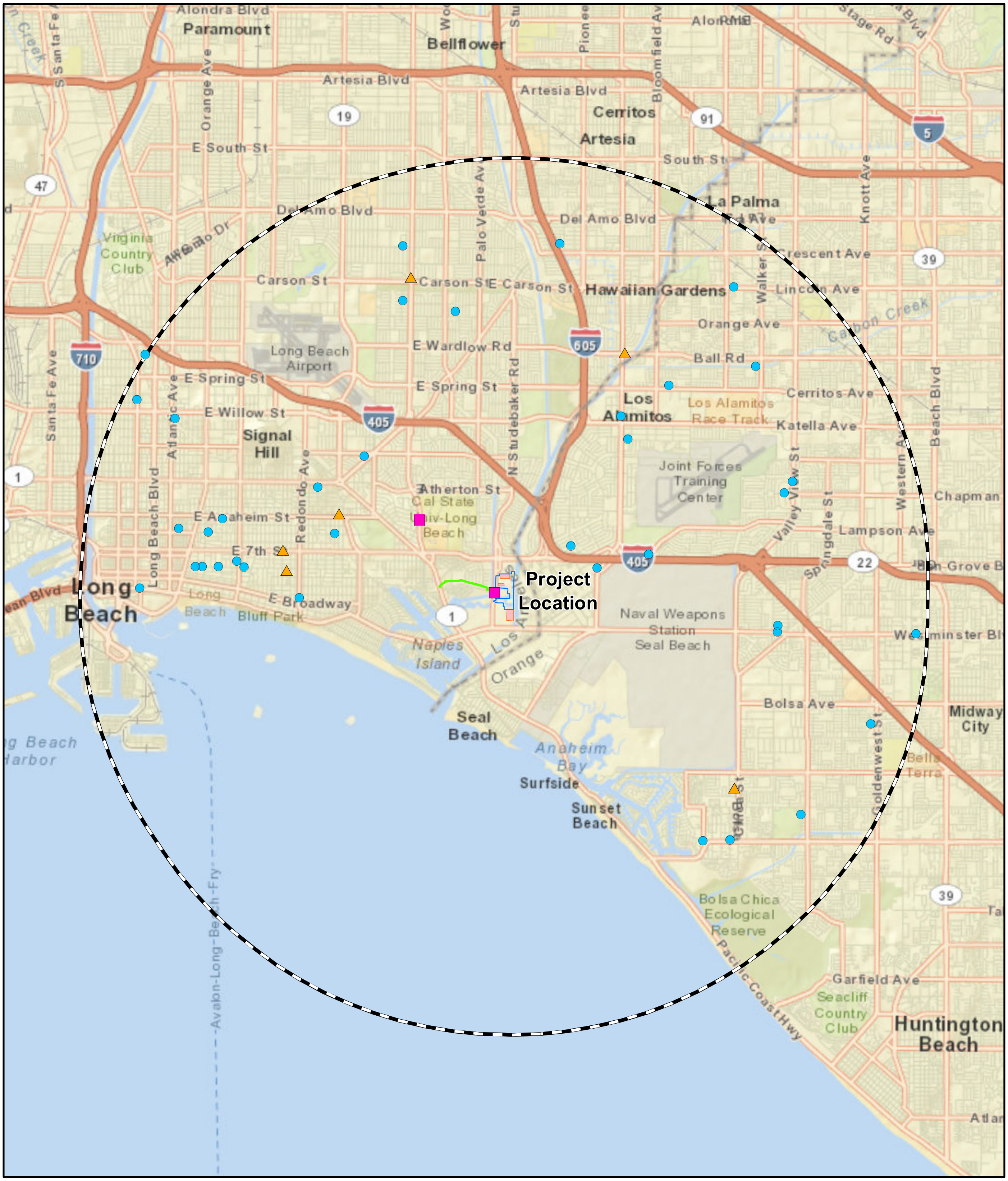


- Target Property
- Roads
- Waterways
- Environmental or Public Receptor
- Federal Lands Linear Features
- Federal Lands Area

0 2 4 8 Miles

FIGURE 5.9-1A
Sensitive Receptors Within 6 miles – EDR Report
Alamitos Energy Center
Long Beach, California

Source: Environmental Data Resources (EDR). 2013. Alamitos Energy Center Offsite Receptor Report. July 18.



Legend

- Project Boundary
- Parking/Laydown Construction Area
- Process/Sanitary Wastewater Pipeline
- 6-Mile Buffer

Sensitive Receptors

- School
- Daycare
- Senior Facility

0 1 2 Miles

N

FIGURE 5.9-1B
Sensitive Receptors Within 6 miles – Supplemental

Alamitos Energy Center
Long Beach, California

CH2MHILL

\\ZION\SACGIS\PROJ\ALAMITOS\MAPFILES\SENSITIVERECEPTORS\FIG5_9-1B_AEC_SENSITIVE_RECEPTORS.MXD KMINO 12/5/2013 10:37:14 AM

5.9.3.1.1 Air Toxics Emission Calculations

Air toxics (TAC and HAP) emissions associated with the project will consist of combustion byproducts produced by the twelve natural-gas-fired CTGs. TACs are compounds designated by OEHHA as pollutants that may pose a significant health hazard. HAPs are compounds designated by EPA as pollutants that are known or suspected to cause cancer or other serious health effects, such as reproductive effects or birth defects, or adverse environmental effects.

Air toxics emission factors for the CTGs were obtained from EPA's *AP-42* (EPA, 2000), with the exception of ammonia and formaldehyde. The ammonia emission factor was based on the operating exhaust ammonia limit of 5 ppmv at 15 percent oxygen and an F-factor of 8,710. The SCAQMD emission factor of 3.6×10^{-4} pound per million British thermal unit (lb/MMBtu) was used to estimate formaldehyde emissions.

The HRA was conducted using the conservative assumption that the CTGs would emit TACs at the maximum rate possible under maximum load for 3,320 hours per turbine, and would have 495 startups and shutdowns (estimated at 366 hours) per turbine per year. A summary of the air toxics emissions included in the HRA is presented in Table 5.9-1. The detailed emission calculations for the air toxics are provided in Appendix 5.1B.

TABLE 5.9-1
Air Toxic Emission Rates Modeled for AEC Operation

		CTG Emissions (per turbine)	
Pollutant[a]	**Chemical Abstracts Service Registry Number**	**lb/hr**[b]	**lb/yr**[b]
Ammonia[c]	7664417	1.33E+01	3.32E+04
Acetaldehyde	75070	6.03E-02	2.03E+02
Acrolein	107028	9.66E-03	3.25E+01
Benzene	71432	1.81E-02	6.09E+01
1,3-Butadiene	106990	6.49E-04	2.18E+00
Ethylbenzene	100414	4.83E-02	1.62E+02
Formaldehyde[d]	50000	5.43E-01	1.83E+03
Naphthalene	91203	1.96E-03	6.60E+00
PAHs[e]	1151	3.32E-03	1.12E+01
Propylene Oxide	75569	4.37E-02	1.47E+02
Toluene	108883	1.96E-01	6.60E+02
Xylenes	1330207	9.66E-02	3.25E+02

[a]Unless otherwise noted, emission rates based on EPA's *AP-42* (EPA, 2000).

[b]Hourly emission rates are based on a maximum turbine heat input of 1,509 MMBtu/hr (high heat value). The annual emission rates are based on 3,686 hours of turbine operation with an average annual heat input of 1,377 MMBtu/hr (see Appendix 5.1B for detailed emission estimates).

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

[d]SCAQMD-recommended emission factor of 3.6 x 10-4 lb/MMBtu.

[e]Carcinogenic polyaromatic hydrocarbons (PAHs) only; naphthalene considered separately.

Notes:
lb/hr = pound(s) per hour
lb/yr = pound(s) per year

5.9.3.1.2 Dispersion Modeling

The AERMOD dispersion model (Version 12345) was used to predict ground-level concentrations of air toxic emissions associated with the AEC. The AERMOD settings, source parameters, meteorological data, and source definition for the risk assessment were the same as the air quality impact analysis methodology (see Section 5.1). A unit emission rate (1 gram per second [g/s]) was used to model each source, as outlined in the HARP On-ramp program manual.[3]

The maximum hourly impacts were predicted using the exhaust parameters for the 107°F, 70 percent load case, which represents the turbine exhaust parameters associated with the maximum predicted 1-hour ground-level impact in Section 5.1, combined with the maximum possible TAC emission rates. The annual impacts were predicted for the 65.3°F, 70 percent load case, which represents the average annual temperature and load scenario resulting in the maximum predicted annual ground-level impact in Section 5.1. Detailed modeling source parameters for the AEC are presented in Appendix 5.1C.

The 50-kilometer radius discrete receptor grid used for the HRA was the same as the receptor grid used in the air quality impact analysis. In addition to the discrete receptor grid, the census block receptor locations and sensitive receptors within 6 miles of the AEC site were also included in the HRA.[4]

5.9.3.1.3 Risk Characterization

The results of the dispersion modeling analysis represent an intermediate product in the HRA process. The HARP On-ramp program was used to convert the AERMOD output files to a format compatible with the HARP model. The HARP model was subsequently used to determine cancer, chronic, and acute health risks.

Cancer risks were evaluated based on the annual air toxics 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 were estimated using the required conservative assumption of 70-year continuous exposure duration for residential and sensitive receptors and a 40-year, 5-days-per-week, 8-hours-per-day exposure duration for commercial/industrial receptors. In addition, for predicted cancer risks where the inhalation pathway is the dominant pathway of cancer risks, the Derived (Adjusted) Method was used for the cancer risk evaluation, based on the *Recommended Interim Risk Management Policy for Inhalation-Based Residential Cancer Risk* (ARB, 2003).

If a predicted Derived Adjusted cancer risk is greater than 1 in 1 million, the cancer burden is calculated for each census block receptor. Cancer burden is defined as the estimated increase in the occurrence of cancer cases in a population resulting from exposure to carcinogenic air contaminants. The population data for census block receptors within 6 miles of the AEC site are based on the population information within the HARP database.

Chronic toxicity is defined as adverse health effects from prolonged chemical exposure caused by chemicals accumulating in the body. Per CEC Siting Regulations, "a chronic exposure is one which is greater than twelve (12) percent of a lifetime of seventy (70) years."[5] Acute toxicity is defined as adverse health effects caused by a brief chemical exposure of no more than 24 hours. Per CEC Siting Regulations, "an acute exposure is one which occurs over a time period of less than or equal to one (1) hour."[6] To assess chronic and acute non-cancer exposures, annual and 1-hour air toxics ground-level concentrations are compared with

---

[3] Note that the HARP On-ramp program manual is made available within the "Help" module of the HARP On-ramp program itself.

[4] All census block receptors were included within a 6-mile radius of the project site with the exception of the census block receptors located within the Alamitos Generating Station property boundary. The census block receptors within the Alamitos Generating Station property boundary were excluded from the analysis.

[5] Data Adequacy Checklist, Appendix B (g)(9)(E)(iii)

[6] Data Adequacy Checklist, Appendix B (g)(9)(E)(ii)

the Reference Exposure Levels (REL) developed by OEHHA to obtain a chronic or acute hazard index. The REL is a concentration in ambient air at or below which no adverse health effects are anticipated.

OEHHA/ARB Cancer and Non-Cancer RELs. The HRA included potential health impacts from home-grown 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 were obtained from the *Consolidated Table of OEHHA/ARB Approved Risk Assessment Health Values* (OEHHA and ARB, 2013), and are shown in Table 5.9-2.

TABLE 5.9-2
Risk Assessment Health Values for Air Toxic Substances

Compound	Inhalation Cancer Potency (mg/kg-day)	Oral Cancer Slope Factor (mg/kg-day)	Chronic Inhalation Reference Exposure Level (µg/m³)	Chronic Oral Reference Exposure Level (mg/kg-day)	Acute Inhalation Reference Exposure Level (µg/m³)
PAHs	3.90E+00	1.20E+01	—	—	—
Xylenes	—	—	7.00E+02	—	2.20E+04
Formaldehyde	2.10E-02	—	9.00E+00	—	5.50E+01
Benzene	1.00E-01	—	6.00E+01	—	1.30E+03
Acetaldehyde	1.00E-02	—	1.40E+02	—	4.70E+02
Propylene Oxide	1.30E-02	—	3.00E+01	—	3.10E+03
Naphthalene	1.20E-01	—	9.00E+00	—	—
Ethylbenzene	8.70E-03	—	2.00E+03	—	—
1,3-Butadiene	6.00E-01	—	2.00E+00	—	6.6E+02
Acrolein	—	—	3.50E-01	—	2.50E+00
Toluene	—	—	3.00E+02	—	3.70E+04
Ammonia	—	—	2.00E+02	—	3.20E+03

Notes:
µg/m³ = microgram(s) per cubic meter
mg/kg-day = milligram(s) per kilogram per day
Source: OEHHA and ARB, 2013

Significance Criteria

Cancer Risk. Cancer risk is the probability or chance of contracting cancer over a human life span (assumed to be 70 years). Carcinogens are not assumed to have a threshold below which there is no human health impact. In other words, any exposure to a carcinogen is assumed to have some probability of causing cancer; the lower the exposure (time or mass), the lower the cancer risk (that is, a linear, no-threshold model). State and local regulations in California use an excess (that is, an incremental increase from the project) cancer risk greater than 10 in 1 million as the significant impact level for public health impact assessments. The excess cancer risk calculation also uses conservative assumptions and techniques to ensure that the excess cancer risk number bounds the actual risk. For example, the 10 in 1 million risk level is used by the Air Toxics Hot Spots (AB 2588) program and California's Proposition 65 as the public notification level for air toxic emissions from existing sources. An excess cancer risk below 1 in 1 million for a project is typically considered the *de minimis* impact level, meaning an excess cancer risk for a project less than 1 in 1 million would result in a less-than-significant health risk.

Based on SCAQMD Rule 1401 and the SCAQMD California Environmental Quality Act (CEQA) significance thresholds (SCAQMD, 2011b), a source with a maximum individual cancer risk (MICR) less than 1 in 1 million individuals and a project increment MICR of less than 10 in 1 million individuals would result in a less-than-significant health risk. Individual sources with a MICR between 1 and 10 in 1 million would be required to install best available control technology for toxics (T-BACT). Therefore, the predicted health risk values for each individual source were compared to the incremental increase in cancer risk of 1 in 1 million individuals per source (that is, each of the twelve CTGs), and the predicted incremental increase in cancer risk for the project will be compared to the 10 in 1 million-individuals threshold.

Based on SCAQMD Rule 1401 and the SCAQMD CEQA significance thresholds (SCAQMD, 2011b), a cancer burden greater than 0.5 excess cancer cases in areas with an incremental increase greater than 1 in 1 million individuals is considered significant.

Non-cancer Risk. Non-cancer health effects can be either chronic or acute. In determining potential non-cancer health risks (chronic and acute) from air toxics, it is assumed there is a dose of the air toxic substance below which there would be no impact on human health. The air concentration corresponding to this dose is called the REL. Non-cancer health risks are measured in terms of a hazard quotient, which is the calculated exposure of each contaminant divided by its REL. Hazard quotients for pollutants affecting the same target organ are typically summed with the resulting totals expressed as hazard indexes for each organ system. Based on SCAQMD Rule 1401 and the SCAQMD CEQA significance thresholds (SCAQMD, 2011b), a chronic or acute hazard index of less than 1.0 for each source and the project increment, respectively, is considered to be a less-than-significant health risk.

5.9.3.1.4 Summary of Air Toxic Exposure Assessment Results

A summary of the MICR, chronic health index, and acute health index at the point of maximum impact (PMI) locations, as well as the maximum predicted public health impacts for worker, residential, and sensitive receptors, has been included in Tables 5.9-3 and 5.9-4. In accordance with SCAQMD Rule 1401, the results in Table 5.9-3 represent the predicted risk for each individual emission unit, while the results in Table 5.9-4 represent a comparison of the total predicted AEC impact to the SCAQMD CEQA significance thresholds. The receptor grid used to evaluate the predicted impacts is included in Appendix 5.1C. Additionally, the HARP report files were also prepared and are provided with this application on compact disc.

As presented in Table 5.9-3, the MICR at the PMI for each individual turbine is predicted to be 0.36 in 1 million.[7] The maximum impact is located approximately 260 meters east of the project boundary. The MICR for the maximum exposed individual resident (MEIR), which is approximately 460 meters east of the project boundary, is predicted to be 0.32 in 1 million (Derived Adjusted); and the MICR for the maximum exposed individual worker (MEIW), which is located approximately 260 meters east of the project boundary, is predicted to be 0.064 in 1 million for the individual units. The MICR at the maximum exposed sensitive receptor is predicted to be 0.19 in 1 million. Overall, the predicted MICR for the MEIR, MEIW, and the maximum exposed sensitive receptor is well below the individual source significance threshold of 1 in 1 million. Therefore, based on SCAQMD Rule 1401, the predicted incremental increase in cancer risk from each individual unit will be less than significant, and T-BACT would not be required. However, while not required, the emission control technologies included in this project are considered to be T-BACT.

The maximum chronic hazard index for an individual source at the PMI is predicted to be 0.00043, which is located approximately 260 meters east of the project boundary. The maximum acute hazard index for an individual source at the PMI is predicted to be 0.024, which is located on the west side of the facility fence line. The predicted chronic and acute hazard indices are well below the SCAQMD individual source significance threshold of 1.0. Therefore, the predicted impact from each individual unit will be less than significant, and T-BACT will not be required. However, as previously noted, the emission control technologies included in this project are considered to be T-BACT.

A risk analysis was also performed to evaluate the potential facility-wide impacts. The potential health impacts at the PMI, MEIR, MEIW, and maximum exposed sensitive receptor resulting from AEC operation are summarized in Table 5.9-4.

[7] All cancer risk values presented represent the 70-year OEHHA Derived methodology, unless noted.

TABLE 5.9-3

Health Risk Assessment Summary: Individual Units[a]

Risk[b]	Turbine 1	Turbine 2	Turbine 3	Turbine 4	Turbine 5	Turbine 6	Turbine 7	Turbine 8	Turbine 9	Turbine 10	Turbine 11	Turbine 12
Derived Cancer Risk at the PMI[c] (per million)	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.35	0.36	0.36	0.36
Derived Adjusted Cancer Risk at the PMI[d] (per million)	0.35	0.36	0.36	0.35	0.36	0.36	0.36	0.36	0.35	0.35	0.35	0.35
Derived Adjusted Cancer Risk at the MEIR[d] (per million)	0.29	0.31	0.32	0.32	0.32	0.32	0.30	0.29	0.28	0.31	0.32	0.32
Derived Adjusted Highest Cancer Risk at a Sensitive Receptor[d] (per million)	0.19	0.19	0.18	0.18	0.17	0.16	0.18	0.19	0.19	0.16	0.15	0.15
Derived Cancer Risk at the MEIW[c] (per million)	0.064	0.064	0.064	0.063	0.064	0.064	0.064	0.064	0.063	0.063	0.064	0.063
Chronic Hazard Index at the PMI	0.00043	0.00043	0.00043	0.00042	0.00043	0.00043	0.00043	0.00043	0.00042	0.00043	0.00043	0.00042
Resident Chronic Hazard Index	0.00035	0.00037	0.00038	0.00039	0.00039	0.00038	0.00036	0.00035	0.00034	0.00037	0.00038	0.00039
Worker Chronic Hazard Index	0.00043	0.00043	0.00043	0.00042	0.00043	0.00043	0.00043	0.00043	0.00042	0.00043	0.00043	0.00042
Chronic Hazard Index at a Sensitive Receptor	0.00023	0.00023	0.00022	0.00021	0.00020	0.00019	0.00022	0.00023	0.00023	0.00019	0.00018	0.00018
Acute Hazard Index at the PMI	0.0079	0.014	0.014	0.024	0.0074	0.0098	0.013	0.012	0.0094	0.018	0.0087	0.0102
Resident Acute Hazard Index	0.0035	0.0038	0.0039	0.0035	0.0036	0.0039	0.0042	0.0046	0.0030	0.0029	0.0036	0.0045
Worker Acute Hazard Index	0.0079	0.0141	0.014	0.024	0.0074	0.0098	0.013	0.012	0.0094	0.018	0.0087	0.0102
Acute Hazard Index at a Sensitive Receptor	0.0024	0.0043	0.0044	0.0035	0.0052	0.0039	0.0041	0.0036	0.0019	0.0026	0.0028	0.0028

[a]The results in Table 5.9-3 represent the predicted excess risk for each individual emission unit in accordance with SCAQMD Rule 1401.

[b]A source with an excess MICR less than 1 in 1 million individuals is considered to be less than significant. 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 OEHHA Derived Methodology.

[d]Cancer risk values are based on the Derived Adjusted 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 5.9-3 may occur at different receptors. Therefore, the AEC totals in Table 5.9-3 are not directly additive and should not be directly compared to the results presented in Table 5.9-4.

TABLE 5.9-4
Health Risk Assessment Summary: Facility[a]

Risk[b]	Receptor Number	Value
Derived Cancer Risk at the PMI[c]	38	3.4 per million
Derived Adjusted Cancer Risk at the PMI[d]	38	3.4 per million
Derived Adjusted Cancer Risk at the MEIR[d]	706	3.1 per million
Highest Cancer Risk at a Sensitive Receptor[d]	19395	2.1 per million
Derived Cancer Risk at the MEIW[c]	38	0.60 per million
Chronic Hazard Index at the PMI	921	0.0040
Resident Chronic Hazard Index	706	0.0038
Worker Chronic Hazard Index	921	0.0040
Chronic Hazard Index at a Sensitive Receptor	19395	0.0025
Acute Hazard Index at the PMI	607	0.078
Resident Acute Hazard Index	743	0.038
Worker Acute Hazard Index	607	0.078
Acute Hazard Index at a Sensitive Receptor	19395	0.041

[a]The results in Table 5.9-4 represent the combined predicted risk for all twelve turbines operating simultaneously.

[b]A facility with an overall individual increase in cancer risk (MICR) less than 10 in 1 million individuals is considered to be less than significant. A facility chronic or acute hazard index less than 1.0 is considered to be a less-than-significant health risk.

[c]Cancer risk values represent the OEHHA Derived Methodology.

[d]Cancer risk values represent the Derived Adjusted Methodology.

The incremental increase in cancer risk at the PMI associated with the AEC is predicted to be 3.4 in 1 million[8] and is located on the project's north boundary. The incremental increase in cancer risk at the MEIR is predicted to be 3.1 in 1 million (Derived Adjusted). The receptor location for the MEIR is approximately 510 meters east of the project boundary. The incremental increase in cancer risk for the MEIW, which is located on the project's northern boundary, is predicted to be 0.60 in 1 million. The incremental increase in cancer risk at the maximum exposed sensitive receptor is predicted to be 2.1 in 1 million. The predicted MICR for the MEIR, MEIW, and the maximum exposed sensitive receptor is below the facility-wide significance threshold of 10 in 1 million. Therefore, based on SCAQMD CEQA significance thresholds, the predicted incremental increase in cancer risk associated with the project will be less than significant.

The maximum chronic hazard index increment at the PMI is predicted to be 0.0040. The maximum predicted chronic impact is located approximately 58 meters north of the project boundary. The maximum acute hazard index at the PMI is predicted to be approximately 0.078. The maximum predicted acute impact is located in the former fuel oil tank farm for the Alamitos Generating Station, which is now owned by a third party, approximately 21 meters north of the project boundary. The predicted chronic and acute hazard

[8] All cancer risk values presented represent the 70-year OEHHA Derived methodology, unless noted.

indices are well below the SCAQMD project significance threshold of 1.0. Therefore, the predicted impact from the project will be less than significant.

5.9.3.2 Uncertainty in the Public Health Impact Assessment

Sources of uncertainty in the HRA include emissions estimates, numerical dispersion modeling calculations, exposure characteristics, and extrapolation of toxicity data in animals to humans. Assumptions used in HRAs are designed to provide sufficient health protection to avoid underestimation of risk to the public, which may add an additional level of conservativeness in the predicted impacts. Some sources of uncertainty and conservativeness applicable to this HRA are discussed below.

As noted in Section 3.1, Stationary Gas Turbines, of EPA's *AP-42* (EPA, 2000), uncontrolled HAP emissions could be reduced by up to 85 to 90 percent with the use of an oxidation catalyst system.[9] The AEC design includes the use of an oxidation catalyst to reduce CO and VOC emissions to the best available control levels of 2 ppmv and 1 ppmv, respectively. Therefore, it is expected that the actual HAP emissions, and resulting predicted health risk impacts, would be significantly less than the potential risk presented in this analysis. Long-term emissions were also estimated, assuming the turbines would operate at an annual average heat input rate for 3,320 hours per year, plus 495 startup and shutdown events. Under normal operating conditions, the turbines would likely be operated less than the permitted levels on an annual basis. Consequently, the emissions used for this HRA are expected to be higher than the actual quantities during normal operation.

The models used in dispersion modeling contain assumptions that tend to over-predict ground-level concentrations. For example, the modeling performed in the HRA assumed a conservation of mass (that is, all of the pollutants emitted from the sources remained in the atmosphere while being transported downwind). During the transport of pollutants from sources to receptors, none of the material was assumed to be removed through chemical reaction or to be lost at the ground surface through reaction, gravitational settling, precipitation, or turbulent impaction. In reality, these mechanisms work to reduce the level of pollutants remaining in the atmosphere.

The long-term exposure characteristics assessed in the HRA included the assumption that residents were exposed to turbine emissions continuously at the same location for 24 hours per day, 365 days per year, for 70 years. It is extremely unlikely that any person would meet this condition. The conservative exposure assumption tends to over-predict risk estimates in the HRA process.

The toxicity data used in the HRA contain uncertainties due to the extrapolation of data from animals to humans. Typically, safety factors are applied when doing the extrapolation. Furthermore, the human population is much more diverse, both genetically and culturally, than animals used for experimental exposures and bred and housed under controlled conditions; thus, the intraspecies variability among humans is expected to be much greater than in laboratory animals. With all of the uncertainty in the assumptions used to extrapolate toxicity data, significant measures are taken to ensure that sufficient health protection is built into the available health effects data.

5.9.3.3 Air Toxics Exposure Assessment (Construction and Demolition Impacts)

The emissions of air toxics associated with the construction of the AEC and the demolition of the existing Alamitos Generating Station units will consist primarily of combustion byproducts generated during movement of onsite construction/demolition equipment and onsite and offsite movement (vehicular miles traveled) of vehicles associated with the construction and demolition activities for the project. Onsite demolition activities will include the removal of existing Alamitos Generating Station Units 1–7, the Unit 7 fuel tank, and the northeast warehouse. Demolition of the existing units will include an organized,

[9] *AP-42*, page 3.1-7—The oxidation process takes place spontaneously, without the requirement for introducing reactants. 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.

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.

The primary air toxic pollutant of concern associated with construction and demolition activities is DPM. The total DPM exhaust emissions from construction and demolition activities, calculated per methodology in Section 5.1 as presented in Appendix 5.1A, were averaged over the 139-month construction period and spatially distributed in: (1) the area associated with the demolition of the northeast warehouse, (2) the area associated with the demolition of Unit 7 and the Unit 7 fuel tank and the construction of Blocks 1 and 2, (3) the area associated with the construction of Blocks 1 and 2, (4) the area associated with the demolition of Units 5 and 6 and the construction of Block 3, (5) the area associated with the demolition of Units 3 and 4 and the construction of Block 4, and (6) the area associated with the demolition of Units 1 and 2. These emission rates are presented in Table 5.9-5.

TABLE 5.9-5
Air Toxic Emission Rates Modeled for AEC Construction

	DPM Exhaust Emissions	
Construction and Demolition Areas	**Total (tons/project)**	**Annualized (tpy)***
Northeast Warehouse Demolition	0.21	0.018
Unit 7 & Unit 7 Fuel Tank Demolition and Blocks 1 & 2 Construction	0.45	0.039
Blocks 1 & 2 Construction	1.35	0.12
Units 5 & 6 Demolition and Block 3 Construction	1.21	0.10
Units 3 & 4 Demolition and Block 4 Construction	0.63	0.054
Units 1 & 2 Demolition	0.24	0.021

*Annualized emissions were calculated by averaging the total emissions over a 139-month construction and demolition period.
tpy = ton(s) per year

Using the DPM exhaust emissions from Table 5.9-5 for construction and demolition activities, HRA methodology outlined in Section 5.9.3.1, and dispersion modeling methodology outlined in Section 5.1, a construction HRA was performed using the ARB HARP (Version 1.4f), along with the ARB HARP On-ramp program (Version 1.0). The HARP On-ramp tool was used to import the AERMOD air dispersion modeling results into the HARP Risk Module. The AERMOD set-up is presented in Appendix 5.9C.

The construction HRA was performed for a shorter exposure duration and different receptor locations. The HARP model limits short-term, continuous residential exposure to 9 years. Therefore, the average annual emissions, calculated as previously described, were assumed to occur each year for 9 years of continuous exposure. Because the primary air toxic pollutant of concern for construction activities is DPM, the cancer risks were evaluated based on annual air toxics ground-level concentrations and inhalation cancer potency. To account for variations in breathing rates, the cancer risks were conservatively estimated using a 9-year continuous residential and sensitive receptor exposure breathing rate, the average of which is equal to 452 liter(s) per kilogram per day (L/kg/day) and higher than the average breathing rate of 271 L/kg/day (OEHHA, 2003).[10] The OEHHA Derived methodology was used to determine the residential and sensitive receptor exposure cancer risk. An adjusted 9-year, 5-days-per-week, 10-hours-per-day exposure duration was used for commercial/industrial receptors. Chronic toxicity was also considered using the average annual emissions, calculated as previously described.

[10] Note that using the child breathing rate may be overly conservative for many receptor locations because the 9-year cancer risk for a child assumes continuous exposure (i.e., 24-hours-per-day, 7-days-per-week) during the first 9 years of life, which would not be representative of non-MEIR or sensitive receptor locations.

For purposes of determining the potential offsite DPM concentrations during construction, receptors were not included in the area within the existing Alamitos Generating Station fence line, with the exception of the sensitive receptor corresponding to the location of Rosie the Riveter Charter High School. Additional receptors were not included within the Alamitos Generating Station fence line because public access is restricted.

The potential health impacts at the PMI, MEIR, MEIW, and maximum exposed sensitive receptor resulting from AEC construction and demolition activities are summarized in Table 5.9-6. Based on the analysis, the incremental increases in cancer risk at the PMI, MEIR, MEIW, and maximum exposed sensitive receptor associated with construction and demolition activities are predicted to be 14.7, 3.3, 8.9, and 5.7 in 1 million, respectively.[11] The chronic health indices at the PMI, MEIR, MEIW, and maximum exposed sensitive receptor are predicted to be 0.037, 0.0084, 0.13, and 0.014, respectively. Although the PMI excess cancer risk is greater than 10 in 1 million, the elevated risk only occurs in areas where public access is controlled (i.e., within the AES-SLD-controlled fence line) or in areas that are not considered residential, commercial, or habitable. Additionally, potential exposure would be sporadic and limited in length. The predicted incremental increase in cancer risk at the MEIR, MEIW, and maximum exposed sensitive receptor and chronic health index at the PMI, MEIR, MEIW, and maximum exposed sensitive receptor are less than the SCAQMD CEQA significance thresholds of 10 in 1 million and 1.0, respectively. Therefore, impacts associated with the finite construction and demolition activities are less than significant. The HARP report files were separately prepared and are included with this application on compact disc.

The impacts presented in Table 5.9-6 would be reduced with the implementation of the additional mitigation measures presented in Section 5.1 and the implementation of a construction fugitive dust and diesel-fueled engine control plan. Therefore, the impacts associated with exhaust emissions from the finite construction and demolition activities are less than significant.

TABLE 5.9-6
Construction: Health Risk Assessment Summary – Facility

Risk[a]	Receptor Number	Value	Universal Transverse Mercator (NAD 83)
Cancer Risk at the PMI[b]	3842	9.93 per million	398186, 3736831
Cancer Risk at the MEIR[b]	3157	2.2 per million	397700, 3737000
Highest Cancer Risk at a Sensitive Receptor[b]	16664	3.8 per million	397910.93, 3737213.62
Cancer Risk at the PMI[c]	3842	14.7 per million	398186, 3736831
Cancer Risk at the MEIR[c]	3157	3.3 per million	397700, 3737000
Highest Cancer Risk at a Sensitive Receptor[c]	16664	5.7 per million	397910.93, 3737213.62
Cancer Risk at the MEIW[d]	3842	8.9 per million	398186, 3736831
Chronic Hazard Index at the PMI	3842	0.037	398186, 3736831
Resident Chronic Hazard Index	3157	0.0084	397700, 3737000
Chronic Hazard Index at a Sensitive Receptor	16664	0.014	397910.93, 3737213.62
Worker Chronic Hazard Index[d]	3842	0.13	398186, 3736831

[a]Values represent the OEHHA Derived Methodology.

[b]Based on an average adult breathing rate of 271 L/kg/day.

[c]Based on an average child breathing rate of 452 L/kg/day.

[d]Cancer risk at the MEIW and Worker Chronic Hazard Index adjusted with 3.36 ground level concentration factor and 9 years of exposure.

[11] Note that the PMI, MEIR, and sensitive receptor values represent the cancer risk for a child breathing rate. The adult breathing rate led to lower cancer risks at the same locations.

Emissions of asbestos and asbestos-containing material (ACM) are also fugitive dust pollutants of concern associated with the demolition of the existing Alamitos Generating Station structures. To reduce the potential risk associated with the removal of asbestos and ACM, the Project Owner will comply with all requirements outlined in SCAQMD Rule 1403, which requires the notification and special handling of ACM during demolition activities. The Project Owner will comply with SCAQMD Rule 1403 by:

- Conducting a facility survey to identify and quantify the presence of all friable and non-friable Class I and Class II ACM prior to the start of demolition activities,
- Notifying the SCAQMD and CEC compliance project manager of the intent to conduct demolition activities in a district-approved format (e.g., submittal of a Rule 1403 Plan) prior to the start of any demolition activities,
- Employing one or more of the following methods for asbestos removal: High Efficiency Particulate Air Filtration, Glovebag or Mini-enclosures, Dray Removal, or an alternative approved method,
- Collecting and storing ACM in a leak-tight or wrapped container to avoid releasing ACM to the atmosphere,
- Requiring an onsite representative to complete the Asbestos Abatement Contractor/Supervisor course pursuant to the Asbestos Hazard Emergency Response Act and Provision of Title 40, Code of Federal Regulations (CFR), Parts 61.145 to 61.147, 61.152, and 763, and be present during all ACM demolition or handling procedures, and
- Disposing of ACM wastes at a licensed waste disposal facility; ACM wastes will be hauled from the site by an appropriately licensed ACM waste transporter.

As a result of the activities listed above and in compliance with SCAQMD Rule 1403, the potential impacts associated with asbestos removal during demolition will be less than significant.

5.9.4 Cumulative Effects

5.9.4.1 Operational Cumulative Effects

As previously discussed, the MATES II and MATES III 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 SCAB. The estimated carcinogenic risk was found to be rather uniform across the SCAB, ranging from about 1,120 in 1 million to about 1,740 in 1 million for the sites monitored. 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 SCAB by accounting for an estimated 94 percent of the overall cancer risk. Diesel emissions alone account 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 maximum incremental increase in the facility-wide cancer risk predicted at the PMI for the AEC is 3.4 in 1 million. The maximum facility-wide chronic and acute hazard indices at the PMI are 0.0040 and 0.078, respectively. These levels are well below the SCAQMD CEQA significance *de minimis* thresholds for cancer risk of 10 in 1 million, and/or the chronic and acute hazard index of 1.0. Furthermore, the results of the MATES III study indicate that the cumulative background cancer risk from exposure to airborne toxics is approximately 1,200 in 1 million, with an estimated 94 percent of the overall cancer risk due to mobile sources. Therefore, facility-wide stationary source emissions from the AEC are expected to contribute to approximately less than 0.28 percent of the background risk in the vicinity of the project. While not required, T-BACT emission control technologies will also be installed as part of the project, which will reduce the TAC emissions to the extent technically feasible. The removal/demolition of the existing Alamitos Generating Station units will also offset a portion of the potential impacts from the operation of the AEC relative to the existing background levels. Therefore, it is concluded that the AEC will not have a significant cumulative human health risk impact.

5.9.4.2 Construction and Demolition

The maximum incremental increase in the cancer risk predicted at the PMI associated with construction and demolition activities is 14.7 in 1 million. Although this value is above the SCAQMD CEQA significance *de minimis* threshold for cancer risk of 10 in 1 million, the elevated risk only occurs in areas where public access is controlled (i.e., within the AES-SLD-controlled fence line) or in areas that are not considered residential, commercial, or habitable. The maximum chronic hazard index at the PMI is 0.037, which is below the chronic hazard index of 1.0. Additionally, the AEC construction activities and the existing Alamitos Generating Station's demolition activities would be finite, and best available emission control techniques would be used throughout the 139-month activity period to control pollutant emissions. Impacts from the demolition of existing Alamitos Generating Station's units would be further reduced with the implementation of the additional construction mitigation measures presented in Section 5.1 and the implementation of a construction fugitive dust and diesel-fueled engine control plan. Therefore, the potential cumulative human health risk impacts from construction and demolition are expected to be less than significant.

5.9.5 Mitigation Measures

5.9.5.1 Criteria Pollutants

5.9.5.1.1 Operation

The results of the air dispersion modeling presented in Section 5.1 concluded that the AEC emissions during operation will not cause or contribute to the violation of the ambient air quality standards (either National Ambient Air Quality Standards [NAAQS] or California Ambient Air Quality Standards) for those pollutants for which the area is designated as attainment. These standards are intended to protect the general public with a wide margin of safety. Therefore, the AEC is not expected to have a significant impact on public health from emissions of criteria pollutants. For those criteria pollutants (and their precursor pollutants) where the ambient air quality standards are categorized as non-attainment, mitigation will be provided to reduce the impacts to less-than-significant levels (see Section 5.1). The AEC will also include emission-control technologies necessary to meet the required emission standards specified for criteria pollutants under SCAQMD rules.

5.9.5.1.2 Construction/Demolition

The construction and demolition activities would be finite and best available emission control techniques would be used throughout the 139-month construction activity period to control criteria pollutant and DPM emissions. Construction impacts would be further reduced with the implementation of the additional construction mitigation measures presented in Section 5.1 and the implementation of a construction fugitive dust and diesel-fueled engine control plan.

5.9.5.2 Air Toxic Substances

As presented in Section 5.9.3.1.4, the maximum per turbine incremental increases in the cancer risk predicted at the PMI, MEIR, MEIW, and maximum exposed sensitive receptor are 0.36, 0.32, 0.064, and 0.19 in 1 million, respectively. The maximum facility incremental increases in the cancer risk predicted at the PMI, MEIR, MEIW, and maximum exposed sensitive receptor are 3.4, 3.1, 0.60 and 2.1 in 1 million, respectively. The maximum facility chronic and acute hazard indices are 0.0040 and 0.078, respectively. These levels are below the per unit emission significance threshold for cancer risk of 1 in 1 million and the facility significance thresholds for cancer risk of 10 in 1 million, and/or the chronic and acute hazard index of 1.0. The AEC will also incorporate T-BACT emission control technologies, which will reduce impacts below the predicted impacts presented in Section 5.9.3. Therefore, mitigation measures are not required for air toxic emissions from the operations of the AEC.

As presented in Section 5.9.3.3, the predicted incremental increases in cancer risk at the PMI, MEIR, MEIW, and maximum exposed sensitive receptor associated with construction and demolition activities are 14.7, 3.3, 8.9, and 5.7 in 1 million, respectively. The predicted chronic hazard indices at the PMI, MEIR, MEIW, and maximum exposed sensitive receptor are 0.037, 0.0084, 0.13, and 0.014, respectively. With the exception of PMI excess cancer risk, these levels are below the significance threshold for cancer risk of 10 in 1 million and the chronic hazard index of 1.0. Although the PMI excess cancer risk is greater than 10 in 1 million, the elevated risk only occurs in areas where public access is controlled. (i.e., within the AES-SLD-controlled fence line) or in areas that are not considered residential, commercial, or habitable. Additionally, the construction and demolition activities would be finite and best available emission control techniques would be used throughout the 139-month construction and demolition period to control air toxic substance emissions. Construction impacts would be further reduced with the implementation of the additional construction mitigation measures presented in Section 5.1 and the implementation of a construction fugitive dust and diesel-fueled engine control plan.

5.9.6 Laws, Ordinances, Regulations, and Standards

An overview of the relevant LORS that affect public health as well as the conformity of the project to each of the LORS are identified in Table 5.9-7.

TABLE 5.9-7
Laws, Ordinances, Regulations, and Standards for Public Health

LORS	Requirements/Applicability	Administering Agency	Analyses of Conformance
Federal			
Title 40 CFR Part 63	Establishes national emission standards to limit emissions of hazardous air pollutants (HAPs, or air pollutants identified by EPA as causing or contributing to the adverse health effects of air pollution but for which NAAQS have not been established) from facilities in specific categories.	SCAQMD with EPA Region IX Oversight	The AEC has proposed a formaldehyde emission limit of 120 parts per billion, by volume (ppbv); as a result, the estimated annual AEC HAP emissions are less than the major source thresholds for HAPs (10 tpy for any one pollutant or 25 tpy for all HAPs combined), and no lower pollutant-specific maximum achievable control technology (MACT) thresholds apply to the AEC emission units. Therefore, National Emissions Standards for Hazardous Air Pollutants (NESHAP) regulations do not apply.
State			
California Health & Safety Code, Sections 44360 to 44366 (Air Toxics "Hot Spots" Information and Assessment Act—AB 2588)	Requires preparation and biennial updating of a facility's emission inventory of hazardous substances; risk assessments.	SCAQMD with Oversight from ARB/OEHHA	An estimate of TAC emissions and associated risk was conducted as part of this analysis (see Conformance description for SCAQMD Rule 1401 [Permits – Toxics New Source Review]).
California Health & Safety Code, Section 25249.5 et seq. (Safe Drinking Water and Toxic Enforcement Act of 1986—Proposition 65)	Provides notification of Proposition 65 chemicals.	OEHHA	The Project Owner will comply with all signage and notification requirements.
Local			
SCAQMD Rule 1401 (Permits – Toxics New Source Review)	The purpose of this rule is to provide for the review of new and modified sources of TAC emissions in order to evaluate potential public exposure and health risk, to mitigate potentially significant health risks resulting from these exposures, and to provide net health risk benefits by improving the level of control when existing sources are modified or replaced.	SCAQMD	T-BACT shall be applied to any new or modified source (i.e., individual permit unit) of TACs where the source risk is a cancer risk greater than 1 in 1 million (1×10^{-6}), a chronic hazard index greater than 1.0, or an acute hazard index greater than 1.0. The predicted MICR at the MEIR and MEIW for an individual unit are 0.32 and 0.064 in 1 million, respectively. These values are less than the individual source thresholds of 1 in 1 million (1×10^{-6}). The predicted MICR at the MEIR and MEIW for the project are 3.1 and 0.60 in 1 million, respectively. These values are below the Permit to Construct or Permit to Operate facility thresholds for cancer risk of 10 in 1 million. The maximum predicted chronic and acute hazard indices for the project are 0.0040 and 0.078, respectively, both of which are below the chronic and acute hazard index of 1.0. Nevertheless, the project will employ emission controls considered to be T-BACT.

TABLE 5.9-7
Laws, Ordinances, Regulations, and Standards for Public Health

LORS	Requirements/Applicability	Administering Agency	Analyses of Conformance
SCAQMD Rule 1403 (Permits – Asbestos Removal)	The purpose of this rule is to specify work practice requirements to limit asbestos emissions from building demolition and renovation activities, including the removal and associated disturbance of ACM.	SCAQMD	The Project Owner will comply with the requirements outlined in Rule 1403 prior to the removal of ACM.
SCAQMD Rule 212 (Permits – Public Notice)	The purpose of this rule is to establish standards for approving permits and issuing public notice.	SCAQMD	Rule 212 requires public notification if: a. Any new or modified permit unit, source under Regulation XX, or equipment under Regulation XXX that may emit air contaminants is located within 1,000 feet from the outer boundary of a school; or b. Any new or modified facility that has onsite emission increases exceeding any of the daily maximums specified in subdivision (g) of this rule; or c. Any new or modified permit unit, source under Regulation XX, or equipment under Regulation XXX with increases in emissions of toxic air contaminants for which the Executive Officer has made a determination that a person may be exposed to a MICR greater than 1 in 1 million (1×10^{-6}), due to a project's proposed construction, modification, or relocation for facilities with more than one permitted equipment unless the applicant can show that the total facility-wide MICR is below 10 in 1 million (10×10^{-6}). The predicted total facility-wide MICR is less than 10 in 1 million. However, the AEC will be within 1,000 feet from the outer boundary of a school, and the onsite emissions will exceed the daily maximums listed in subdivision (g) of this rule. Therefore, a public notice consistent with the requirements outlined in Rule 212 will be issued. The process for public notification and comment will include all of the applicable provisions of 40 CFR 51, Section 51.161(b), and 40 CFR 124, Section 124.10.

5.9.7 Agencies and Agency Contacts

Table 5.9-8 provides contact information for agencies involved with public health.

TABLE 5.9-8
Agency Contacts for Public Health

Issue	Agency Contacted	Person Contacted
Regulatory oversight	EPA Region IX	Gerardo Rios EPA Region IX 75 Hawthorne Street San Francisco, CA 94105 (415) 947-3974
Regulatory oversight	ARB	Michael Tollstrup Project Assessment Branch California Air Resources Board 2020 L Street Sacramento, CA 95814 (916) 322-6026
Permit issuance, enforcement	SCAQMD	Mohsen Nazemi South Coast Air Quality Management District 21865 Copley Drive Diamond Bar, CA 91765 (909) 396-2662

5.9.8 Permits and Permit Schedule

Consistent with the CEC Siting Regulations, SCAQMD is responsible for issuing the required operating permits related to public health. Sections 5.1.9 and 5.1.11 include a summary of the SCAQMD and EPA permits required and expected issuance schedule.

5.9.9 References

California Air Resources Board (ARB). 2003. *Recommended Interim Risk Management Policy for Inhalation-based Residential Cancer Risk*. October.

CH2M HILL. 2013. *Dispersion Modeling Protocol for the Alamitos Energy Center*. December.

Environmental Data Resources (EDR). 2013. *Alamitos Energy Center Offsite Receptor Report*. July.

Google Earth. 2013. Aerial view 6 miles surrounding the AEC, 690 N. Studebaker Road, Long Beach, CA 90803. Viewed August 2013.

Office of Environmental Health Hazard Assessment (OEHHA). 2003. *The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments*. August.

Office of Environmental Health Hazard Assessment (OEHHA) and California Air Resources Board (ARB). 2013. *Consolidated Table of OEHHA/ARB Approved Risk Assessment Health Values.* August.

South Coast Air Quality Management District (SCAQMD). 2011a. *Supplemental Guidelines for Preparing Risk Assessments for the Air Toxics "Hot Spots" Information and Assessment* Act (AB2588). June.

South Coast Air Quality Management District (SCAQMD). 2011b. *SCAQMD Air Quality Significance Thresholds*. March.

U.S. Environmental Protection Agency (EPA). 2000. *AP-42, Compilation of Air Pollutant Emission Factors*. Chapter 3. Volume 1. Fifth Edition.

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

Yahoo Yellowpages (Yahoo). 2013. Search focused on 6 miles surrounding the AEC, 690 N. Studebaker Road, Long Beach, CA 90803. Schools and Senior Care Facilities. Available online at: http://www.yellowpages.com. Accessed August 2013.