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APPENDIX G

Ambient Air Quality Analysis
And
Risk Management Review

For

PUENTE POWER PROJECT

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1. Purpose of this Document

This document serves as the Ambient Air Quality Analysis (AAQA) and Risk Management Review (RMR) for the proposed installation of a new H-Class simple cycle natural gas fired combustion turbine (CTG) and a new emergency diesel generator engine for the Puente Power Project. This document describes the modeling performed to satisfy the requirements of Ventura County Rule 26 (New Source Review) and Rule 51 (Nuisance).

2. Applicant

Project Site Location:

Puente Power Project at the Mandalay Generating Station
393 North Harbor Blvd.
Oxnard, CA 93035

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3. Project Location

The project is located at 393 North Harbor Blvd in Oxnard, California within the Ventura County Air Pollution Control District (VCAPCD). It is located in a rural setting along the coastline in Ventura County.

Figure 3-1 Project Location

4. Project Description

The Puente Power Project will consist of replacing the existing Mandalay Generating Station Natural Gas Fired Electric Utility Boiler (MGS Unit 2) (1,990 MMBtu/hr, 215 MW net) with a new natural gas fired GE H-Class simple-cycle combustion turbine generator (262 MW net nominal), replacing the existing diesel emergency generator engine with a new emergency generator engine, and shutting down the existing diesel emergency fire pump engine. The remainder of the facility will remain unchanged.

The new CTG will be fueled with pipeline quality natural gas and will be equipped with dry low-NOx combustion, selective catalytic reduction (SCR), and an oxidation catalyst. The operating schedule for the new unit will vary and may range from no operation during the winter months to potentially 24 hours of operation per day during the summer months. The maximum annual operation for the unit assumes a total of 200 hours of startups, 200 hours of shutdowns, and 1,750 hours of full load operation.

The new diesel emergency generator engine will be certified to meet non-road diesel engine EPA Tier 4 (final) standards. The new emergency diesel engine will only be operated for up to 200 hours per year for all types of operation.

5. Ventura County Rule 26 – New Source Review

Ambient Air Quality Standards (AAQS) are established to protect the public and the environment. An air quality standard defines the maximum amount of a pollutant that can be present in outdoor air without harm to public health, vegetation or wildlife. The Clean Air Act, which was last amended in 1990, requires EPA to set National Ambient Air Quality Standards (40 CFR part 50) for pollutants considered harmful to public health and the environment. At present, EPA has set National Ambient Air Quality Standards for the following principal pollutants, which are called "criteria" pollutants:

- Ozone (O_3)
- Nitrogen Dioxide (NO_2)
- Sulfur Dioxide (SO_2)
- Respirable particulate matter having an aerodynamic diameter smaller than or equal to 10 microns (PM_{10})
- Fine particulate matter having an aerodynamic diameter smaller than or equal to 2.5 microns ($PM_{2.5}$)
- Carbon Monoxide (CO)
- Lead (Pb)

The National Ambient Air Quality Standards contain primary and secondary standards for each of the criteria pollutants. If a primary standard is exceeded, the public is considered at risk. If a secondary standard is exceeded, then crops, trees and buildings may be damaged. Air quality standards are based on a particular exposure period (averaging period) and concentration (average, maximum, or other statistical measure) during that period. A violation occurs if the observed concentration is greater than the standard during the specified averaging period.

The Clean Air Act also permits states to adopt additional or more protective air quality standards if needed. California law authorizes the Air Resources Board (ARB) to set ambient (outdoor) air pollution standards in consideration of public health, safety and welfare. California has set standards for certain pollutants, such as particulate matter and ozone, which are more protective of public health than respective federal standards. California has also set standards for some pollutants that are not addressed by federal standards, including the following:

- Visibility Reducing Particles
- Hydrogen Sulfide (H_2S)
- Vinyl Chloride

Both state and federal regulations require ambient air quality standards to be reviewed periodically, or whenever substantial new information becomes available.

Table 5-1. CAAQS/NAAQS Attainment Status for Ventura County

Pollutant		Attainment Status	
		Federal	State
Lead (Pb)		Attainment (Unclassified)	Attainment
Nitrogen Dioxide (NO_2)		Attainment (Unclassified)	Attainment
Sulfur Dioxide (SO_2)		Attainment (Unclassified)	Attainment
Carbon Monoxide (CO)		Attainment (Unclassified)	Attainment
Particulate Matter under 2.5 micrometers diameter ($PM_{2.5}$)		Attainment	Attainment
Particulate matter under 10 micrometers diameter (PM_{10})		Attainment	Nonattainment
Ozone	1-hour	N/A	Nonattainment
	8-Hour	Nonattainment	Nonattainment
Hydrogen Sulfide		N/A	Unclassified
Sulfates		N/A	Attainment
Visibility Reducing Particles		N/A	Unclassified
Vinyl Chloride		N/A	Attainment

VCAPCD Rule 26.2.C requires that:

> *The APCO shall deny an applicant an Authority to Construct for any new, replacement, modified or relocated emissions unit that would cause the violation of any ambient air quality standard or the violation of any ambient air increment as defined in 40 CFR 51.166(c). In making this determination the APCO shall take into account any offsets which were provided for the purpose of mitigating the emission increase*.

In order to insure that this project will not cause or contribute to a violation of State or Federal air quality standards, an Ambient Air Quality Analysis (AAQA) must be performed on the Puente Power Project.

VCAPCD has determined that AAQAs performed for the purpose of complying with New Source Review use EPA's preferred air dispersion model along with 5 years of meteorological data to perform the air dispersion modeling. Information necessary to perform dispersion modeling includes the coordinates of the sources of emissions and the plant/facility boundary. Also required are the stack/modeling parameters for all emissions sources involved in the project.

The AAQA performed for this project was conducted using a progressive approach where any failure of preliminary analyses necessitates advancing to more refined approaches.

5.1 Project Criteria Pollutant Emissions

5.1.1 Natural Gas Turbine

Emission rates for the gas turbine are determined by the unit's operating state. The following were considered for this evaluation:

- Commissioning. The period of time where the turbine is prepared for first operation, prior to the installation of the emissions control system. During this period NO_x and CO emissions are elevated.
- Startup. The period of time during which the turbine is brought from a shutdown status to its operating temperature and pressure, including the time required by the unit's emission control system to reach full operation. During this period NO_x and CO emissions are elevated.
- Shutdown. The period of time during which the turbine is taken from an operational to a non-operational status by allowing it to cool down from its operating temperature to ambient temperature as the fuel supply to the unit is completely turned off. During this period NO_x and CO emissions are elevated.
- Normal Operations. The period of time during which the turbine is operating at optimal temperature and pressure. NO_x emissions reflect the application of dry, low-NO_x combustion and SCR. The CO emissions reflect the use of an oxidation catalyst.

For AAQA modeling the following worst-case scenarios were developed for the natural gas turbine emissions:

- Hourly emissions. Hourly emissions are from either startup or shutdown, whichever results in the worst case emissions for each pollutant.
- Annual emissions. Annual emissions are from 200 startups, 200 shutdowns, plus 1,750 hours of normal steady state operation.

5.1.2 Diesel Emergency Engine

For AAQA modeling the following worst-case scenarios were developed for the emergency diesel engine emissions:

- Hourly emissions. The emergency diesel engine will be operated for one hour at maximum load.
- Annual emissions. The emergency diesel engine will be operated a total of 200 hours per year for all purposes combined.

5.1.3 AAQA Emissions Summary

Applicable project emissions are shown in Table 5-2 (provided by the permit engineer). Note that $PM_{2.5}$ emissions may be reported as both primary and

secondary $PM_{2.5}$ emissions. If the project facility is a minor $PM_{2.5}$ source, only primary (directly emitted) $PM_{2.5}$ emissions are modeled. If the project facility is a major $PM_{2.5}$ source, both the primary and secondary $PM_{2.5}$ emissions are modeled. Since the project facility is a minor $PM_{2.5}$ source, only primary $PM_{2.5}$ emissions are required to be modeled.

Table 5-2. Emissions by Unit

Unit Description	Emissions (lbs)			
	SO_x	NO_x	CO	$PM_{10}/PM_{2.5}$
Commissioning – Maximum Hourly Emissions				
Natural Gas Turbine	5.5	246.3	1,973	10.1
Normal Operation – Maximum Hourly Emissions				
Natural Gas Turbine	5.5	143.2	412.2	10.1
Diesel Emergency Engine	0.008	0.86	4.48	0.03
Total	5.5	144.1	416.7	10.1
Normal Operation – Maximum Annual Emissions				
Natural Gas Turbine	11,820	65,900	108,840	21,360
Diesel Emergency Engine	2	172	896	6
Total	11,822	66,072	109,736	21,366

5.2 Refined Analysis

The VCAPCD modeled the impact of the proposed project on the NAAQS and/or CAAQS using EPA's Guideline for Air Quality Modeling (Appendix W of 40 CFR Part 51) for guidance. The VCAPCD used a progressive three level approach to perform the AAQA. The first level (Level 1) uses a very conservative approach. If this analysis indicates a likely exceedance of an AAQS or SIL, the analysis proceeds to the second level (Level 2) which implements a more refined approach. For the 1-hour NO_2 standard, there is also a third level that can be implemented if the Level 2 analysis indicates a likely exceedance of an AAQS or SIL.

The modeling analyses included the maximum air quality impacts during commissioning, startup, shutdown and normal operations of the turbine and normal operation of the emergency engine using the appropriate emissions during each averaging period. Required model inputs for a refined AAQA include background ambient air quality data, land characteristics, meteorological inputs, a receptor grid, and source parameters including emissions. These inputs are described in the sections that follow.

5.2.1 Model Selection

VCAPCD required that the following regulatory models be used to analyze air quality impacts:

Table 5-3. Summary of Preferred Models

Model Name	Model Purpose	Model Version
AERMOD	Air dispersion modeling	15181
AERMAP	Terrain processing	11103
AIRMET	Meteorological data processing	15181
AERSCREEN	Fumigation Modeling	15181

5.2.2 Background Ambient Air Quality

VCAPCD regulations require the air quality analysis to contain air quality monitoring data in the area for regulated pollutants for which there are NAAQS and/or CAAQS that may be affected by the source. For demonstrating compliance with the NAAQS and/or CAAQS, a background concentration is added to represent those sources not explicitly included in the modeling, as determined by the VCAPCD, so that the total concentration accounts for all contributions to current air quality.

Ambient air concentrations of CO, ozone (O_3), NO_2, PM_{10} and $PM_{2.5}$ are recorded at monitoring stations throughout the South Central Coast Air Basin. Monitoring stations may not measure all necessary pollutants, so background data may need to be collected from multiple sources. Table 5-4 displays monitors within close proximity to the project, as well as the pollutants measured.

Table 5-4 Monitoring Stations in Close Proximity to the Project Site

Site Criteria	Monitoring Site			
	El Rio Rio Mesa School	**Simi Valley Cochran St**	**Santa Barbara UCSB**	**Santa Barbara E Canyon Perdido**
Site ID	06-111-3001	06-111-202	06-083-1020	06-083-0011
Distance from Project (km)	11	53	62	47
Direction from Project	NE	E	NW	NW
Urban/Rural	Rural	Urban	Rural	Urban
Land Use	Ag / Mixed	Residential	Undeveloped Mixed	Mixed
Pollutants Monitored				
Ozone (O_3)	**X**	•		•
Nitrogen Dioxide (NO_2)	**X**	•		•
Respirable Particulate (PM_{10})	**X**	•		•
Fine Particulate ($PM_{2.5}$)	**X**	•		•
Carbon Monoxide (CO)				**X**
Sulfur Dioxide (SO_2)			**X**	

X = site selected for pollutant indicated; "•" = pollutant monitored at site

The area immediately surrounding the project site can be characterized as rural with land use being predominantly farmland/undeveloped.

The monitoring station closest to the project site is the El Rio – Rio Mesa School #2 station in Oxnard, located 11 kilometers to the northeast. This station measures O_3, NO_X/NO_2, PM_{10} and $PM_{2.5}$. This site is the most representative for these pollutants.

The Santa Barbara – UCSB station is located 62 kilometers to the northwest of the project site. This is the closest station to the project site that monitors SOx, and was selected as having the most representative background value for this pollutant.

The Santa Barbara – Canyon Perdido station is located 47 kilometers to the northwest of the project site. This is the closest station to the project site that monitors CO, and was selected as having the most representative background value for this pollutant.

Table 5-5 below describes the maximum background concentrations, from the most recent available 3 year period of data collection, for which there are NAAQS and CAAQS that may be affected by the project's emissions.

Table 5-5 AAQS and Background Concentrations

Pollutant	Averaging Time	AAQS (µg/m^3)		Background Concentration (µg/m^3)[6]
		California	National (Primary)	
Respirable Particulate Matter (PM_{10})	24 Hour	50	150	59
	Annual Arithmetic Mean	20	--	24
Fine Particulate Matter ($PM_{2.5}$)	24 Hour[1]	--	35	21
	Annual Arithmetic Mean	12	15	9
Carbon Monoxide (CO)	1 Hour	23,000	40,000	4,580
	8 Hour	10,000	10,000	2,176
Nitrogen Dioxide (NO_2)	1 Hour Max	339	---	169
	1 Hour 98th Percentile[2]	---	188	70
	Annual Arithmetic Mean	57	100	14
Sulfur Dioxide (SO_2)[4]	1 Hour Max	655	---	13
	1 Hour 99th Percentile[3]	---	196	11
	3 Hour[5]	---	1,300	11
	24 Hour	105	365	5
	Annual Arithmetic Mean	--	79	3

[1] The $PM_{2.5}$ 24-hr value is the 98th percentile averaged over three years.
[2] The 1-hr value as the 98th percentile averaged over three years.
[3] The 1-hr value as the 99th percentile averaged over three years.
[4] The SO_2 annual standard is replaced by the more stringent SO_2 1-hour standard.
[5] No primary standard exist for SO_2 3-hour standard. Value used is for the secondary standard.
[6] Background reported as the maximum design value for the most recent 3-year period for which information is available (2012-2014).

5.2.3 Land Characteristics

Land characteristics are used in the AERMOD modeling system in three ways:

- via elevation within AERMOD to assess plume interaction with the ground;
- via a choice of rural versus urban algorithm within AERMOD; and
- via specific values of AERMET parameters that affect turbulence and dispersion. This aspect will be discussed in more detail in Section 5.2.4, Meteorological Inputs.

5.2.3.1 Elevation

Terrain elevations from United States Geological Survey (USGS) National Elevation Dataset (NED) data were used at a horizontal resolution of 30 meters, for receptor heights in AERMOD, which uses them to assess plume distance

from the ground for each receptor. All coordinates were referenced to UTM North American Datum 1983 (NAD83). The AERMOD, receptor elevations were interpolated among the NED nodes according to standard AERMAP procedure.

Table 5-6. Unit Location and Elevation Summary

Unit Description	Location			Elevation (m)
	UTM Zone	UTMN (m)	UTME (m)	
Natural Gas Turbine	11	3787499	292538	4.41
Diesel Emergency Engine	11	3787495	292540	4.42

5.2.3.2 Urban/Rural Classification

The classification of a site as urban or rural can be based on the Auer method specified in the EPA document Guideline on Air Quality Models (40 CFR Part 51, Appendix W). From the Auer's method, areas typically defined as Rural include:

- Residences with grass lawns and trees
- Large estates
- Metropolitan parks and golf courses
- Agricultural areas
- Undeveloped land
- Water surfaces

Auer defines an area as urban if it has less than 35% vegetation coverage or the area falls into one of the following use types:

Table 5-7. Land Use in Urban Classifications

Type	Use and Structures	Vegetation
I1	Heavy industrial	Less than 5%
I2	Light/moderate industrial	Less than 5%
C1	Commercial	Less than 15%
R2	Dense single / multi-family	Less than 30%
R3	Multi-family, two-story	Less than 35%

To determine if an area should be classified as urban or rural, evaluate land use within a 3 km radius from the center of the emissions source. If land use types I1, I2, C1, R2, and R3 account for 50 % or more of the area within 3 km, then the area is classified as urban, otherwise the area is classified as Rural. For this project, it was determined that the source's land use classification is rural.

5.2.4 Meteorological Inputs

5.2.4.1 Surface Data

AERMOD requires representative meteorological data in order to accurately simulate air quality impacts. In order to select a meteorological site, the VCAPCD did a qualitative comparison of the following factors from EPA's *Meteorological Monitoring Guidance for Regulatory Modeling Applications* (Document EPA-454/R-99-005) recommended for consideration for siting:

- Proximity.
- Height of measurement.
- Aspects of the site's surface that affect turbulence and dispersion.

Table 5-8 provides the characteristics of the meteorological sites that are in close proximity to the project area, the type of data collected at each site, the met data processing parameters, and identifies the site selected.

Table 5-8. Surface Met Sites Near the Project Site

Site Criteria	Surface Met Sites			
	Oxnard Airport	**Point Mugu NAS**	**Camarillo Airport**	**Santa Barbara Municipal Airport**
Distance from Project (km)	4	16	15	60
Elevation	11	4	24	3
Direction from Project	E	SE	E	NW
Urban/Rural	Rural	Rural	Rural	Rural
Land Use	Ag/ Residential	Undeveloped Mixed	Ag/ Mixed	Mixed
Met Type	Station	Station	Station	Station
Station WBAN ID	93110	93111	23136	23190
Data Type	NCDC	NCDC	NCDC	NCDC
Years Available	2010-2014	2010-2014	2010-2014	2010-2014
U* Adjustment Applied	Yes	---	---	---
Site Selected	**X**			

[1]Met data was processed per the VCAPCD's meteorological data processing guidance (http://www.valleyair.org/busind/pto/Tox_Resources/AirQualityMonitoring.htm#modeling_guidance). Lakes' Land Cover Data Tool was used to update National Land Cover Data (NLCD) used by AERSURFACE.

The VCAPCD believes that the chosen surface meteorological data is the most representative for the proposed project analysis for the following reasons:

- The project site and the meteorological site are in close proximity to each other.
- The land use and the location with respect to near-field terrain features are similar between both the selected surface meteorological site and the project site.

- Both locations are at approximately the same elevation.
- There are no significant terrain features separating the surface meteorological site from the project site that would cause significant differences in wind or temperature conditions between these respective areas.

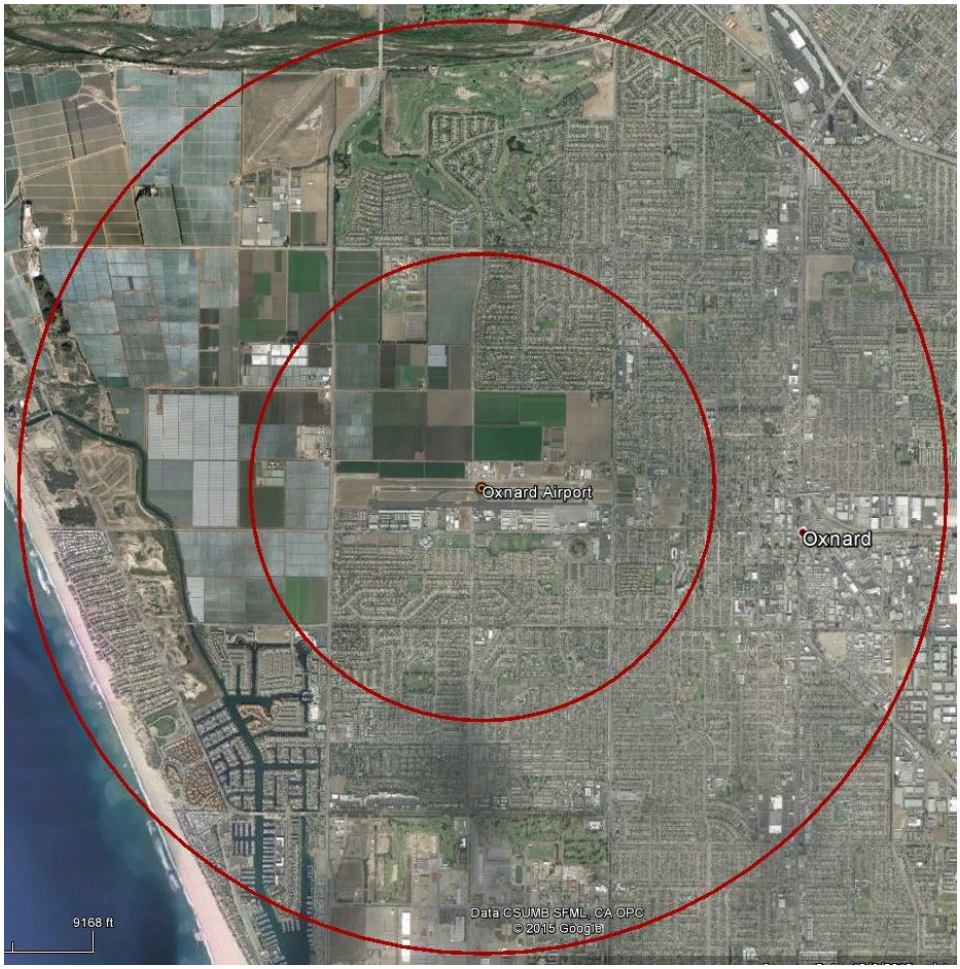

Figure 5-1 Oxnard Airport Met Site

5.2.4.1.1 Adjusted U Option*

The adjusted U* option in AERMET was recently proposed for approval by EPA as discussed below. The adjusted U* option in AERMET is focused on improving model performance during periods of stable/low-wind conditions. For the Puente Power Project air dispersion modeling, the District used the adjusted U* option based upon its review of following information:

- Information provided by EPA in the addendum of the *User's Guide for the AMS/EPA Regulatory Model – AERMOD* (EPA-454/B-03-001, September 2004) provided with AERMOD version 15181 indicates that model performance is improved when using the adjusted U* option for a variety of sources and conditions.
- Discussion with EPA during the modeling updates for AERMOD version 15181.
- Discussion with other regulatory agencies involved with dispersion modeling.
- In an EPA presentation given during the 11th Modeling Conference titled *Proposed Updates to AERMOD Modeling System,* EPA stated that they have proposed in a Notice of Proposed Rule Making (NPRM) that the ADJ_U* option be listed in Appendix W of 40 CFR Part 51 as a regulatory option for AERMOD and AERMET.
- EPA has issued several recent concurrence memoranda for the use of the Adjusted U* option in projects subject to their review. On April 29, 2016 they approved its use for the Schiller Station energy generating facility. This project involved a tall stack located near complex terrain, where high modeled concentrations are likely to occur under low wind, stable conditions.

The EPA has not yet finalized its approval of the adjusted U* option. Public comment on the Puente Power Project questioned the use of the adjusted U* option as it had not yet received final approval from EPA. Rather than seek site-specific approval from EPA or provide additional justification for the use of the adjusted U* option, the District has modeled the Puente Power project both with, and without, the adjusted U* option.

5.2.4.2 Upper Air Data

The Point Mugu NAS upper air met site is closest to the project site, but data completeness was not acceptable. Therefore, the VCAPCD selected upper air data from Vandenberg Air Force Base as the most representative upper air site available that had acceptable data completeness.

Table 5-9. Upper Air Met Sites Near the Project Site

Site Criteria	Vandenberg AFB	Point Mugu NAS
Distance from Project (km)	135	16
Direction from Project	NW	SE
Station WBAN ID	93214	93111
Years Available	2010-2014	2010-2014
Site Selected	**X**	

5.2.5 Receptor Grid

Receptors in the model are geographic locations at which the model estimates concentrations. Receptors were placed such that they have good area coverage and so that the maximum model concentrations can be found. At greater distances from the emissions source, spacing between receptors may be greater since concentrations vary less with increasing distance. The spatial extent of the receptors is limited by the applicable range of the model (roughly 50 km for AERMOD), and possibly by knowledge of the distance at which impacts fall to negligible levels. Receptors need be placed only in ambient air, that is, locations to which the public has access, and that are not inside the project boundary.

The VCAPCD used a Cartesian coordinate receptor grid to provide adequate spatial coverage surrounding the project area, to identify the extent of significant impacts, and to identify the maximum impact location. In the analyses, the VCAPCD used a grid with 25 meter spacing telescoping from the facility fence line to 250 meter spacing out to a distance of 20 km.

After a preliminary modeling run was completed, subgrids of varying sizes, with 25 meter spacing were placed at the points of maximum impact for each averaging period in order refine their impact values and locations.

5.2.6 Source Parameters

Screening modeling was performed to select worst-case CTG operating modes for each pollutant and averaging period. The modeling used emissions data based on an ISO temperature (59°F), average summer temperature (78°F), maximum summer temperature (82°F), and minimum temperature (39°F), and at nominal minimum and maximum CTG operating load points of 30 percent and 100 percent (percent loads based on gross MW output levels).

Table 5-10. Turbine Stack Parameter Screening Scenarios

Scenario	Ambient Temp. (ºF)	Stack Exit Vel. (m/s)	Emissions (lbs/hr)			
			NOx	CO	PM_{10}/ $PM_{2.5}$	SO_x
Winter/Maximum	38.9	47.18	23.11	22.51	10.10	5.41
Winter/Minimum	38.9	25.69	9.67	9.42	10.10	2.27
ISO/Maximum	59.0	47.95	22.90	22.31	10.10	5.37
ISO/Minimum	59.0	25.60	9.47	9.22	10.10	2.23
Summer Avg. Temp./Maximum w/ Cooling	77.8	47.79	22.51	21.93	10.10	5.29
Summer Avg. Temp./Maximum w/o Cooling	77.8	46.57	21.71	21.15	10.10	5.09
Summer Avg. Temp./Minimum	77.8	26.43	9.79	9.54	10.10	2.30
Summer High Temp./Maximum w/ Cooling	82.0	48.01	22.64	22.06	10.10	5.31
Summer High Temp./Maximum w/o Cooling	82.0	46.57	21.40	20.85	10.10	5.02
Summer High Temp./Minimum	82.0	26.66	9.87	9.61	10.10	2.32

Modeling was performed to obtain maximum 1-hour, 3-hour, 8-hour, 24-hour, and annual average concentrations of NO_x, CO, SO_x, and $PM_{10}/PM_{2.5}$. After evaluating modeled concentrations of each pollutant for each year in the five-year meteorological data set, it was determined that the "Winter/Maximum" parameters produced the highest impacts for NO_x, CO and SO_x, and the "ISO/Minimum" parameters produced the highest impacts for $PM_{10}/PM_{2.5}$. Therefore, further refined modeling was performed using the source parameters in the tables below to conservatively estimate the project's impacts.

Table 5-11. Point Source Parameters

Unit Description	Release Height (m)	Temp. (°K)	Exit Velocity (m/sec)	Stack Diameter (m)
Natural Gas Turbine - Winter/Maximum[1] - ISO Minimum[2]	 57.3 57.3	 755 755	 47.2 25.6	 6.706 6.706
Diesel Emergency Engine	21.3	957	82.4	0.152

[1]Winter/Maximum parameters selected as producing the highest impacts for NO_x, CO and SO_x

[2]ISO/Minimum parameters selected as producing the highest impacts for $PM_{10}/PM_{2.5}$.

5.2.6.1 Good Engineering Practice (GEP) Analysis

The VCAPCD performed a Good Engineering Practice (GEP) stack height analysis, to ensure that:

- downwash is properly considered in the modeling, and

- stack heights used as inputs to the modeling are no greater than GEP height, so as to disallow artificial dispersion from the use of overly tall stacks.

The GEP analysis was performed with EPA's BPIP Prime (Building Profile Input Program) software, which uses building dimensions and stack heights as inputs.

There were not any stacks present that exceeded GEP stack height of 65 meters. Therefore, actual stack heights were used to model emissions.

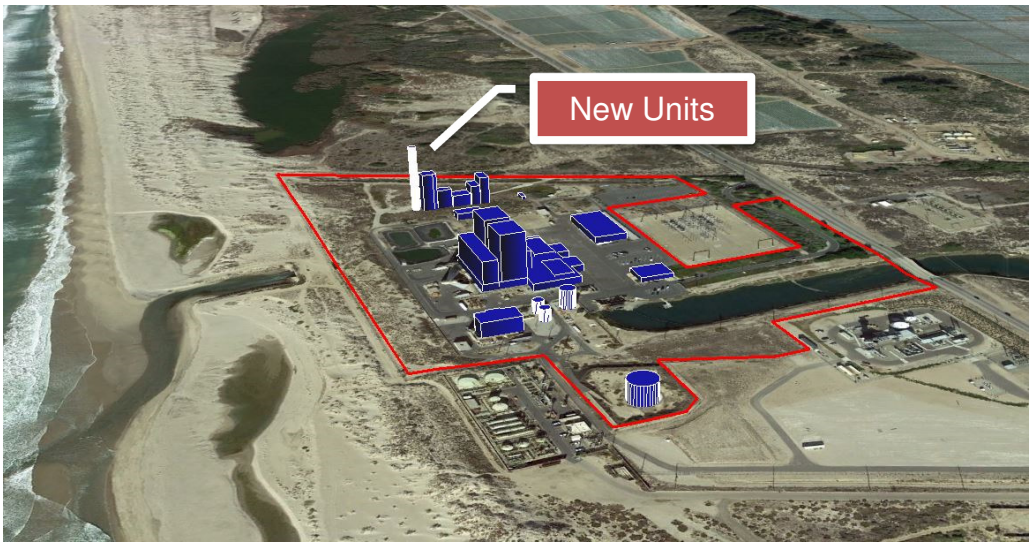

Figure 5-2. Onsite Structures (Blue Objects)

5.2.7 Level 1 AAQA

Assessment begins with the Level 1 approach, and only proceeds to the next level if necessary. In a Level 1 AAQA analysis, for each averaging period, the maximum modeled concentration for each source and receptor combination is summed to produce a worst-case concentration. The sum of the maximum modeled concentration and maximum monitor value is compared to the national and state AAQS to determine whether or not an exceedance would be expected to occur. If an exceedance does occur, the maximum modeled concentrations are compared to their SILs to determine whether they exceed their *de minimus* value. If emissions of a pollutant are expected to cause an exceedance of both the standard and SIL, a more refined approach is required.

5.2.7.1 Level 1 NO_2 Modeling

While the new 1-hour NO_2 NAAQS is defined relative to ambient concentrations of NO_2, the majority of NO_x emissions from stationary sources are in the form of nitric oxide (NO) rather than NO_2. Appendix W notes that the impact of an individual source on ambient NO_2 depends in part "on the chemical environment into which the source's plume is to be emitted" (see Appendix W, Section 5.1.j). Because of the role NO_x chemistry plays in determining ambient impact levels of NO_2 based on modeled NO_x emissions, Section 5.2.4 of Appendix W recommends a three-tiered screening approach for NO_2 modeling. Later guidance documents issued by EPA expand on this approach. In a Level 1 AAQA it is assumed that there is a full conversion of NO to NO_2. A summary of the Level 1 AAQA results for turbine commissioning and startup/shutdown/normal operation of the turbine plus operation of the emergency engine are provided in the following tables:

Table 5-12 Level 1 AAQA Results: Turbine Commissioning (Using Adjusted U* Option)

AAQS Pollutant & Averaging Time[1]	Modeled Impacts (µg/m³)	Back-ground (µg/m³)[3]	Total (µg/m³)	AAQS (µg/m³)		Significant Impact Level (SIL, µg/m³)	Project Impact Significant? [4]	
				National	State		AAQS	SIL
CO, 1-hour	209.8	4,582	4,792	23,000	40,000	2000	No	No
CO, 8-hour	54.0	1,265	1,319	10,000	10,000	500	No	No
NO_2, 1-hour (CAAQS)	26.2	107	133	---	339	7.5	No	Yes
NO_2, 1-hour (NAAQS)	26.2	68	94	188	---	7.5	No	Yes
SO_2, 1-hour (CAAQS)	0.6	11	12	---	655	7.8	No	No
SO_2, 1-hour(NAAQS)	0.6	8	9	196	---	7.8	No	No
SO_2, 3-hour	0.3	11	11	1,300	---	25	No	No
SO_2, 24-hour	0.1	5	5	365	105	5	No	No
PM_{10}, 24-hour	0.1	57	57	150	50	5	Yes	No
$PM_{2.5}$, 24-hour	0.1	18	18	35	---	---[2]	No	---

[1]Per applicant, the emergency engine will not operate during turbine commissioning. Only the new turbine was included in the evaluation.
[2]On January 22, 2013, the United States Court of Appeals for the District of Columbia Circuit (Court) granted a request from the Environmental Protection Agency (EPA) to vacate and remand to the EPA the portions of two Prevention of Significant Deterioration (PSD) $PM_{2.5}$ rules (40 CFR 51.166 and 40 CFR 52.21) addressing the Significant Impact Levels (SILs) for $PM_{2.5}$ so that the EPA could voluntarily correct an error in these provisions.
[3]Background reported as the maximum design value for the most recent 3-year period for which information is available (2012-2014).
[4]If the project is expected to cause an exceedance of both the AAQS and SIL for any of the pollutant/averaging time categories, a more refined assessment would be required for the project as is explained in Section 5.2.7. As shown above, no impacts are above both the AAQS and the SIL, therefore no further analysis is needed.

Table 5-13 Level 1 AAQA Results: Turbine Commissioning (Not Using Adjusted-U* Option)

AAQS Pollutant & Averaging Time[1]	Modeled Impacts (µg/m^3)	Back-ground (µg/m^3)[3]	Total (µg/m^3)	AAQS (µg/m^3)		Significant Impact Level (SIL, µg/m^3)	Project Impact Significant? [4]	
				National	State		AAQS	SIL
CO, 1-hour	429.2	4,582	5,011	23,000	40,000	2000	No	No
CO, 8-hour	115.3	1,265	1,380	10,000	10,000	500	No	No
NO_2, 1-hour (CAAQS)	53.6	107	161	---	339	7.5	No	Yes
NO_2, 1-hour (NAAQS)	53.6	68	122	188	---	7.5	No	Yes
SO_2, 1-hour (CAAQS)	1.2	11	13	---	655	7.8	No	No
SO_2, 1-hour(NAAQS)	1.2	8	9	196	---	7.8	No	No
SO_2, 3-hour	0.7	11	12	1,300	---	25	No	No
SO_2, 24-hour	0.1	5	5	365	105	5	No	No
PM_{10}, 24-hour	0.2	57	57	150	50	5	Yes	No
$PM_{2.5}$, 24-hour	0.2	18	18	35	---	---[2]	No	---

[1]Per applicant, the emergency engine will not operate during turbine commissioning. Only the new turbine was included in the evaluation.
[2]On January 22, 2013, the United States Court of Appeals for the District of Columbia Circuit (Court) granted a request from the Environmental Protection Agency (EPA) to vacate and remand to the EPA the portions of two Prevention of Significant Deterioration (PSD) $PM_{2.5}$ rules (40 CFR 51.166 and 40 CFR 52.21) addressing the Significant Impact Levels (SILs) for $PM_{2.5}$ so that the EPA could voluntarily correct an error in these provisions.
[3]Background reported as the maximum design value for the most recent 3-year period for which information is available (2012-2014).
[4]If the project is expected to cause an exceedance of both the AAQS and SIL for any of the pollutant/averaging time categories, a more refined assessment would be required for the project as is explained in Section 5.2.7. As shown above, no impacts are above both the AAQS and the SIL, therefore no further analysis is needed.

As noted in the preceding tables (Table 5-12 and Table 5-13), emissions of CO, NO_2, SO_2 and $PM_{2.5}$ during commissioning are not expected to cause an exceedance of any State or Federal ambient air quality standards. The 24-hour PM_{10} background concentration in Ventura County exceeds the State ambient air quality standard. However, the 24-hour PM_{10} emissions during commissioning are not expected to exceed the Federal SIL. Therefore, the project is not expected to contribute to an exceedance of the 24-hour PM_{10} State or Federal standards.

Table 5-14 Level 1 AAQA Results: Turbine Startup/Shutdown/Normal Operations Plus Operation of the Emergency Engine (Using Adjusted U* Option)

AAQS Pollutant & Averaging Time	Modeled Impacts ($\mu g/m^3$)	Back-ground ($\mu g/m^3$)[2]	Total ($\mu g/m^3$)	AAQS ($\mu g/m^3$)		Significant Impact Level (SIL, $\mu g/m^3$)	Project Impact Significant? [3]	
				National	State		AAQS	SIL
CO, 1-hour	207.2	4,582	4,789	23,000	40,000	2000	No	No
CO, 8-hour	80.4	1,265	1,345	10,000	10,000	500	No	No
NO_2, 1-hour (CAAQS)	44.5	107	152	---	339	7.5	No	Yes
NO_2, 1-hour (NAAQS)	44.5	68	113	188	---	7.5	No	Yes
NO_2, annual (CAAQS)	0.0	13	13	100	57	1	No	No
SO_2, 1-hour (CAAQS)	0.7	11	12	---	655	7.8	No	No
SO_2, 1-hour (NAAQS)	0.7	8	9	196	---	7.8	No	No
SO_2, 3-hour	0.5	11	12	1,300	---	25	No	No
SO_2, 24-hour	0.1	5	5	365	105	5	No	No
SO_2, annual	0.0	3	3	79	--	1	No	No
PM_{10}, 24-hour	0.4	57	57	150	50	5	Yes	No
PM_{10}, annual	0.0	25	25	--	20	1	Yes	No
$PM_{2.5}$, 24-hour	0.4	18	18	35	---	---[1]	No	No
$PM_{2.5}$, annual	0.0	9	9	15	12	---[1]	No	No

[1]On January 22, 2013, the United States Court of Appeals for the District of Columbia Circuit (Court) granted a request from the Environmental Protection Agency (EPA) to vacate and remand to the EPA the portions of two Prevention of Significant Deterioration (PSD) $PM_{2.5}$ rules (40 CFR 51.166 and 40 CFR 52.21) addressing the Significant Impact Levels (SILs) for $PM_{2.5}$ so that the EPA could voluntarily correct an error in these provisions.

[2]Background reported as the maximum design value for the most recent 3-year period for which information is available (2012-2014).

[3]If the project is expected to cause an exceedance of both the AAQS and SIL for any of the pollutant/averaging time categories, a more refined assessment would be required for the project as is explained in Section 5.2.7. As shown above, no impacts are above both the AAQS and the SIL, therefore no further analysis is needed.

Table 5-15 Level 1 AAQA Results: Turbine Startup/Shutdown/Normal Operations Plus Operation of the Emergency Engine (Not Using Adjusted-U* Option)

AAQS Pollutant & Averaging Time	Modeled Impacts ($\mu g/m^3$)	Back-ground ($\mu g/m^3$)[2]	Total ($\mu g/m^3$)	AAQS ($\mu g/m^3$)		Significant Impact Level (SIL, $\mu g/m^3$)	Project Impact Significant? [3]	
				National	State		AAQS	SIL
CO, 1-hour	412.8	4,582	4,995	23,000	40,000	2000	No	No
CO, 8-hour	86.3	1,265	1,431	10,000	10,000	500	No	No
NO_2, 1-hour (CAAQS)	88.3	107	195	---	339	7.5	No	Yes
NO_2, 1-hour (NAAQS)	88.3	68	156	188	---	7.5	No	Yes
NO_2, annual (CAAQS)	0.0	13	13	100	57	1	No	No
SO_2, 1-hour (CAAQS)	0.7	11	12	---	655	7.8	No	No
SO_2, 1-hour (NAAQS)	0.7	8	9	196	---	7.8	No	No
SO_2, 3-hour	0.5	11	12	1,300	---	25	No	No
SO_2, 24-hour	0.1	5	5	365	105	5	No	No
SO_2, annual	0.0	3	3	79	--	1	No	No
PM_{10}, 24-hour	0.4	57	57	150	50	5	Yes	No
PM_{10}, annual	0.0	25	25	--	20	1	Yes	No
$PM_{2.5}$, 24-hour	0.4	18	18	35	---	---[1]	No	No
$PM_{2.5}$, annual	0.0	9	9	15	12	---[1]	No	No

[1]On January 22, 2013, the United States Court of Appeals for the District of Columbia Circuit (Court) granted a request from the Environmental Protection Agency (EPA) to vacate and remand to the EPA the portions of two Prevention of Significant Deterioration (PSD) $PM_{2.5}$ rules (40 CFR 51.166 and 40 CFR 52.21) addressing the Significant Impact Levels (SILs) for $PM_{2.5}$ so that the EPA could voluntarily correct an error in these provisions.
[2]Background reported as the maximum design value for the most recent 3-year period for which information is available (2012-2014).
[3]If the project is expected to cause an exceedance of both the AAQS and SIL for any of the pollutant/averaging time categories, a more refined assessment would be required for the project as is explained in Section 5.2.7. As shown above, no impacts are above both the AAQS and the SIL, therefore no further analysis is needed.

As noted in the preceding tables (Table 5-14 and Table 5-15), emissions of CO, NO_2, SO_2, and $PM_{2.5}$ during normal operations are not expected to cause an exceedance of any State or Federal ambient air quality standard. The 24-hour PM_{10} background concentration in Ventura County exceeds the State ambient air quality standard, and the annual PM_{10} background concentration in Ventura County exceeds the State ambient air quality standard. However, the 24-hour and annual PM_{10} emissions during startup/shutdown/normal operations are not expected to exceed the Federal SILs. Therefore, the project is not expected to contribute to an exceedance of the 24-hour or annual PM_{10} State or Federal standards.

5.2.8 Fumigation Modeling

Fumigation occurs when a plume that was originally emitted into a stable layer is mixed rapidly to ground-level when unstable air below the plume reaches plume

level. Fumigation can cause very high ground-level concentrations. Two types of fumigation were analyzed for this project:

1. **Inversion breakup fumigation**. Inversion breakup fumigation occurs under low-wind conditions when a rising morning mixing height caps a stack and "fumigates" the air below.
2. **Shoreline fumigation**. Shoreline fumigation is a turbulent dispersion process where a plume, released from a tall stack within the stable (or neutral) onshore breeze, enters a growing thermal internal boundary layer that forms over land. The plume is subsequently mixed to the ground by the convective turbulence within the thermal internal boundary layer.

Currently, AERSCREEN is the only regulatory model approved by EPA for shoreline fumigation and inversion breakup modeling. AERSCREEN calculates fumigation due to inversion break-up and shoreline fumigation for point sources with release heights (above ground level) of 10 m or more. The fumigation equations for AERSCREEN are taken from SCREEN3. Surface files were generated with the following parameters using AERSURFACE and a geoTIFF file from the 2011 National Land Cover Database (NLCD2011):

- Center latitude: 34.207826
- Center longitude: -119.251759
- Datum: NAD83
- Study radius (km) for surface roughness: 1.0
- Airport: N
- Continuous snow cover: N
- Surface moisture: average
- Arid region: Y
- Month/season assignments: user-specified
- Late autumn after frost and harvest, or winter with no snow: 0
- Winter with continuous snow on ground: 0
- Transitional spring (partial green coverage, short annuals): 1, 2, 3, 4, 5, 6, 11, 12
- Midsummer with lush vegetation: 7, 8, 9, 10
- Autumn with unharvested cropland: 0
- Freq sect: monthly 3
    - Sector 1: 100-160
    - Sector 2: 160-330
    - Sector 3: 330-100

Meteorological data for AERSCREEN was then generated by MAKEMET using these surface files. Fumigation analysis was conducted for each of the screening scenarios previously presented in Table 5-10. Ambient air quality analysis results are presented in the table below.

Table 5-16 Level 1 AAQA Results: Fumigation

AAQS Pollutant & Averaging Time	Modeled Impacts ($\mu g/m^3$)[1]	Back-ground ($\mu g/m^3$)[2]	Total ($\mu g/m^3$)	AAQS ($\mu g/m^3$)		Significant Impact Level (SIL, $\mu g/m^3$)	Project Impact Significant? [3]	
				National	State		AAQS	SIL
CO, 1-hour	181.6	4,582	4,764	23,000	40,000	2000	No	No
CO, 8-hour	42.1	1,265	1,307	10,000	10,000	500	No	No
NO_2, 1-hour (CAAQS)	63.1	107	170	---	339	7.5	No	Yes
NO_2, 1-hour (NAAQS)	63.1	68	131	188	---	7.5	No	Yes
SO_2, 1-hour (CAAQS)	1.3	11	12	---	655	7.8	No	No
SO_2, 1-hour (NAAQS)	1.3	8	9	196	---	7.8	No	No
SO_2, 3-hour	0.8	11	12	1,300	---	25	No	No
SO_2, 24-hour	0.2	5	5	365	105	5	No	No
PM_{10}, 24-hour	0.4	57	57	150	50	5	Yes	No
$PM_{2.5}$, 24-hour	0.4	18	18	35	---	---[1]	No	No

[1]Fumigation modeled impact reported as the higher of the shoreline fumigation or inversion breakup fumigation concentrations.
[2]Background reported as the maximum design value for the most recent 3-year period for which information is available (2012-2014).
[3]If the project is expected to cause an exceedance of both the AAQS and SIL for any of the pollutant/averaging time categories, a more refined assessment would be required for the project as is explained in Section 5.2.7. As shown above, no impacts are above both the AAQS and the SIL, therefore no further analysis is needed.

As noted in the table above, emissions of CO, NO_2, SO_2, and $PM_{2.5}$ under fumigation conditions are not expected to cause an exceedance of any State or Federal ambient air quality standard. The 24-hour PM_{10} background concentrations in Ventura County exceed the State ambient air quality standard. However, the 24-hour PM_{10} emissions under fumigation conditions are not expected to exceed the Federal SILs. Therefore, the project is not expected to contribute to an exceedance of the 24-hour or annual PM_{10} State or Federal standards.

6. Ventura County APCD Rule 51 – Nuisance Risk Management Review

The purpose of VCAPCD Rule 51 is to protect the health and safety of the public. This rule prohibits discharge of air contaminants which could cause injury, detriment, nuisance or annoyance to the public. VCAPCD requires that for an increase in emissions or a change in mode or time of operation associated with a proposed new source or modification, VCAPCD shall perform an analysis to determine the possible impact to the nearest resident or worksite. An assessment shall be performed on a unit by unit basis, project basis, and on a facility-wide basis. If a preliminary prioritization analysis demonstrates that:

- A unit's prioritization score is less than the VCAPCD's significance threshold and;
- The project's prioritization score is less than the VCAPCD's significance threshold and;
- The facility's total prioritization score is less than the VCAPCD's significance threshold

Then, generally no further analysis is required.

The significant prioritization score threshold is defined as being equal to or greater than 1.0. If a preliminary analysis demonstrates that either the unit(s) or the project's or the facility's total prioritization score is greater than the threshold, a screening or a refined assessment is required using VCAPCD approved models including but not limited to VCAPCD screening assessment tools, EPA's AERMOD, and CARB's HARP2 program. Required model inputs characterize the various emitting units, meteorology, and the land surface, and define a set of receptors (spatial locations at which to estimate concentrations, typically out to 2-5 km from the facility). Modeling should be performed in accordance with VCAPCD, OEHHA, and EPA's Guideline on Air Quality Modeling, in Appendix W to 40 CFR Part 51 (GAQM or Appendix W).

If a refined assessment is greater than one in a million but less than 10 in a million for carcinogenic impacts (cancer risk) and less than 1.0 for the acute and chronic Hazard Indices (non-carcinogenic) on a unit by unit basis, project basis and on a facility-wide basis the proposed application is considered less than significant. For projects that exceed a cancer risk of 10 in one million or an acute or chronic hazard index of 1.0, the applicant must develop and implement a Health Risk Reduction Plan as explained in Section 6.7.1 of this document.

Carcinogenic impacts greater than 10 in a million, or acute or chronic hazard indices greater than 1.0 are considered significant and may not be permitted.

6.1 Toxic Emissions

Toxic emissions for the proposed natural gas turbine were calculated using hourly and annual rates of natural gas combustion calculated by the permit engineer and emission factors provided by the applicant. Toxic emission factors for the turbine were proposed by the applicant and compiled from two sources:

- US EPA's AP-42 Table 3.1-3 (4/00). Since the emission factors presented in AP-42 are uncontrolled, a 50% control efficiency was applied to account for the presence of the oxidation catalyst.
- The California Toxic Emission Factor (CATEF) database. Information from this database was used to supplement the toxic emissions profile by adding pollutants not included in AP-42's profile.

The turbine emission factors proposed are similar to those used for the Pio Pico Energy Center in San Diego.

Toxic emissions for the proposed diesel emergency engine were calculated as the mass of diesel particulate matter (DPM), which is considered equal to its PM_{10} emissions.

Emissions unit process rates are summarized in the following table:

Table 6-1. Source Process Rates

Unit Description	Process Material	Process Units	Hourly Process Rate	Annual Process Rate
Natural Gas Turbine	Natural Gas	MMBtu	2,572	5,529,800
Diesel Emergency Engine	Diesel Particulate Matter	Hours of operation	1	200

Toxics emissions are summarized in the following table:

Table 6-2. Source Process Rates

Pollutant ID	Pollutant Name	Max. Hourly Emissions (lbs)[1]	Annual Emissions (lbs)[2]	Emission Factor Origin
Natural Gas Turbine				
7664417	Ammonia	1.75E+01	3.52E+04	Permit Limit
115071	Propylene	7.79E+00	4.82E+03	CATEF[3]
75070	Acetaldehyde	4.12E-01	2.55E+02	AP-42[4]
107028	Acrolein	6.61E-02	4.09E+01	AP-42
71432	Benzene	1.24E-01	7.65E+01	AP-42
106990	1,3-Butadiene	4.44E-03	2.74E+00	AP-42
100414	Ethylbenzene	3.30E-01	2.04E+02	AP-42
50000	Formaldehyde	9.27E+00	5.73E+03	CATEF[4]
110543	Hexane	2.62E+00	1.62E+03	CATEF
91203	Naphthalene	1.35E-02	8.35E+00	AP-42
---	Total PAH's (listed individually below)	6.63E-03	4.10E+00	---
83329	Acenaphthene	1.92E-04	1.18E-01	CATEF
208968	Acenaphthylene	1.48E-04	9.17E-02	CATEF
120127	Anthracene	3.42E-04	2.12E-01	CATEF
56553	Benzo(a)anthracene	2.29E-04	1.41E-01	CATEF
50328	Benzo(a)pyrene	1.40E-04	8.66E-02	CATEF
192972	Benzo(e)pyrene	5.50E-06	3.40E-03	CATEF
205992	Benzo(b)fluoranthrene	1.14E-04	7.07E-02	CATEF
207089	Benzo(k)fluoranthyene	1.11E-04	6.88E-02	CATEF
191242	Benzo(g,h,i)perlene	1.38E-04	8.54E-02	CATEF
218019	Chrysene	2.55E-04	1.58E-01	CATEF
53703	Dibenz(a,h)anthracene	2.37E-04	1.47E-01	CATEF
206440	Fluoranthene	4.37E-04	2.70E-01	CATEF
86737	Fluorene	5.87E-04	3.63E-01	CATEF
193395	Indeno(1,2,3-cd)pyrene	2.37E-04	1.47E-01	CATEF
85018	Phenanthrene	3.17E-03	1.96E+00	CATEF
129000	Pyrene	2.80E-04	1.73E-01	CATEF
75569	Propylene oxide	2.99E-01	1.85E+02	AP-42
108883	Toluene	1.35E+00	8.35E+02	AP-42
1330207	Xylene	6.59E-01	4.08E+02	AP-42
Diesel Emergency Engine				
9901	Diesel particulate matter	3.00E-02	6.00E+00	Engine's EPA Certification

[1]The maximum hourly emissions for the natural gas turbine represent a startup/shutdown scenario with a low catalyst control efficiency that results in an 8.01 time increase in the rate of toxic emissions. This rate of increase was calculated as the ratio of the worst case startup/shutdown hourly VOC emission rate to the normal operation hourly VOC emission rate.

[2]Annual emissions for the natural gas turbine represent 400 combined startup/shutdown hours and 1,750 normal operation hours.

[3]Toxic emission factors derived from the California Toxic Emission Factor (CATEF) database. The CATEF emission factors (mean values) were converted to from lb/mmcf to lb/mmBtu using the HHV of natural gas.

[4]Toxic emission factor derived from US EPA's AP-42 Table 3.1-3 (4/00). Since the emission factors presented in AP-42 are uncontrolled, a 50% control efficiency was applied to account for the presence of the oxidation catalyst.

The VCAPCD compared the turbine's hourly and annual toxic emissions calculated using the applicant's toxics profile to hourly and annual emissions calculated using the District's default profile for uncontrolled toxic emissions from natural gas-fired turbines (AP-42 Table 3.1-3 (4/00)). The District found that the proposed profile generated hourly and annual toxic emissions that resulted in cancer, chronic and acute risk values that were similar to those calculated from the default profile. Therefore, the District determined that the toxic emissions calculated using the applicant's proposed profile represented a conservative estimate and were acceptable for this project.

6.2 Prioritization

The prioritization methodology used by the VCAPCD was developed by the *Facility Prioritization Guidelines of the AB 2588 Risk Assessment Committee* of the California Air Pollution Control Officers Association (CAPCOA) in 1990. In December of 2014, CAPCOA changed the cancer normalization factor for the emissions and potency method from 1,700 to 7,700 to account for changes made by OEHHA to their risk assessment methodology.

The prioritization methodology has two basic methods that can be used to determine a source's potential impact on nearby receptors. The first is the "Emissions and Potency" method which relies on the quantity of a specific pollutant and the pollutant's specific potency (tendency to cause harm) in conjunction with the distance a source is from a receptor to calculate a score or potential for exposure.

The second method, "Dispersion Adjustment", is similar to the first method except that the stack height is also included as a parameter in the calculations to derive the prioritization score. Both prioritization methodologies look at three aspects of exposure 1) Acute short term non-carcinogenic risk [1-24 hours], 2) Chronic long term non-carcinogenic risk [24 hours to 1 year], and 3) Carcinogenic risk over a 70 year period.

For the purpose of this assessment the word carcinogenic refers to those compounds that have been identified by the Office of Environmental Health hazard Assessment (OEHHA) as having the potential of cause cancer.

Since the applicant determined that a refined health risk assessment was required in their assessment, a prioritization was not performed.

6.3 Screening and Refined Assessment

If modeling is required after implementing a screening technique, two modeling options may be available.

- The first option is a screening model that uses conservative modeling assumptions to estimate impacts, or it may be a spreadsheet that was derived from a screening/refined model using conservative assumptions.
- The second option is to use a refined model which will require more resources and time. This is due to the facility and source specific information required to perform a given run.

The determination of which option is used will mainly be based on the following:

- Is there a screening method available for the scenario under review?
- Is the conservative screening method acceptable to the reviewing agency?
- Is the meteorological data used to develop the screening method acceptable?
- Are the source parameters used in the screening method acceptable?

The VCAPCD does not have a screening method available for the sources included in this project. Therefore, a refined assessment was conducted.

6.4 Refined Assessment

The impact of the project was assessed in accordance with VCAPCD, OEHHA, and CARB guidance. The modeling analyses included the maximum air quality impacts during commissioning, startup, shutdown and normal operations using maximum hourly emissions for the acute hazard index (HI), annual emissions for the chronic HI, and annual emissions for the cancer risk.

6.4.1 Model Selection

The VCAPCD requires that the following regulatory models be used to analyze health impacts in the project area:

Table 6-3. Summary of Preferred Models

Model Name	Model Purpose	Model Version
AERMOD	Air dispersion modeling	15181
AERMAP	Terrain processing	11103
AIRMET	Meteorological data processing	13350
HARP2	Analysis of health impacts	16088

6.4.2 Land Characteristics

Land characteristics are used in the AERMOD modeling system in three ways:

- via elevation within AERMOD to assess plume interaction with the ground;
- via a choice of rural versus urban algorithm within AERMOD; and

- via specific values of AERMET parameters that affect turbulence and dispersion. This aspect applies to the meteorological inputs discussed in Section 6.4.3.

6.4.2.1 Elevation

Terrain elevations from United States Geological Survey (USGS) National Elevation Dataset (NED) data were used at a horizontal resolution of 30 meters, for receptor heights in AERMOD, which uses them to assess plume distance from the ground for each receptor. All coordinates were referenced to UTM North American Datum 1983 (NAD83). The AERMOD, receptor elevations were interpolated among the NED nodes according to standard AERMAP procedure.

Table 6-4. Unit Location and Elevation Summary

Unit Description	Location			Elevation (m)
	UTM Zone	UTMN (m)	UTME (m)	
Natural Gas Turbine	11	3787499	292538	4.41
Diesel Emergency Engine	11	3787495	292540	4.42

6.4.2.2 Urban/Rural Classification

The classification of a site as urban or rural can be based on the Auer method specified in the EPA document Guideline on Air Quality Models (40 CFR Part 51, Appendix W). From the Auer's method, areas typically defined as Rural include:

- Residences with grass lawns and trees
- Large estates
- Metropolitan parks and golf courses
- Agricultural areas
- Undeveloped land
- Water surfaces

Auer defines an area as urban if it has less than 35% vegetation coverage or the area falls into one of the following use types:

Table 6-5. Land Use in Urban Classifications

Type	Use and Structures	Vegetation
I1	Heavy industrial	Less than 5%
I2	Light/moderate industrial	Less than 5%
C1	Commercial	Less than 15%
R2	Dense single / multi-family	Less than 30%
R3	Multi-family, two-story	Less than 35%

To determine if an area should be classified as urban or rural, evaluate land use within a 3 km radius from the center of the emissions source. If land use types I1, I2, C1, R2, and R3 account for 50 % or more of the area within the circle, then the area is classified as urban, otherwise the area is classified as Rural.

For this project, it was determined that the source's land use classification is rural.

6.4.3 Meteorological Inputs

6.4.3.1 Surface Data

AERMOD requires representative meteorological data in order to accurately simulate air quality impacts. In order to select a meteorological site, the VCAPCD did a qualitative comparison of the following factors from EPA's *Meteorological Monitoring Guidance for Regulatory Modeling Applications* (Document EPA-454/R-99-005) recommended for consideration for siting:

- Proximity.
- Height of measurement.
- Aspects of the site's surface that affect turbulence and dispersion.

Table 6-6 provides the characteristics of the meteorological sites that are in close proximity to the project area, the type of data collected at each site, the met data processing parameters, and identifies the site selected.

Table 6-6. Surface Met Sites Near the Project Site

Site Criteria	Surface Met Sites			
	Oxnard Airport	**Point Mugu NAS**	**Camarillo Airport**	**Santa Barbara Municipal Airport**
Distance from Project (km)	4	16	15	60
Elevation	11	4	24	3
Direction from Project	E	SE	E	NW
Urban/Rural	Rural	Rural	Rural	Rural
Land Use	Ag/ Residential	Undeveloped Mixed	Ag/ Mixed	Mixed
Met Type	Station	Station	Station	Station
Station ID	93110	93111	23136	23190
Data Type	NCDC	NCDC	NCDC	NCDC
Years Available	2009-2013	2009-2013	2009-2013	2009-2013
U* Adjustment Applied	Yes	---	---	---
Site Selected	**X**			

[1]Met data was processed per the SJVAPCD's meteorological data processing guidance (http://www.valleyair.org/busind/pto/Tox_Resources/AirQualityMonitoring.htm#modeling_guidance). Lakes' Land Cover Data Tool was used to update National Land Cover Data (NLCD) used by AERSURFACE.

The VCAPCD believes that the chosen surface meteorological data is the most representative for the proposed project analysis for the following reasons

- The project site and the meteorological site are in close proximity to each other.
- The land use and the location with respect to near-field terrain features are similar between both the selected surface meteorological site and the project site.
- Both locations are at approximately the same elevation.
- There are no significant terrain features separating the surface meteorological site from the project site that would cause significant differences in wind or temperature conditions between these respective areas.

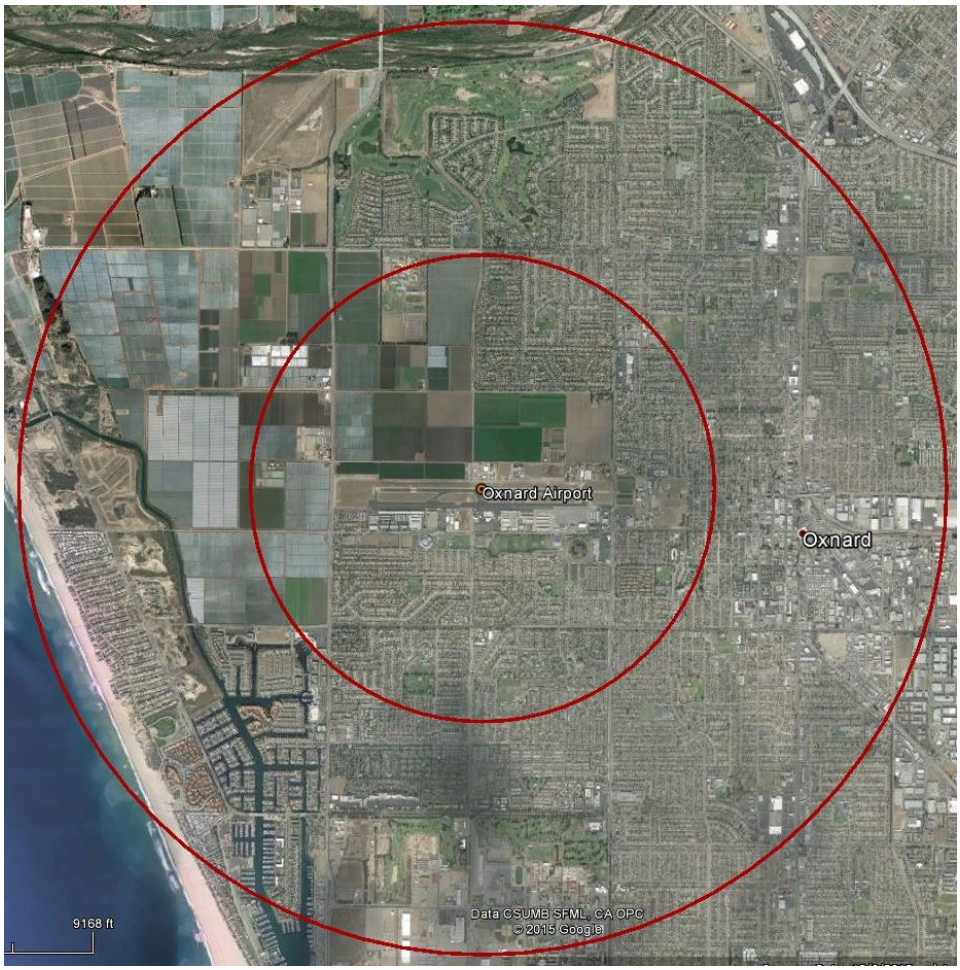

Figure 6-1 Oxnard Airport Met Site

6.4.3.1.1 Adjusted U Option*

The adjusted U* option in AERMET was recently proposed for approval by EPA as discussed below. The adjusted U* option in AERMET is focused on improving model performance during periods of stable/low-wind conditions. For the Puente Power Project air dispersion modeling, the District used the adjusted U* option based upon its review of following information:

- Information provided by EPA in the addendum of the *User's Guide for the AMS/EPA Regulatory Model – AERMOD* (EPA-454/B-03-001, September 2004) provided with AERMOD version 15181 indicates that model performance is improved when using the adjusted U* option for a variety of sources and conditions.
- Discussion with EPA during the modeling updates for AERMOD version 15181.

- Discussion with other regulatory agencies involved with dispersion modeling.
- In an EPA presentation given during the 11th Modeling Conference titled *Proposed Updates to AERMOD Modeling System,* EPA stated that they have proposed in a Notice of Proposed Rule Making (NPRM) that the ADJ_U* option be listed in Appendix W of 40 CFR Part 51 as a regulatory option for AERMOD and AERMET.
- EPA has issued several recent concurrence memoranda for the use of the Adjusted U* option in projects subject to their review. On April 29, 2016 they approved its use for the Schiller Station energy generating facility. This project involved a tall stack located near complex terrain, where high modeled concentrations are likely to occur under low wind, stable conditions.

The EPA has not yet finalized its approval of the adjusted U* option. Public comment on the Puente Power Project questioned the use of the adjusted U* option as it had not yet received final approval from EPA. Rather than seek site-specific approval from EPA or provide additional justification for the use of the adjusted U* option, the District has modeled the Puente Power project both with, and without, the adjusted U* option.

6.4.3.2 Upper Air Data

The Point Mugu NAS upper air met site is closest to the project site, but data completeness was not acceptable. Therefore, the VCAPCD selected upper air data from Vandenberg Air Force Base as the most representative upper air site available that had acceptable data completeness.

Table 6-7. Upper Air Met Sites Near the Project Site

Site Criteria	Vandenberg AFB	Point Mugu NAS
Distance from Project (km)	135	16
Direction from Project	NW	SE
Station WBAN ID	93214	93111
Years Available	2009-2013	2009-2013
Site Selected	**X**	

6.4.4 Sensitive Receptors

Sensitive receptors are defined as infants and children, the elderly, the chronically ill, and any other members of the general population who are more susceptible to the effects of exposure to environmental contaminants than the population at large. Additionally, the VCAPCD includes in the definition of sensitive receptors locations occupied by groups of individuals that may be more susceptible than the general population to health risks from a chemical exposure

and therefore include schools (public and private), day-care facilities, convalescent homes, parks, and hospitals.

The RMR approach treats all receptors as sensitive receptors. Long term health impacts (chronic and cancer) are evaluated for all sensitive receptors within the project area. In addition, short term health impacts (acute) are evaluated at all locations within the project area (beyond the facility fence line) at which an individual may be exposed for a period of one hour.

6.4.5 Source Parameters

Modeling was performed using the source parameters in the tables below to conservatively estimate the project's impacts.

Table 6-8. Point Source Parameters

Unit Description	Release Height (m)	Temp. (°K)	Exit Velocity (m/sec)	Stack Diameter (m)
Natural Gas Turbine	57.3	755	47.5	6.706
Diesel Emergency Engine	21.3	957	82.4	0.152

6.5 Risk Management Review (RMR)

Adverse health effects are expressed in terms of cancer or non-cancer health risks. Cancer risk is typically reported as "lifetime cancer risk," which is the estimated maximum increase in the risk of developing cancer caused by long-term exposure to a pollutant identified as being a carcinogen by the OEHHA. The calculation of cancer risk conservatively assumes an individual is exposed continuously to the maximum pollutant concentrations 24 hours per day for 70 years. Although such continuous lifetime exposure to maximum Toxic Air Contaminants (TAC) levels is highly unlikely, the goal of the approach is to produce a conservative worst-case estimate of potential cancer risk.

Non-cancer risk is typically reported as a Hazard Index (HI). The HI is calculated for each target organ as a fraction of the maximum acceptable exposure level or REL for an individual pollutant. The REL is generally the level at (or below) which no adverse health effects are expected. The HI's are calculated for both short-term (acute) and long-term (chronic) exposures to non-carcinogenic substances by adding the ratios of predicted concentrations to RELs for all pollutants.

Both cancer and non-cancer risk estimates produced by the RMR represent incremental risks (i.e., risks due to the modeled sources only) and do not include potential health risks posed by existing background concentrations. The HARP model performs all of the necessary calculations to estimate the potential lifetime

cancer risk, and the acute and chronic non-cancer HIs due to the project's TAC emissions. The following parameters were selected in the HARP model:

- Intake rate percentile
  - OEHHA derived method
- Exposure duration
  - Resident: 70 years
    - Fraction time at home adjustment: disabled
  - Worker: 25 years
- Site parameters
  - Inhalation pathway: enabled
  - Drinking water pathway: disabled
  - Fish water pathway: enabled (resident)
    - Surface area: 532,525 m^2
    - Volume: 1,772,649,000 kg
    - Volume changes per year: 1
    - Fraction fish consumed from contaminates source: 1
  - Beef/dairy (pasture) pathway: disabled
  - Home grown produce pathways: enabled (resident)
  - Pigs, chickens, and/or eggs pathways: disabled
  - Dermal pathway: enabled
  - Soil ingestion pathway: enabled
  - Mother's milk pathway: enabled (resident)
  - Deposition rate: 0.02 m/s

6.6 Risk Management Review Significance Thresholds

Project-related emissions are considered significant when the predicted increase in lifetime cancer risk exceeds 10 in 1 million (10×10^{-6}), and the non-carcinogenic acute and chronic hazard index exceeds a value of 1.0.

6.7 Risk Management Review Results

The locations of the maximally exposed receptors for each type of adverse health impact are presented in Table 6-9.

Table 6-9. RMR Project Level Maximally Exposed Receptors

Unit Description	Health Impact	Receptor Type	Receptor Location		
			UTM Zone	UTMN (m)	UTME (m)
Using Adjusted U* Option (Adj-U*)					
Natural Gas Turbine	Cancer	Resident[1]	11	3787509	296622
	Chronic	Worker	11	3787370	293874
	Acute	Grid	11	3800207	295714
Diesel Emergency Engine	Cancer	Resident	11	3787067	293443
	Chronic	Worker	11	3787350	293417
	Acute	--	---	---	---
Combined	Cancer	Resident	11	3787067	293443
	Chronic	Worker	11	3787370	293734
	Acute	Grid	11	3800207	295714
Not Using Adjusted U* Option					
Natural Gas Turbine	Cancer	Resident	11	3787509	296622
	Chronic	Worker	11	3787370	293874
	Acute	Grid	11	3799207	296464
Diesel Emergency Engine	Cancer	Resident	11	3787067	293443
	Chronic	Worker	11	3787350	293418
	Acute	--	11	--	--
Combined	Cancer	Resident	11	3787067	293443
	Chronic	Worker	11	3787370	293874
	Acute	Grid	11	3788207	296464

[1]Resident refers to the Maximally Exposed Individual Resident (MEIR).
[2]Worker refers to the Maximally Exposed Individual (Offsite) Worker (MEIW)

The estimated cancer risk, and acute and chronic non-cancer hazard indexes for the project are summarized in Table 6-10.

Table 6-10 RMR Results

Unit Description	Cancer Risk	Hazard Index	
		Chronic	Acute
Using Adjusted U* Option (Adj-U*)			
Natural Gas Turbine	3.81×10^{-8}	8.24×10^{-5}	2.08×10^{-2}
Diesel Emergency Engine	5.37×10^{-8}	1.66×10^{-5}	---
Project Total	8.48×10^{-8}	9.23×10^{-5}	2.08×10^{-2}
Not Using Adjusted U* Option			
Natural Gas Turbine	3.81×10^{-8}	8.24×10^{-5}	4.19×10^{-2}
Diesel Emergency Engine	4.22×10^{-8}	1.59×10^{-5}	--
Project Total	7.32×10^{-8}	9.12×10^{-5}	4.19×10^{-2}

The acute and chronic indices are below 0.5 and the cancer risk associated with the project is less than 1 in a million. In accordance with the attached VCAPCD policy regarding Air Toxic Review of Permit Applications (revised 7/10/02), the project is approved as proposed.

6.7.1 Health Risk Reduction Plan

Per the attached VCAPCD policy regarding Air Toxic Review of Permit Applications (revised 7/10/02), if the health risk assessment indicates that the carcinogenic risk is greater than 1 in a million, or that the acute or chronic hazard indices are greater than 1, District staff will work with the applicant to reduce the risk to an acceptable level. If after working with the applicant to reduce the risk, the health risk assessment still indicates that the additional carcinogenic risk is greater than 10 in a million, or with acute or chronic hazard indices greater than 1, permit conditions will be placed on the permit requiring the applicant to develop and implement a Health Risk Reduction Plan.

The acute and chronic indices are below 1.0 and the cancer risk factor associated with the each new emissions unit is less than 1.0 in a million. Therefore, a Health Risk Reduction Plan will not be required for this project.

6.7.2 Rule 51 Permit Conditions

To ensure that human health risks will not exceed VCAPCD allowable levels; the following permit conditions shall be included for:

<u>New Turbine - CTG</u>

- The CTG shall be fired exclusively on natural gas, consisting primarily of methane and ethane, with a sulfur content no greater than 0.75 grains of sulfur compounds (as S) per 100 dry scf of natural gas.
- The CTG shall be operated with an oxidation catalyst and a selective catalytic reduction (SCR) system.

<u>New Emergency Engine</u>

- The PM_{10} emissions rate shall not exceed the EPA Tier 4-Final Standard of 0.02 g/bhp-hr based on U.S. EPA certification.
- The exhaust stack shall vent vertically upward. The vertical exhaust flow shall not be impeded by a rain cap, roof overhang, or any other obstruction. A flapper type rain cap that is open while the engine is operating may be used.
- Only CARB certified diesel fuel containing not more than 0.0015% sulfur by weight shall be used.

7. Report Summary

7.1 Ventura County Rule 26 - New Source Review (NSR)

Ventura County Rule 26.2.C requires that an Ambient Air Quality Analysis (AAQA) be conducted for the purpose of determining whether a new or modified Stationary Source will cause or make worse a violation of an Air Quality Standard (AAQS). Therefore, the VCAPCD has performed an AAQA for this project.

As presented in Section 5 of this document, the proposed project will not cause or contribute significantly to a violation of the State or National Ambient Air Quality Standards (AAQS) for NO_x, CO, SO_x, PM_{10}, or $PM_{2.5}$.

7.2 Ventura County Rule 51 – Nuisance

Rule 51 prohibits discharge of air contaminants which could cause injury, detriment, nuisance or annoyance to the public. Public nuisance conditions are not expected as a result of this operation provided the equipment is well maintained. Therefore, compliance with this rule is expected.

California Health & Safety Code 41700 (Health Risk Assessment)

VCAPCD policy regarding Air Toxic Review of Permit Applications (revised 7/10/02) specifies that if the additional carcinogenic risk associated with new emission units subject to the application is less than 1 in a million, and that the acute and chronic hazard indices are less than 0.5, no further action is required. If the health risk assessment indicates that the additional carcinogenic risk is greater than 10 in a million, or acute or chronic hazard indices are greater than 1, then a health risk reduction plan will be required. Risk assessment results for this project are summarized in the table below.

Table 7-1 RMR Results

Unit Description	Cancer Risk	Hazard Index		Health Risk Reduction Plan Required?
		Chronic	Acute	
Using Adjusted U* Option (Adj-U*)				
Natural Gas Turbine	3.81×10^{-8}	8.24×10^{-5}	2.08×10^{-2}	No
Diesel Emergency Engine	5.37×10^{-8}	1.66×10^{-5}	---	No
Project Total	8.48×10^{-8}	9.23×10^{-5}	2.08×10^{-2}	No
Not Using Adjusted U* Option				
Natural Gas Turbine	3.81×10^{-8}	8.24×10^{-5}	4.19×10^{-2}	No
Diesel Emergency Engine	4.22×10^{-8}	1.59×10^{-5}	--	No
Project Total	7.32×10^{-8}	9.12×10^{-5}	4.19×10^{-2}	No

The acute and chronic indices are below 0.5 and the cancer risk factor associated with the project is less than 1.0 in a million. In accordance with VCAPCD's Air Toxics Review of Permit Application policy, the project is approved without the need for submittal of a Health Risk Reduction Plan.

These conclusions are based on the data provided by the applicant and the project engineer. Therefore, this analysis is valid only as long as the proposed data and parameters do not change.

VENTURA COUNTY AIR POLLUTION CONTROL DISTRICT

POLICIES AND PROCEDURES

AIR TOXICS REVIEW OF PERMIT APPLICATIONS

Issued: February 12, 1992
Revised: July 10, 2002

Policy Statement

Each application for an Authority to Construct, or an application for a Permit to Operate when no Authority to Construct was issued, will be reviewed by the Air Toxics Section to determine if a health risk assessment needs to be prepared for the application.

If a health risk assessment is needed, the health risk assessment shall be prepared for the air toxic emissions from the emissions units that are the subject of the application. The health risk assessment shall be prepared in accordance with the current guidelines used for the Air Toxics Hot Spots program.

If the health risk assessment indicates that the additional carcinogenic risk associated with the emissions units that are the subject of the application is less than 1 in a million, and that the acute and chronic hazard indices are less than 0.5, no further action will be required.
If the health risk assessment indicates that the additional carcinogenic risk is greater than 1 in a million, or that the acute or chronic hazard indices are greater than 0.5, District staff will work with the applicant to reduce the risk to an acceptable level.

If, after working with the applicant to reduce the risk, the health risk assessment still indicates that the additional carcinogenic risk is greater than 10 in a million, or that the acute or chronic hazard indices are greater than 1, permit conditions will be placed on the permit requiring the applicant to develop and implement a health risk reduction plan. The plan will be required to be

submitted within 6 months. The plan will be required to show an acceptable reduction in the health risk within 5 years from permit issuance. An acceptable reduction in the health risk will be one that reduces the additional carcinogenic risk to 10 in a million or less and the acute or chronic hazard indices to 1 or less.

If, after working with the applicant to reduce the risk, the health risk assessment still indicates that the additional carcinogenic risk is greater than 100 in a million, or that the acute or chronic hazard indices are greater than 10, the application will be denied based on failure to demonstrate compliance with the Rule 51 – Nuisance.

If the application is subject to the notice requirements of Health and Safety Code Section 42301.6 because the facility is located near a school, appropriate public notice of the application must be provided prior to permit issuance independent of the results of the health risk assessment.

If the application is subject to Rule 36 – New Source Review – Hazardous Air Pollutants because the facility is a major source of hazardous air pollutants, the provisions of Rule 36 apply independent of the results of the health risk assessment.

Background

Rule 15 – Standards for Permit Issuance requires District staff to deny a permit application unless the applicant shows that the emissions units that are the subject of the application will comply with all applicable requirements including Rule 51 – Nuisance.

Health and Safety Code Section 42301.6 requires District staff to provide public notice of any permit application for a source that emits hazardous air pollutants if the application will result in an emissions increase and the facility is located within 1,000 feet from the outer boundary of a school site.

Rule 36 – New Source Review – Hazardous Air Pollutants requires District staff to conduct a case-by-case maximum achievable control technology determination for any facility that is a major source of federal hazardous air pollutants (HAP). For Rule 36, a major source is defined as one that emits 10 tons per year or more of a single HAP or 25 tons per year or more of a combination of HAP.

Discussion

The District does not have a general new source review rule for toxic air pollutants. District staff does, however, consider that an excessive additional

health risk due to the emissions of toxic air pollutants for a new or modified facility is a violation of Rule 51 – Nuisance. The primary object of this policy is, therefore, to define how the Engineering Division will determine if a new, modified, replacement or relocated emissions unit that emits toxic air pollutants can operate in compliance with Rule 51.