8.1 Air Quality

8.1.1 Introduction

The City of Vernon (City) proposes to develop a power plant (VPP) on a 13.7-acre property at the southeast corner of Fruitland and Boyle avenues. The VPP will be a 914-megawatt (MW) net (at 65 degrees Fahrenheit [°F] with duct burners and evaporative cooling)/943-MW (gross) combined-cycle generating facility configured using three natural-gas-fired combustion turbines and one steam turbine. Two transmission line options are being considered to connect the plant to Southern California Edison's (SCE) Laguna Bell Substation. Natural gas for the facility will be delivered via approximately 2,300 feet of new 24-inch pipeline that will connect to Southern California Gas Company's (SoCalGas) existing gas transmission line (Line 765). Potable water for drinking, safety showers, fire protection, service water, and sanitary uses will be served from the City's potable water system through two 10-inch pipelines connecting to the City's water mains. One would connect in Boyle Avenue and the other one in Fruitland Avenue. Recycled water for industrial purposes will be provided by the Central Basin Municipal Water District (CBMWD) through a nominal 16-inch carbon steel (or if using high density polyethylene [HDPE], a 20-inch) water line connecting to its recycled water line in Boyle Avenue, adjacent to the plant site. The blowdown will be sent to Sanitation Districts of Los Angeles County (LACSD) via a new 2,400-foot section of City sanitary sewer line.

This subsection describes the existing air quality setting, maximum potential impacts from project construction and operation, and mitigation measures to reduce these impacts below thresholds of significance. The project will use fuel-efficient combined-cycle generation technology with secondary air pollution control systems to generate electricity, which would minimize the amount of fuel needed, emissions of criteria pollutants, and potential impacts on ambient air quality. Additional project design features that would minimize adverse air quality impacts include the following:

- Using clean-burning natural gas for fuel
- Using ultra-low oxides of nitrogen (NO_x) combustors to reduce NO_x emissions formed during combustion
- Operating with a selective catalytic reduction system (SCR) to minimize NO_x emissions following combustion
- Operating with an oxidation catalyst to reduce carbon monoxide (CO) and volatile organic compound (VOC) emissions
- Installing appropriately-sized stacks to reduce ground-level concentrations of exhaust pollutants
- Installing a continuous emissions monitoring system (CEMS) for NO_x, CO, and oxygen (O_2) to assist in maintaining and documenting compliance with emissions limits

Subsection 8.1.2 presents the air quality setting, including geography, topography, climate, and meteorology. Subsection 8.1.3 provides an overview of the ambient air quality standards. Subsection 8.1.4 discusses existing air quality in the vicinity of the project and

describes each of the criteria pollutants. The laws, ordinances, regulations, and standards (LORS) that can affect the project and project conformance, as well as the air quality regulatory agencies relevant to the project are identified in Subsection 8.1.5. The environmental analysis of emissions from the construction and operation of the project, as well as, the procedures used in assessing facility emissions and air quality impacts are presented in Subsection 8.1.6. The results of the health risk assessment are also summarized in Subsection 8.1.6. Potential public health risks posed by emissions of noncriteria pollutants are addressed in more detail in Subsection 8.6, Public Health.

Subsection 8.1.7 discusses compliance with LORS applicable to the project. An analysis of cumulative impacts is presented in Subsection 8.1.8. Mitigation for project air quality impacts is discussed in Subsection 8.1.9. A list of references used in preparing the subsection is provided in Subsection 8.1.10.

8.1.2 Air Quality Setting

8.1.2.1 Geography and Topography

The proposed project will be located near the center of the City of Vernon at Fruitland Avenue and South Boyle Avenue. The City of Vernon is located in south-central Los Angeles County, 3.4 miles from the City of Los Angeles and 3.6 miles from East Los Angeles.

The project site is located on relatively flat terrain, at an elevation of approximately 180 feet above sea level.

8.1.2.2 Climate and Meteorology

The semi-permanent high-pressure zone of the eastern Pacific dominates the climate of southern California including the City of Vernon, where the VPP project site will be located. Seasonally, the high-pressure zone oscillates in a north-south direction. During the summer, the high-pressure zone moves northward over the southwest United States, including southern California, resulting in increased subsidence and clear skies inland, while the coastal sections of southern California experience increased coastal stratus and fog caused by the relatively cool ocean surface temperatures. Frequent inversions, which are caused by subsidence of air that warms when it is compressed over relatively cool, moist marine air, occur during the summer. In winter, the high-pressure zone moves south of southern California, which allows storms originating in the Gulf of Alaska and the mid-latitudes of the Pacific Ocean to impact southern California, bringing rain and wind.

The climate of the South Coast Air Basin, including the City of Vernon, is influenced primarily by terrain and geographical location. The relative close proximity to the ocean tends to moderate air temperatures, especially near the coast. For example, daytime summer temperatures at the Los Angeles Civic Center, located approximately 3 miles north of City of Vernon, average about 74 °F (WRCC, 2005) while cities a relatively short distance to the north and east record average summer temperatures well above 90°F. Daytime winter temperatures at the Los Angeles Civic Center average about 58°F (WRCC, 2005). A climate summary, including average annual rainfall, for the Los Angeles Civic Center, is included in Appendix 8.1C (Table 8.1C.7).

A majority of the rainfall in the Vernon area falls during winter and spring as frontal storms move from the northwest to southeast. Over 90 percent of the average annual rainfall of about 15 inches (measured at the Los Angeles Civic Center) occurs between November and April (WRCC, 2005). Monsoon moisture and remnants from Eastern Pacific hurricanes occasionally produce showers in the Los Angeles Basin during the summer. Rainfall amounts usually tend to be light and isolated during these events.

Wind speed and wind direction patterns in the Los Angeles Basin are dominated by diurnal cycles driven by the differences in temperature between the land and the ocean, as well as the mountainous terrain surrounding the basin. Synoptically, frontal storms and Santa Ana flow episodes frequently tend to break the diurnal onshore/offshore wind pattern cycle during the period of September through March. Overall, the basin experiences light, average wind speeds with little seasonal variation.

The South Coast Air Quality Management District (SCAQMD) prepared a modeling data set for 1981 for the City of Vernon meteorological monitoring station. This data set was evaluated for typical winds at the VPP project site. Figures 8.1-1a to 8.1-1i (figures can be found at the end of this subsection) show the annual, and the morning and evening, quarterly wind rose plots for the Vernon meteorological monitoring station. As indicated by the plot in Figure 8.1-1f, nearly 60 percent of all average summer daytime winds come from the west with average speeds over 2.75 miles per hour. As indicated in Figure 8.1-1g, nearly 50 percent of average summer nighttime winds come from the west through northwest. Figure 8.1-1b shows that nearly 40 percent of all average winter daytime winds come from the west through southwest with average speeds over 2.5 miles per hour. Fifty percent of all average winter nighttime winds come from the north through northeast and east as shown in Figure 8.1-1c.

8.1.3 Overview of Air Quality Standards

The U.S. Environmental Protection Agency (USEPA) has established national ambient air quality standards (NAAQS) for the following seven pollutants, termed "criteria pollutants": ozone, nitrogen dioxide (NO_2), CO, sulfur dioxide (SO_2), particulate matter with aerodynamic diameter less than or equal to 10 microns (PM_{10}), particulate matter with aerodynamic diameter less than or equal to 2.5 microns ($PM_{2.5}$) and airborne lead (Pb). The federal Clean Air Act (CAA) requires the USEPA to designate areas (counties or air basins) as attainment or nonattainment with respect to each criteria pollutant, depending on whether the areas meet the NAAQS. An area that is designated nonattainment means the area is not meeting the NAAQS and is subject to planning requirements to attain the standard.

In addition to the seven pollutants listed above, the California Air Resources Board (CARB) has also established state standards for visibility-reducing particles, sulfates, hydrogen sulfide, and vinyl chloride. Similar to the USEPA, CARB designates counties in California as attainment or nonattainment with respect to the California ambient air quality standards (CAAQS). The state standards were designed to protect the most sensitive members of the population, such as children, the elderly, and people who suffer from lung or heart diseases.

Both state and federal air quality standards were based on two variables: maximum concentration and an averaging time over which the concentration would be measured.

Maximum concentrations were based on levels that may have an adverse effect to human health. The averaging times were based on whether the damage caused by the pollutant would occur during exposures to a high concentration for a short time (e.g., 1 hour), or to a relatively lower average concentration over a longer period (8 hours, 24 hours, or 1 month). For some pollutants, there is more than one air quality standard, reflecting both short-term and long-term effects. Table 8.1-1 presents the NAAQS and CAAQS.

TABLE 8.1-1
Ambient Air Quality Standards

Pollutant	Averaging Time	California	National
Ozone	1 hour	0.09 ppm (180 µg/m^3)	0.12 ppm[a]
	8 hours	0.07 ppm (137 µg/m^3)	0.08 ppm (157 µg/m^3)
CO	8 hours	9.0 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)
	1 hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)
NO_2	Annual arithmetic mean	-	0.053 ppm (100 µg/m^3)
	1 hour	0.25 ppm (470 µg/m^3)	-
SO_2	Annual arithmetic mean	-	0.03 ppm (80 µg/m^3)
	24 hours	0.04 ppm (105 µg/m^3)	0.14 ppm (365 µg/m^3)
	3 hours	-	0.5 ppm[b] (1300 µg/m^3) (Secondary standard)
	1 hour	0.25 ppm (655 µg/m^3)	-
PM_{10}	24 hours	50 µg/m^3	150 µg/m^3
	Annual arithmetic mean	20 µg/m^3	50 µg/m^3
$PM_{2.5}$	Annual arithmetic mean	12 µg/m	15 µg/m^3
	24 hours	-	65 µg/m^3
Sulfates	24 hours	25 µg/m^3	-
Lead	30 day average	1.5 µg/m^3	-
	Calendar quarter	-	1.5 µg/m^3
Hydrogen sulfide	1 hour	0.03 ppm (42 µg/m^3)	-
Vinyl chloride	24 hours	0.010 ppm (26 µg/m^3)	-
Visibility-reducing particles	8 hours (10am to 6pm PST)	In sufficient amount to produce an extinction coefficient of 0.23 per kilometer due to particles when the relative humidity is less than 70 percent.	-

[a] As of June 15, 2005 the federal 1-hour ozone standard (0.12 ppm) is no longer used except in Early Action Compact (EAC) areas.

[b] This is a national secondary standard, which is designed to protect public welfare.

ppm = parts per million

µg/m^3 = micrograms per cubic meter

On June 15, 2005, the federal 1-hour ozone standard was revoked for all areas except the 8-hour ozone nonattainment Early Action Compact areas (these areas do not yet have an effective date for their 8-hour designations). This means that the previous 1-hour federal standard of 0.12 ppm was replaced by the 8-hour average standard of 0.08 ppm.

On December 20, 2005, USEPA proposed changes to the federal particulate matter standards. However, these standards are in the rule-making process and are not expected to be promulgated until 2008 or later. On April 14, 2006, the California Office of Environmental Health Hazard Assessment (OEHHA) and CARB staff proposed to lower the existing 1-hour average standard for NO_2 to 0.18 ppm and establish a new annual average standard for NO_2 at 0.030 ppm. Public comments on the proposal were to be submitted by May 31, 2006 with the CARB Board hearing on the proposal expected at the end of 2006.

8.1.4 Existing Air Quality

The reported ambient air quality data were obtained from data published by SCAQMD, CARB (ADAM website), and the USEPA (AIRS website). The three CARB-certified monitoring stations located closest to the project site are: (1) the South Central Los Angeles County 1 monitoring station located at 11220 Long Beach Boulevard in the city of Lynwood (Lynwood), (2) the Central Los Angeles County monitoring station located at 1630 North Main Street in the city of Los Angeles (North Main Street), and (3) the West San Gabriel Valley located 752 South Wilson Avenue in the city of Pasadena (Pasadena). Ambient concentrations of ozone, NO_2, CO, and fine particulates ($PM_{2.5}$) are recorded at the North Main Street and Lynwood monitoring stations. Ambient concentrations of SO_2 and PM_{10} are recorded only at the North Main Street station.

The Central Los Angeles County monitoring station is located approximately 6.3 miles north of the project site. The South Central Los Angeles County 1 monitoring station is located approximately 5.6 miles south of the project site. The West San Gabriel Valley monitoring station is located approximately 9 miles northeast of the project site. The locations of the monitoring stations relative to the proposed project are such that emissions measurements recorded at South Central Los Angeles County and Central Los Angeles County monitoring stations are believed to represent area-wide ambient conditions rather than the localized impacts of any particular facility. Due to its proximity, it was assumed the data from the South Central Los Angeles County 1 monitoring station in Lynwood would be representative of the background ambient air quality for this project. Consequently, data from this monitoring station were used to estimate background concentrations, when available. If data were not available from the Lynwood site, background concentrations were based on data from the Central Los Angeles County (North Main St.) station.

8.1.4.1 Ozone

Ozone is a photochemical oxidant that is formed when volatile organic compounds (VOCs) and NO_x react in the presence of ultraviolet sunlight (SCAQMD, 2001). The South Coast Air Basin is designated as a nonattainment area for ozone by both the USEPA and CARB.

Tables 8.1-2A and 2B present the annual maximum hourly ozone levels recorded at the North Main Street and Lynwood monitoring stations during the period from 2003 to 2005, as well as the number of days in which the state and federal standards were exceeded. Data from these stations indicate that over the last 3 years ozone concentrations have been

consistently above both state and federal standards at the North Main Street station. Maximum ozone concentrations recorded at the Lynwood station were less than the state and federal standards with the exception of 1-hour and 8-hour readings in 2005.

TABLE 8.1-2A
Ozone Levels at North Main Street Station, Los Angeles, 2003-2005

	2003	2004	2005
Highest 1-hour Average (ppm)	0.152	0.110	0.121
Highest 1-hour Average (μg/m^3)	298	216	238
Highest 8-hour Average (ppm)	0.088	0.092	0.098
Highest 8-hour Average (μg/m^3)	173	181	192
Number of Days Exceeding			
State Standard (180 μg/m^3, 1-hour)	11	7	2
State Standard (137 μg/m^3, 8-hour)	NA*	7	2
Federal Standard (157 μg/m^3, 8-hour)	2	1	1
Federal Standard (225.8 μg/m^3, 1-hour)	1	0	0

Source: South Coast Air Quality Management District by Year: http://www.aqmd.gov/smog/historicaldata.htm.

* The state 8-hour ozone was established by CARB on April 28, 2005 so the number of exceedances of the 8-hour standard was not recorded in the year 2003.

TABLE 8.1-2B
Ozone Levels at Lynwood Station, 2003-2005

	2003	2004	2005
Highest 1-hour Average (ppm)	0.081	0.084	0.111
Highest 1-hour Average (μg/m^3)	159	165	218
Highest 8-hour Average (ppm)	0.063	0.072	0.081
Highest 8-hour Average (μg/m^3)	124	141	159
Number of Days Exceeding			
State Standard (180 μg/m^3, 1-hour)	0	0	1
State Standard (137 μg/m^3, 8-hour)	NA*	0	1
Federal Standard (157 μg/m^3, 8-hour)	0	0	0
Federal Standard (225.8 μg/m^3, 1-hour)	0	0	0

Source: South Coast Air Quality Management District by Year: http://www.aqmd.gov/smog/historicaldata.htm.

* The state 8-hour ozone was established by CARB on April 28, 2005 so the number of exceedances of the 8-hour standard was not recorded in the year 2003.

8.1.4.2 Nitrogen Dioxide

NO_2 is a byproduct of combustion sources such as motor vehicle exhaust or stationary combustion sources (SCAQMD, 2001). The principle form of nitrogen oxide produced by combustion is nitric oxide (NO), but NO reacts quickly to form NO_2, creating a mixture of

NO and NO_2 commonly called NO_x (SCAQMD, 2001). The South Coast Air Basin is designated attainment status for NO_2 by both the USEPA and CARB. On April 14, 2006, CARB and OEHHA issued a draft Staff Report reviewing the state's 1-hour NO_2 standard and establishing an annual NO_2 standard. CARB is tentatively scheduled to conduct hearings on this issue in the Fall of 2006. At this time, the Applicant has not incorporated the recommended revised standards into the analysis.

Tables 8.1-3A and 3B present the maximum 1-hour and annual-average NO_2 levels recorded at the North Main Street and Lynwood monitoring stations between 2003 and 2005. Over the 3-year period, ambient NO_2 concentrations measured at this monitoring station did not violate either the 1-hour (0.25 ppm) state or the average annual (0.053 ppm) federal standards

TABLE 8.1-3A
Nitrogen Dioxide Levels at the North Main Street Station, Los Angeles, 2003-2005

	2003	2004	2005
Highest 1-hour Average (ppm)	0.16	0.16	0.13
Highest 1-hour Average (μg/m^3)	301	301	244.6
Annual Average (ppm)	0.0338	0.0328	0.0278
Annual Average (μg/m^3)	63.6	61.7	52.3
Number of Days Exceeding			
State Standard (470 μg/m^3, 1-hour)	0	0	0
Federal Standard (100 μg/m^3, Annual)	0	0	0

Sources: SCAQMD Historical Air Quality Data by Year: http://www.aqmd.gov/smog/historicaldata.htm and CARB: http://www.arb.ca.gov/adam/welcome.html

TABLE 8.1-3B
Nitrogen Dioxide Levels at the Lynwood Station, Los Angeles, 2003-2005

	2003	2004	2005
Highest 1-hour Average (ppm)	0.13	0.10	0.11
Highest 1-hour Average (μg/m^3)	244.6	188.1	207
Annual Average (ppm)	0.0312	0.0301	0.0312
Annual Average (μg/m^3)	58.7	56.6	58.7
Number of Days Exceeding			
State Standard (470 μg/m^3, 1-hour)	0	0	0
Federal Standard (100 μg/m^3, Annual)	0	0	0

Sources: SCAQMD Historical Air Quality Data by Year: http://www.aqmd.gov/smog/historicaldata.htm and CARB: http://www.arb.ca.gov/adam/welcome.html

8.1.4.3 Carbon Monoxide

CO is a colorless, odorless gas formed by incomplete combustion of fossil fuels (SCAQMD, 2001). Industrial sources typically contribute less than 10 percent of ambient CO levels. Peak

CO levels typically occur during winter months, due to a combination of higher emission rates and stagnant weather conditions. The South Coast Air Basin is designated attainment status for the state CO standards by CARB. Because there have been no recorded violations of the CO NAAQS over the required 3-year duration, the SCAQMD requested in March 2005 to have USEPA redesignate the basin as CO attainment.

Tables 8.1-4A and 4B present the California and federal air quality standards for CO, and the maximum 1- and 8-hour average levels recorded at the North Main Street and Lynwood stations during the period 2003 to 2005. Based on the recorded CO concentrations, the maximum 8-hour and 1-hour average CO levels near the project site have been below the state and federal standards for the last 3 years.

TABLE 8.1-4A
Carbon Monoxide Levels at North Main Street Station, Los Angeles, 2003-2005

	2003	2004	2005
Highest 8-hour average (ppm)	4.6	3.2	2.9
Highest 8-hour average (mg/m^3)	5.3	3.7	3.3
Highest 1-hour average (ppm)	6	4	4
Highest 1-hour average (mg/m^3)	6.9	4.6	4.6
Number of Days Exceeding			
State Standard (10 mg/m^3, 8-hr)	0	0	0
State Standard (23 mg/m^3, 1-hr)	0	0	0
Federal Standard (10 mg/m^3, 8-hr)	0	0	0
Federal Standard (40 mg/m^3, 1-hr)	0	0	0

Sources: SCAQMD Historical Air Quality Data by Year: http://www.aqmd.gov/smog/historicaldata.htm and USEPA AIRS: http://www.epa.gov/air/data/monvals.html

TABLE 8.1-4B
Carbon Monoxide Levels at Lynwood Station, 2003-2005

	2003	2004	2005
Highest 8-hour average (ppm)	7.3	6.7	5.9
Highest 8-hour average (mg/m^3)	8.4	7.7	6.8
Highest 1-hour average (ppm)	12	10	7
Highest 1-hour average (mg/m^3)	13.7	11.5	8.02
Number of Days Exceeding			
State Standard (10 mg/m^3, 8-hr)	0	0	0
State Standard (23 mg/m^3, 1-hr)	0	0	0
Federal Standard (10 mg/m^3, 8-hr)	0	0	0
Federal Standard (40 mg/m^3, 1-hr)	0	0	0

Sources: SCAQMD Historical Air Quality Data by Year: http://www.aqmd.gov/smog/historicaldata.htm and USEPA AIRS: http://www.epa.gov/air/data/monvals.html

8.1.4.4 Sulfur Dioxide

Sulfur dioxide is a colorless, pungent gas formed primarily by the combustion of sulfur-containing fossil fuels (SCAQMD, 2001). The South Coast Air Basin is designated attainment status for SO_2 by both the USEPA and CARB.

Table 8.1-5 presents the maximum SO_2 levels recorded at the North Main Street Station in Los Angeles. During the period shown, the maximum hourly, 3-hour, 24-hour and annual average SO_2 concentrations have been well under the state and federal standards.

TABLE 8.1-5
Sulfur Dioxide Levels at North Main Street, Los Angeles, 2003-2005

	2003	2004	2005
Highest 1-hour average (ppm)	0.05[a]	0.08	0.07
Highest 1-hour average (μg/m^3)	130.9	209.4	183.2
Highest 3-hour average (ppm)	0.011	0.018	0.016
Highest 3-hour average (μg/m^3)	28.8	47.1	41.9
Highest 24-hour average (ppm)	0.006[a]	0.015	0.010
Highest 24-hour average (μg/m^3)	15.7	39.3	26.2
Annual Average, All Hours (ppm)	0.002	0.003	0.002
Annual Average, All Hours (μg/m^3)	5.2	7.9	5.2
Number of Days Exceeding			
State Standard (655 μg/m^3, 1-hour)	0[b]	0[b]	0[b]
State Standard (105 μg/m3, 24-hour)	0	0	0
Federal Standard (1300 μg/m3, 3-hour)	0	0	0
Federal Standard (365 μg/m3, 24-hours)	0	0	0
Federal Standard (80 μg/m3, Annual)	0	0	0

Sources: SCAQMD Historical Air Quality Data by Year: http://www.aqmd.gov/smog/historicaldata.htm; USEPA AIRS: http://www.epa.gov/air/data/monvals.html; CARB: http://www.arb.ca.gov/adam/welcome.html.

[a] Less than 12 full months of data. May not be representative.

[b] For the years 2003 and 2004, the SCAQMD reported in the air quality data tables that no location exceeded state SO_2 standards and SO_2 concentrations were well below the federal standards. However, for the year 2005, because the maximum 1-hour SO_2 concentration (183.2 μg/m^3) is less than 655 μg/m^3, it was assumed the number of hours exceeding 655 μg/m^3 was zero.

8.1.4.5 Particulate Sulfates

Particulate sulfates are the product of further oxidation of SO_2. The South Coast Air Basin is designated attainment status for particulate sulfates by the CARB. A federal standard has not been established for particulate sulfates.

Tables 8.1-6A and 6B present the maximum 24-hour average sulfate levels recorded at the North Main Street and Lynwood monitoring stations. The data for 2002 through 2004 are presented for particulate sulfate because the 2005 SCAQMD data had not been released at the time of the analysis. The maximum 24-hour average sulfates over this period indicate that the maximum levels have declined to about 50 percent of the state standard.

TABLE 8.1-6A
Particulate Sulfate Levels at North Main Street Station, 2002-2005 (µg/m^3)

	2002	2003	2004
Maximum 24-hour average	15.2	14.6	12.7
Number of Days Exceeding			
State Standard (25 µg/m^3, 24-hour)	0	0	0

Source: SCAQMD Historical Air Quality Data by Year: http://www.aqmd.gov/smog/historicaldata.htm.

TABLE 8.1-6B
Particulate Sulfate Levels at Lynwood Station, 2002-2004 (µg/m^3)

	2002	2003	2004
Maximum 24-hour Average	15.3	14.9	14.7
Number of Days Exceeding			
State Standard (25 µg/m^3, 24-hour)	0	0	0

Source: SCAQMD Historical Air Quality Data by Year: http://www.aqmd.gov/smog/historicaldata.htm.

8.1.4.6 Fine Particulates (PM_{10} and $PM_{2.5}$)

PM_{10} arises from sources such as road dust, diesel soot, combustion products, tire and brake abrasions, construction activities, and fires (SCAQMD, 2001). $PM_{2.5}$ consists mostly of products from the reaction of NO_x and SO_2 with ammonia, secondary organics, and finer dust particles (SCAQMD, 2001). The South Coast Air Basin is designated a nonattainment area for both federal and state PM_{10} and $PM_{2.5}$ standards by the USEPA and CARB.

Table 8.1-7 presents the maximum 24-hour and annual concentrations of PM_{10} recorded at the North Main Street, monitoring station during 2003 to 2005. The maximum 24-hour PM_{10} levels exceeded the state standard several times per year, but the federal 24-hour standard was not exceeded during the period reported.

TABLE 8.1-7
PM_{10} Levels at the North Main Street Station, Los Angeles, 2003-2005 (µg/m^3)

	2003	2004	2005
Highest 24-hour average	81	72	70
Annual Arithmetic Mean (Federal Standard = 50 µg/m^3)	34.6	32.7	29.6
Measured Number of Days Exceeding[a]			
State Standard (50 µg/m^3, 24-hour)	6	5	3
Federal Standard (150 µg/m^3, 24-hour)	0	0	0
Estimated Maximum Expected Violation Days[a,b]			
State Standard (50 µg/m^3, 24-hour)	36.3	30.4	17.8
Federal Standard (150 µg/m^3, 24-hour)	0	0	0

Sources: SCAQMD Historical Air Quality Data by Year: http://www.aqmd.gov/smog/historicaldata.htm;
USEPA AIRS: http://www.epa.gov/air/data/monvals.html; CARB: http://www.arb.ca.gov/adam/welcome.html.

[a] Based on readings every 6 days.

[b] Based on multiplying exceedance readings by a factor of 6 due to readings taken only once per 6 days. The actual number of violation days is expected to be less since some of the days readings not taken will be within the standards.

The reported $PM_{2.5}$ data were obtained from the North Main Street and Lynwood monitoring stations for 2003 to 2005. Tables 8.1-8A and 8B present the maximum 24-hour average concentration and annual arithmetic mean reported by SCAQMD. Based on the data reported, measured 24-hour concentrations exceeded the federal standard at the North Main Street station each of the 3 years but were below the federal standard at the Lynwood monitoring station for the same time period.

TABLE 8.1-8A
$PM_{2.5}$ Levels at North Main Street Station, Los Angeles, 2003-2005 (µg/m^3)

	2003	2004	2005
Highest 24-hour Average	83.7	75	73.7
Number of Days Exceeding the Federal Standard	5	2	2
Annual Arithmetic Mean	21.3	19.6	17.8

Sources: SCAQMD Historical Air Quality Data by Year: http://www.aqmd.gov/smog/historicaldata.htm; USEPA AIRS: http://www.epa.gov/air/data/monvals.html; CARB: http://www.arb.ca.gov/adam/welcome.html.

TABLE 8.1-8B
$PM_{2.5}$ Levels at Lynwood Station, 2003-2005 (µg/m^3)

	2003	2004	2005
Highest 24-Hour Average	54.8	55.8	54.6
Number of Days Exceeding the Federal Standard	0	0	0
Annual Arithmetic Mean	20.2	18.5	17.5

Source: SCAQMD Historical Air Quality Data by Year: http://www.aqmd.gov/smog/historicaldata.htm; California Air Quality Data, California Air Resources Board website.

8.1.4.7 Airborne Lead

Lead concentrations once exceeded the state and federal air quality standards by a wide margin, but have not exceeded state (1.5 µg/m^3; 30 day average) or federal (1.5 µg/m^3; calendar quarter) standards at any regular monitoring station since 1982 (SCAQMD, 2001). The South Coast Air Basin is designated attainment status for lead by both the USEPA and CARB. Tables 8.1-9A and 9B list the airborne lead levels recorded at the North Main Street and Lynwood monitoring stations between 2003 and 2005.

TABLE 8.1-9A
Airborne Lead Levels at North Main Street Station, Los Angeles, 2003-2005 (µg/m^3)

	2003	2004	2005
Highest Monthly Average	0.15	0.03	*
Highest Quarterly Average	0.15	0.03	0.02

Source: SCAQMD Historical Air Quality Data by Year: http://www.aqmd.gov/smog/historicaldata.htm; USEPA AIRS website.

* Insufficient data to determine.

TABLE 8.1-9B
Airborne Lead Levels at Lynwood Station, Los Angeles, 2003-2005 (µg/m^3)

	2003	2004	2005
Highest Monthly Average	0.04	0.03	*
Highest Quarterly Average	0.04	0.03	0.02

Source: SCAQMD Historical Air Quality Data by Year: http://www.aqmd.gov/smog/historicaldata.htm; USEPA AIRS website.
* Insufficient data to determine.

8.1.5 Laws, Ordinances, Regulations, and Standards

The Clean Air Act, implemented by the USEPA, requires major new and modified stationary sources of air pollution to obtain a construction permit prior to commencing construction through a program known as Federal New Source Review (NSR). The requirements of the NSR program are dependent on whether the air quality in the area where the new source (or modified source) is being located attains the NAAQS. The program that applies in areas that are in attainment of the NAAQS is the Prevention of Significant Deterioration (PSD). The program that applies to areas where the air does not meet the NAAQS (termed nonattainment areas) is the nonattainment NSR.

The USEPA implements the NSR program through regional offices. Arizona, California, Hawaii, Nevada, and specific Pacific trust territories are administrated by the USEPA Region IX office located in San Francisco. The USEPA typically delegate its NSR, Title V, and Title IV authority to state or local air quality agencies that have sufficient regulatory structure to implement these programs consistent with requirements of the Clean Air Act and implementing regulations. The SCAQMD has been delegated several of these programs.

CARB was established by the state legislature in 1967 with the purpose of attaining and maintaining healthy air quality, conducting research into causes and solutions to air pollution, and addressing the impacts that motor vehicles have on air quality. To this end, CARB implements the following programs:

- Establish and enforce motor vehicle emission standards, including fuel standards.
- Monitor, evaluate, and set health-based air quality standards.
- Conduct research to solve air pollution problems.
- Establish toxic air contaminant (TAC) control measures.
- Oversee and assist local air quality districts.

Air pollution control districts were established shortly after CARB, based on meteorological and topographical factors. The districts were established to enforce air pollution regulations for the purpose of attaining and maintaining all state and federal ambient air quality standards. The districts regulate air emissions by issuing air permits to stationary sources of air pollution in compliance with approved regulatory programs. Each district promulgates rules and regulations specific to air quality issues within its jurisdiction. The air emissions sources regulated by each district vary. The types of air pollution sources that might be regulated include: manufacturers, power plants, refineries, gasoline service stations, and auto body shops.

Federal and state agencies and SCAQMD have specific regulations applicable to stationary combustion sources. These applicable regulations are presented in Table 8.1-10. Subsection 8.1.7 presents a detailed discussion of the project's conformance with the applicable regulations. An Authority to Construct/Title V permit application and a PSD analysis will be filed concurrently with the SCAQMD and the USEPA Region IX office, respectively with the submittal of the Application for Certification (AFC) filing with the California Energy Commission (CEC).

TABLE 8.1-10
Air Quality Agencies

Agency	Authority	Contact
USEPA Region IX	Permit issuance, enforcement	Gerardo Rios USEPA Region IX 75 Hawthorne Street San Francisco, CA 94105 (415) 947-3974
CARB	Regulatory oversight	Michael Tollstrup Project Assessment Branch California Air Resources Board 2020 L Street Sacramento, CA 95814 (916) 322-6026
SCAQMD	Permit issuance, enforcement	John Yee South Coast Air Quality Management District 21865 Copley Drive Diamond Bar, CA 917635 (909) 396-2531

8.1.5.1 Federal

The USEPA promulgates and enforces federal air quality laws, with Region IX administering the federal air programs in California. The federal Clean Air Act provides the legal authority to regulate air pollution from stationary sources. The applicable federal regulations are summarized at the end of Subsection 8.1.5, along with the agency responsible for administration of the regulation.

8.1.5.1.1 National Standards of Performance for New Stationary Sources

Title 40, Code of Federal Regulations, Part 60, Subpart KKKK – NO_x Emission Limits for New Stationary Combustion Turbines. This standard was finalized on February 9, 2006 (Federal Register publication expected end of June 2006). Under this regulation, the term "stationary combustion turbine," includes combined cycle turbine units. Units installed after February 18, 2005, have to comply with this regulation which contains standards for NO_x and SO_2 along with associated monitoring, reporting, recordkeeping, and testing requirements. Emission standards apply at points in the exhaust flow path that are downstream of the duct burner. Units complying with this regulation do not have to comply with Subparts GG (for the turbine) or Da (for the duct burner).

The NO_x standard for units firing natural gas, and rated at greater than 850 MMBtu/hr heat input, is 15 ppm at 15 percent O_2 (or 54 ng/J of useful output or 0.43 lb/MWhr). Compliance

is determined on a 30-unit-operating-day rolling average, where "unit operating day," is defined as a 24-hour period between 12:00 midnight and the following midnight during which any fuel is combusted in the unit.

The SO_2 standard is 110 ng/J (or 0.9 lb/MWhr) gross output. Operators can also comply with an alternative standard, limiting potential sulfur emissions to below 26 ng/J (0.06 lb/MMBtu) heat input. Fuel sulfur monitoring is required each unit operating day. However, options are available to reduce frequency or entirely avoid the necessity to monitor (e.g., representative sampling according to the schedule in Part 75, Appendix D or tariff sheet attesting that sulfur content is < 0.05 percent by weight).

VPP NO_x emissions will be 0.08 lb/MWhr (based on 192.6 kW and 14.7 lb NO_x/hr at 65°F) and CEMS will be used to ensure compliance. Natural gas tariff sheet will ensure compliance with the SO_2 standard.

8.1.5.1.2 National Emission Standards for Hazardous Air Pollutants

Title 40, Code of Federal Regulations, Part 63 - National Emission Standards for Hazardous Air Pollutants for Source Categories, establishes emission standards to limit emissions of hazardous air pollutants from specific source categories. Sources subject to Part 63 requirements must either use the maximum achievable control technology (MACT), be exempted under Part 63, or comply with published emission limitations. The applicable MACT standard to the project is Subpart YYYY, which sets a formaldehyde emission limit or operational limit for subject sources.

8.1.5.1.3 Prevention of Significant Deterioration Program

Title 40, Code of Federal Regulations, Parts 51 and 52 establish a pre-construction review and permitting program for new or modified major stationary sources to prevent significant deterioration of ambient air quality. As indicated above, the PSD program applies to areas where the ambient concentrations of air pollutants do not exceed the NAAQS. The program was designed to facilitate economic growth while protecting public health and welfare and Class I areas (national parks, wilderness areas, and national monuments, etc.). SCAQMD has relinquished the PSD program and, therefore, the administering agency for the PSD program is USEPA.

The VPP is considered one of the listed 28-PSD source categories. Thus, the threshold for PSD review will be 100 tons per year (tpy) of any criteria pollutant. Emissions of criteria pollutants will exceed this threshold and the Project will be subject to PSD review.

8.1.5.1.4 Title IV—Acid Rain Program

Title 40, Code of Federal Regulations, Part 72 – Acid Rain Program, establishes emission standards for SO_2 and NO_x emissions from electric generating units through the use of market incentives, requires sources to monitor and report acid gas emissions, and requires the acquisition of SO_2 allowances sufficient to offset SO_2 emissions on an annual basis. This program is implemented through the SCAQMD's Regulation XXXI.

8.1.5.1.5 Title V—Operating Permits Program

Title 40, Code of Federal Regulations, Part 70 – Operating Permits Program, requires the issuance of operating permits that identify all applicable federal performance, operating, monitoring, recordkeeping, and reporting requirements. These requirements are

implemented at the local level through SCAQMD Regulation XXX. The Title V permit is linked to the SCAQMD NSR regulations and construction of a new facility cannot commence until a Final Title V Operation Program Permit for the facility has been issued. A parallel application has been submitted to the SCAQMD in addition to the CEC AFC application.

8.1.5.1.6 CAM Rule

Title 40, Code of Federal Regulations, Part 64 – Compliance Assurance Monitoring (CAM), requires facilities to monitor the operation and maintenance of emissions control systems and report any control system malfunctions to the appropriate regulatory agency. If an emission control system is not working properly, the CAM rule also requires a facility to take action to correct the control system malfunction. The CAM rule applies to emissions units with uncontrolled potential to emit levels greater than applicable major source thresholds. Emission control systems governed by Title V operating permits requiring continuous compliance determination methods are generally compliant with the CAM rule. Exemptions from CAM are presented in 40 CFR 64.2(b). Since the VPP will participate in the SCAQMD's Regional Clean Air Incentives Market (RECLAIM) Cap and Trade program, which has been submitted and approved as part of the State Implementation Plan (SIP), the Project would qualify for the CAM exemption for NO_x emission sources provided in 40 CFR 64.2(b)(1)(iv). Thus, it is further believed that this exemption also exempts the Project from a requirement to prepare and submit a CAM plan for NO_x emissions from fired equipment.

8.1.5.1.7 Toxic Chemical Release Inventory Program

The Emergency Planning and Community Right-to-Know Act (EPCRA), through the Toxic Chemical Release Inventory (TRI) program, establishes reporting requirements for toxic releases to the environment if the facility: (1) produces more than 25,000 pounds of a listed chemical per year; (2) processes more than 25,000 pounds of a listed chemical per year; or (3) uses more than 10,000 pounds of a listed chemical per year.

Electric utilities, in Standards Industrial Classification (SIC) Codes 4911, 4931, and 4939, that combust coal and/or oil for the purpose of generating electricity for distribution in commerce must report under this regulation. The Project falls under SIC Code 4911, which covers establishments engaged in the generation, transmission, and/or distribution of electric energy for sale. However, the Project will not combust coal and/or oil for the purpose of generating electricity for the distribution in commerce. Therefore, the TRI program does not apply to the Project and will not be addressed further.

8.1.5.2 State

CARB's primary responsibilities are to develop, adopt, implement, and enforce the state's motor vehicle pollution control program; to administer and coordinate the state's air pollution research program; to adopt and update, as necessary, the state's ambient air quality standards; to review the operations of the local air pollution control districts; and to review and coordinate preparation of the SIP for achievement of the federal ambient air quality standards.

The California Health and Safety Code, Section 41700, prohibits the discharge from a facility of air pollutants that cause injury, detriment, nuisance, or annoyance to the public, or which endanger the comfort, repose, health, or safety of the public, or that damage business or property.

The state has promulgated numerous laws and regulations at the state level (i.e., Toxic Air Contaminants and Air Toxic Hot Spots) that are effectuated at the local level by the air districts. A discussion of these LORS is presented in Section 8.1.5.3.

8.1.5.3 Local

When the state's air pollution statutes were reorganized in the mid-1960s, local districts were required to be established in each county of the state. There are three different types of districts: county, regional, and unified. In addition, special air quality management districts (AQMDs), with more comprehensive authority over non-vehicular sources as well as transportation and other regional planning responsibilities, have been established by the Legislature for several regions in California, including the South Coast Air Basin. AQMDs have principal responsibility for developing plans for meeting the NAAQS and California ambient air quality standards; for developing control measures for non-vehicular sources of air pollution necessary to achieve and maintain both state and federal air quality standards; for implementing permit programs established for the construction, modification, and operation of sources of air pollution; for enforcing air pollution statutes and regulations governing non-vehicular sources; and for developing employer-based trip reduction programs. The agency with the responsibility for the South Coast Air Basin is the SCAQMD.

8.1.5.3.1 South Coast Air Quality Management District Air Quality Plans

The SCAQMD plan, i.e., the Air Quality Management Plant (AQMP), defines the proposed strategies, including stationary source control measures and NSR rules, whose implementation will attain the state ambient air quality standard (AAQS). The air quality plans also demonstrate a five percent annual reduction in emissions of nonattainment pollutants in the SCAQMD. The relevant stationary source control measures and NSR requirements are discussed with SCAQMD Rules and Regulations.

SCAQMD Rule 201—Permit to Construct

Rule 201 (Permit to Construct) establishes an orderly procedure for the review of new and modified sources of air pollution through the issuance of permits. Rule 201 specifies that any facility installing nonexempt equipment that causes or controls the emission of air pollutants must first obtain a Permit to Construct from the SCAQMD.

SCAQMD Preconstruction Review for Criteria Pollutants

SCAQMD has three separate preconstruction review programs for new or modified sources of criteria pollutant emissions:

- Regulation XIII (New Source Review) combines the federal and state NSR requirements into a single rule. Regulation XIII establishes pre-construction requirements for new or modified facilities to ensure that operation of such facilities does not interfere with progress towards the attainment of AAQS without unnecessary restricting economic growth. For RECLAIM facilities, this rule applies only to those nonattainment pollutants, or their precursors, not regulated under the RECLAIM program. Since the Project will be a NO_x RECLAIM facility, NSR provisions for NO_x are addressed under Rule 2005, and not under Regulation XIII.

- Regulation XVII (Prevention of Significant Deterioration) implements the PSD requirements of the federal Clean Air Act for attainment pollutants (i.e., NO_2 and SO_2). Regulation XVII establishes pre-construction review requirements for new or modified

facilities to ensure that operation of such facilities does not significantly deteriorate air quality in attainment areas while maintaining a margin for future growth. The PSD requirements apply on a pollutant-specific basis to any project that is a new major stationary source or a major modification to an existing major stationary source. SCAQMD classifies an unlisted source (which is not in the specified 28 source categories) that emits or has the potential to emit 250 tpy of any pollutant regulated by the Act as a major stationary source. For listed sources, the threshold is 100 tpy. NO_x or SO_x emissions from a modified major source are subject to PSD if the cumulative emission increases for either pollutant exceeds 40 tpy. In addition, a modification at a non-major source is subject to PSD if the modification itself would be considered a major source. SCAQMD has relinquished the PSD program and Regulation XVII no longer applies. The administering agency for the PSD program is USEPA.

- Rule 2005 (NSR for RECLAIM) integrates the NSR requirements of the federal and California Clean Air Acts with the SCAQMD's RECLAIM program. Rule 2005 establishes pre-construction requirements for new or modified RECLAIM facilities to ensure that operation of such facilities does not interfere with progress towards the attainment of AAQS without unnecessarily restricting economic growth. RECLAIM is a "Cap and Trade" market incentive program designed to allow facilities flexibility in achieving emission reduction requirements for NO_x and SO_x using methods that include add-on emission controls, equipment modifications, reformulated products, operational changes, shutdowns, and the purchase of excess emission reductions. Since the Project will be a NO_x RECLAIM facility, it will be subject to the NO_x NSR requirements of Rule 2005. The proposed equipment will not be subject to the SO_x NSR requirements of Rule 2005 because the RECLAIM program does not include SO_x emissions from natural gas combustion equipment for applicability purposes.

A facility can be subject to more than one of these preconstruction review programs depending on the type of criteria pollutants and criteria pollutant precursors they will emit. The relevant criteria pollutants and precursors are summarized in Table 8.1-11. A new or modified facility can be subject to the elements of all three programs.

TABLE 8.1-11
Criteria Pollutant Precursors

Criteria Pollutants	Precursors
Ozone	VOC, NO_x
NO_2	NO_x
SO_2	SO_x
Sulfate	SO_x
PM_{10}	VOC, NO_x, SO_x

Preconstruction Air Quality Monitoring—The SCAQMD may, at its discretion, require preconstruction ambient air quality monitoring. Preconstruction monitoring data must be gathered over a one-year period to characterize local ambient air quality. The SCAQMD may approve a shorter monitoring period; however, it is unlikely that the SCAQMD will

require preconstruction monitoring due to the proximity of ambient monitoring sites relative to the project site.

Best Available Control Technology—Best Available Control Technology (BACT) must be applied to any new or modified source resulting in an increase in criteria pollutant, ozone depleting compound, and ammonia emissions. The SCAQMD defines BACT as the following unless the limitations are demonstrated to be unachievable:

- Most stringent emission limitation achieved in practice by a control device or technique for that category or class of sources.
- Any control device or technique determined to be technologically feasible and cost-effective.
- Most stringent emission limitation on a comparable emission source contained in any approved SIP (i.e., cannot be less stringent than the emission control required by any applicable federal, state, or SCAQMD laws, rules, or regulations).

Emission Offsets—For a new or modified facility located in SCAQMD Zone 1 ("Coastal Zone") (as is the Project), except as exempted in Rule 1304, sufficient emission reduction credits (ERCs) must be provided to offset the increase in CO, PM_{10}, SO_x, and VOC emissions at a 1.2 to 1 offset ratio. If the offsets are being obtained from the SCAQMD's Priority Reserve, the offset ratio is also 1 to 1 (Rule 1303).

For a new or modified facility located in SCAQMD Zone 1, sufficient RECLAIM Trading Credits (RTCs) must be provided to offset the actual anticipated NO_X emissions for the first year of operation at a 1 to 1 offset ratio (Rule 2005).

Air Quality Impact Analysis—An air quality dispersion analysis must be conducted, using a mass emissions-based analysis contained in the rule or an approved dispersion model, to evaluate impacts of increased criteria pollutant emissions from any new or modified facility on ambient air quality. The Project's emissions must not cause a significant increase in ambient concentrations of nonattainment pollutants as shown in Subsection 8.1.6.2.

Protection of Class I Areas—A modeling analysis must be conducted to assess the impacts of project emissions on plume visibility in nearby Class I areas if the increase from the new or modified source in NO_X and PM_{10} emissions exceed 40 tpy and 15 tpy, respectively, and the location of the source, relative to the closest boundary of a specified federal Class I area, is within the specified distance. The project is located over 31 kilometers from the nearest Class I area (San Gabriel). Therefore, no visibility analysis is required to satisfy the SCAQMD NSR requirement.

Rule 1316

In December 2002, the USEPA adopted amendments to the Clean Air Act modifying NSR requirements for modifications of major sources. Although opposed by the California Air Resources Board (CARB), as well as the AQMD and numerous other local and state agencies, the amendments were mostly upheld upon appeal. Following adoption of the amendment by USEPA, California Senate Bill 288—Protect California Air Act of 2003 (SB 288) sponsored by State Senator Byron Sher was signed into law by the Governor on September 22, 2003. The bill prohibits local districts, including the AQMD, from amending or revising their NSR rules or regulations to be less stringent that those rules and

regulations that existed on December 30, 2002. Rule 1316 addresses these two differing state and federal requirements applicable to modifications of major federal sources. USEPA has imposed a deadline of January 1, 2006 for NSR rules to be amended to comply with their requirements. Rule 1316 also provides provisions for the operator of a major stationary source to apply to the SCAQMD Executive Officer for approval of a Plantwide Applicability Limit (PAL) if the operator demonstrates the PAL conforms to all applicable provisions. The SCAQMD Governing Board adopted the amendment to Rule 1316 on December 2, 2005. The main provisions of this rule affect modifications to sources.

SCAQMD Rule 212—Standards for Approving Permits

Rule 212 requires projects subjected to this rule to distribute the public notice to each address within a quarter-mile radius of the project. Additionally, if a K-12 school is located within the notice zone, then a copy of the notice must be distributed to the parents of each child attending that school. A project is required to notify the public if it will:

- Emit air contaminants within 1,000 feet from the outer boundary of a school; or
- Have onsite emission increases exceeding any of the daily maximums as specified in Rule 212 subdivision (g); or
- Have onsite increases in emissions of TACs to which a person may be exposed to an individual cancer risk greater than, or equal to, one in one million as specified in Rule 1401.

SCAQMD Rule 1401—New Source Review of Toxic Air Contaminants

Rule 1401 (New Source Review of Toxic Air Contaminants) establishes allowable health risks for new or modified sources of TAC emissions. Rule 1401 specifies permit unit limits for maximum individual cancer risk (MICR), cancer burden, and noncarcinogenic acute and chronic hazard indices (HIs) for new or modified sources of TAC emissions. The rule allows a higher MICR risk threshold when best available control technology for toxics (T-BACT) is applied. The health risks resulting from project emissions, as demonstrated with a risk assessment, must not exceed the following risk thresholds:

- MICR and Cancer Burden
  - An increased MICR greater than one in one million at any receptor location if the permit unit is constructed without T-BACT
  - An increased MICR greater than 10 in one million at any receptor location if the permit unit is constructed with T-BACT
  - A Cancer Burden greater than 0.5
- Chronic HI
  - Cumulative HI increase for any target organ system will not exceed 1.0 at any receptor location.
- Acute HI
  - Acute HI for any target organ system will not exceed 1.0 at any receptor location.

Rule 1401.1—Requirements for New and Relocated Facilities Near Schools

Rule 1401.1 specifies limits for MICR, cancer burden, and noncarcinogenic acute and chronic HIs for new or modified sources of TAC emissions that are within 1,000 feet of a school. As there are no schools within 1,000 feet of the Project site, this rule is not applicable.

SCAQMD Regulation XXX—Federal Operating Permit

Regulation XXX (Title V Permits) provides for the issuance of federal operating permits that contain all federally enforceable requirements for stationary sources as mandated by Title V of the Clean Air Act. Regulation XXX requires major facilities and acid rain facilities undergoing modifications to obtain an operating permit containing the federally enforceable requirements mandated by Title V of the Clean Air Act. A facility shall not construct, modify, or operate equipment at a Title V facility without first obtaining a permit that allows such construction, modification, or operation. An application must be submitted to the SCAQMD that presents all information necessary to evaluate the subject facility and determine the applicability of all regulatory requirements.

SCAQMD Regulation XXXI—Acid Rain Permit Program

Regulation XXXI provides for the issuance of acid rain permits in accordance with Title IV of the Clean Air Act. Regulation XXXI requires a subject facility to hold emissions allowances for SO_x, and to monitor SO_x, NO_x, and CO_2 emissions and exhaust gas flow rates (monitoring of operating parameters such as fuel use and fuel consumption is an allowable alternative to exhaust continuous emission monitoring (CEM) systems). An acid rain facility, such as the Project, must also obtain an acid rain permit as mandated by Title IV of the Clean Air Act. A permit application must be submitted to the SCAQMD at least 24 months before operation of the new units commence. The application must present all relevant sources at the facility, a compliance plan for each unit, applicable standards, and estimated commencement date of operation. The necessary Title IV applications will be included with the Title V/RECLAIM/NSR permit application submitted to the SCAQMD.

SCAQMD Regulation IX—Standards of Performance for New Stationary Sources

Regulation IX incorporates, by reference, the provisions of Part 60, Chapter 1, Title 40 of the Code of Federal Regulations. Regulation IX requires compliance with federal Standards of Performance for Stationary Gas Turbines.

40 CFR Part 60 Subpart KKKK – NOx Emission Limits for New Stationary Combustion Turbines

This standard was finalized on February 9, 2006 (Federal Register publication expected end June 2006). Under this regulation, the term "stationary combustion turbine," includes combined cycle turbine units. Units installed after February 18, 2005, have to comply with this regulation which contains standards for NO_x and SO_2 along with associated monitoring, reporting, recordkeeping, and testing requirements. Emission standards apply at points in the exhaust flow path that are downstream of the duct burner. Units complying with this regulation do not have to comply with Subparts GG (for the turbine) or Da (for the duct burner).

The NO_x standard for units firing natural gas, and rated at greater than 850 MMBtu/hr heat input, is 15 ppm at 15 percent O_2 (or 54 ng/J of useful output or 0.43 lb/MWhr). Compliance is determined on a 30-unit-operating-day rolling average, where "unit operating day," is defined as a 24-hour period between 12:00 midnight and the following midnight during which any fuel is combusted in the unit.

The SO_2 standard is 110 ng/J (or 0.9 lb/MWhr) gross output. Operators can also comply with an alternative standard, limiting potential sulfur emissions to below 26 ng/J (0.06 lb/MMBtu) heat input. Fuel sulfur monitoring is required each unit operating day. However, options are available to reduce frequency or entirely avoid the necessity to monitor (e.g., representative sampling according to the schedule in Part 75, Appendix D or tariff sheet attesting that sulfur content is < 0.05 percent by weight).

VPP NO_x emissions will be 0.08 lb/MWhr (based on 192.6 kW and 14.7 lb NO_x/hr at 65°F) and CEMS will be used to ensure compliance. Natural gas tariff sheet will ensure compliance with the SO_2 standard.

SCAQMD Prohibitory Rules

Relevant prohibitory rules of the SCAQMD applicable to the project include the following:

- **Rule 401—Visible Emissions:** Establishes limits for visible emissions from stationary sources. Rule 401 prohibits visible emissions as dark as or darker than Ringlemann No. 1 for periods greater than 3 minutes in any hour.
- **Rule 402—Nuisance:** Prohibits the discharge from a facility of air pollutants that cause injury, detriment, nuisance, or annoyance to the public, or that damage business or property.
- **Rule 403—Fugitive Dust:** Establishes requirements to reduce the amount of particulate matter entrained in the ambient air as a result of man-made fugitive dust sources. Rule 403 requires the implementation of best available control measures to minimize fugitive dust emissions and prohibits visible dust emissions beyond the property line, a 50 $\mu g/m^3$ incremental increase in PM_{10} concentrations across a facility as measured by upwind and downwind concentrations), and track-out of bulk material onto public, paved roadways.
- **Rule 404—Particulate Matter—Concentration:** Establishes limits for particulate matter emission concentrations. This rule does not apply to emissions resulting from the combustion of liquid or gaseous fuels in steam generators or gas turbines.
- **Rule 405—Particulate Matter—Weight:** Establishes limits for particulate matter mass emission rates. Emission rate limits are based upon the process weight (i.e., fuel burned) per hour.
- **Rule 407—Liquid and Gaseous Air Contaminants:** Establishes limits for CO and SO_x emissions from stationary sources. Rule 407 prohibits CO and SO_x emissions in excess of 2,000 ppm and 500 ppm, respectively, from any source. In addition, equipment that complies with the requirements of Rule 431.1 is exempt from the SO_x limit. Since the facility will comply with Rule 431.1, the SO_x provisions of Rule 407 will not be addressed further.
- **Rule 409—Combustion Contaminants:** Establishes limits for particulate emissions from fuel combustion sources. Rule 409 prohibits particulate emissions in excess of 0.1 grains per cubic foot of gas at 12 percent CO_2 at standard conditions.
- **Rule 431.1—Sulfur Content of Gaseous Fuels:** Establishes limits for the sulfur content of gaseous fuels to reduce SO_x emissions from stationary combustion sources. Rule 431.1 limits the sulfur content of natural gas calculated as hydrogen sulfide (H_2S) to be less than 16 ppmv.

- **Rule 431.2—Sulfur Content of Liquid Fuels:** Establishes limits for the sulfur content of liquid fuels to reduce SO_x emissions from stationary combustion sources. Rule 431.2 limits the sulfur content of diesel fuel purchased after June 1, 2004 to 15 ppmw.
- **Rule 474—Fuel Burning Equipment—Oxides of Nitrogen:** Establishes limits for emissions of NO_x from stationary combustion sources. However, NO_x RECLAIM facilities are exempt from the provisions of Rule 474. Since the Project will be a NO_x RECLAIM facility, Rule 474 is not applicable and will not be addressed further.
- **Rule 475—Electric Power Generating Equipment:** Establishes limits for combustion contaminant (i.e., PM) emissions from subject equipment. Rule 475 prohibits PM emissions that exceed both 11 lbs/hr (per emission unit) and 0.01 grains per dry standard cubic foot (gr/dscf) at 3 percent O_2. These provisions do not apply to replacement equipment if such equipment reduces NO_x emissions by at least 50 percent provided that PM emissions do not exceed 0.05 gr/dscf.
- **Rule 476—Steam Generating Equipment:** Establishes limits for NO_x and PM emissions from steam generating equipment with a maximum heat input rating exceeding 50 MMBtu/hr. However, NO_x RECLAIM facilities are exempt from the NO_x requirements for this rule. Therefore, only the PM provisions of this rule will apply.
- **Rule 53A—Specific Contaminants:** Established limits for emissions of sulfur compounds (i.e., SO_x) and combustion contaminants (i.e., PM) from stationary sources. Rule 53A prohibits SO_2 and PM emissions of 500 ppm and 0.1 gr/dscf at 12 percent CO_2, respectively.

SCAQMD Source Specific Standards

Relevant source-specific standards of the SCAQMD applicable to the project include the following:

- **Rule 1134—Emissions of Oxides of Nitrogen from Stationary Gas Turbines:** Establishes limits for emissions of NO_x from the stationary gas turbines. However, NO_x RECLAIM facilities are exempt from the provisions of Rule 1134. Therefore, Rule 1134 is not applicable to the Project and will not be addressed further.
- **Rule 1135—Emissions of Oxides of Nitrogen from Electric Power Generating Systems:** Establishes limits for emissions of NO_x from the electricity generating systems. However, NO_x RECLAIM facilities are exempt from the provisions of Rule 1135. Therefore, Rule 1135 is not applicable to the Project and will not be addressed further.

SCAQMD Toxics and Other Non-Criteria Pollutant Standards

Relevant toxics and other non-criteria pollutant standards of the SCAQMD applicable to the project include the following:

- **Rule 1404—Hexavalent Chromium Emissions from Cooling Towers:** Prohibits the addition of hexavalent chromium-containing water treatment chemicals to cooling tower circulating water.

8.1.5.3.2 Proposed SCAQMD Rules

Proposed rules of the SCAQMD applicable to the project include the following:

- **Proposed Rule 1309.1—Priority Reserve:** If approved, the provisions that authorized electric generating facilities (EGFs) access to the Priority Reserve that expired on December 31, 2003 would be re-established with a revised sunset date of December 31, 2008. This amendment would allow, as previously done, EGFs access to the AQMD Priority Reserve account for the purpose of obtaining offsets at an offset ration of 1.2:1, after having first established that the required offsets are not reasonably available in the open market, paying a mitigation fee and adhering to certain other requirements of the rule. This rule is being proposed due to the shortage of ERCs, specifically SO_x, CO and PM_{10} in the open market. It is anticipated that this rule will be heard by the SCAQMD Governing Board on September 8, 2006. As currently proposed, this rule would change the offset ratio from the current of 1 to 1, to 1.2 to 1 for sources acquiring ERCs from the Priority Reserve.

All applicable LORS are summarized in Table 8.1-12.

8.1.6 Environmental Analysis

8.1.6.1 Methodology for Estimating Facility Impacts

Emissions sources at VPP include three gas turbines with heat recovery steam generators (HRSG) and supplemental burners (duct burners), and a 14-cell cooling tower, plus minor auxiliary equipment, including an emergency diesel fire pump engine, and two oil/water separators to process stormwater runoff. The normal operating range of the turbines will be between 60 percent and 100 percent of their maximum rated output. As needed, supplemental firing will be provided by the duct burners to maintain required electricity production rates. Evaporative inlet air cooling will also be used to increase power output under certain ambient conditions. An electric auxiliary boiler will be used to provide steam to shorten the duration required to start up the plant. Emission control systems will be fully operational during all operations except startups and shutdowns. Maximum annual emissions are based on operation of the project at maximum firing rates and include the expected maximum number of startup periods that may occur in a year. During turbine startup, emission rates will be higher until steady-state operation for the gas turbine and emission control systems is achieved.

Ambient air quality impact analyses for the VPP have been conducted to satisfy the USEPA, SCAQMD, and CEC requirements during the operational phase for criteria pollutants (NO_2, CO, PM_{10}, $PM_{2.5}$, and SO_2), noncriteria pollutants, and construction phase impacts on a pollutant-specific basis. The following subsections describe the emission sources that have been evaluated, the ambient impact analyses results, and the evaluation of facility compliance with the applicable air quality regulations, including SCAQMD Rule 2005 (NO_x RECLAIM New Source Review), Rule XIII (New Source Review), and the PSD requirements per USEPA Region IX.

TABLE 8.1-12
Laws, Ordinances, Regulations, Standards (LORS), and Permits for Protection of Air Quality

LORS	Purpose	Regulating Agency	Permit or Approval	Schedule and Status of Permit
Federal				
Title 40 Code of Federal Regulations Part 60, Subparts Db and KKKK, National Standards of Performance for New Stationary Sources	Establishes standards of performance to limit the emission of criteria pollutants (air pollutants for which USEPA has established NAAQS) from new or modified facilities in specific source categories.	SCAQMD, with USEPA Region IX oversight	After project review, issues determination of compliance (DOC) with conditions limiting emissions.	Permit submitted concurrently with AFC. Agency approval to be obtained before start of construction. GG will not be applicable once KKKK is published.
Title 40 Code of Federal Regulations Part 63 National Emission Standards for Hazardous Air Pollutants	Establishes national emission standards to limit emissions of hazardous air pollutants (HAPs, or air pollutants identified by USEPA as causing or contributing to the adverse health effects of air pollution but for which NAAQS have not been established) from facilities in specific source categories.	SCAQMD, with USEPA Region IX oversight	Not applicable	Not applicable
Title 40 Code of Federal Regulations Parts 51 & 52 Prevention of Significant Deterioration Program	Requires PSD review and facility permitting for construction of new or modified major stationary sources of air pollution. PSD review applies to pollutants for which the area is in attainment with the NAAQS.	USEPA Region IX	Issues PSD Permit for New Source.	Permit submitted concurrently with AFC. Agency approval to be obtained before start of construction.
Title 40 Code of Federal Regulations Part 51 and 52, NSR	Requires NSR facility permitting for construction or modification of specified stationary sources. NSR applies to pollutants for which ambient concentration levels are higher than NAAQS.	SCAQMD, with USEPA Region IX oversight	After project review, issues DOC with conditions limiting emissions	Permit submitted concurrently with AFC. Agency approval to be obtained before start of construction.
Title 40 Code of Federal Regulations Part 70 Title LV Acid Rain Permitting	Requires reductions in NO_x and SO_2 emissions.	Permit application will be submitted 24 months prior to operation. SCAQMD, with USEPA Region IX oversight	Issues Acid Rain monitoring plan error report after review of application.	Permit submitted concurrently with AFC. Agency approval to be obtained before start of construction.

TABLE 8.1-12
Laws, Ordinances, Regulations, Standards (LORS), and Permits for Protection of Air Quality

LORS	Purpose	Regulating Agency	Permit or Approval	Schedule and Status of Permit
Title 40 Code of Federal Regulations Part 64 CAM Rule	Establishes onsite monitoring requirements for emission control systems.	SCAQMD, with USEPA Region IX oversight	Monitoring conditions included in RECLAIM/Title V permit.	Permit submitted concurrently with AFC. Agency approval to be obtained before start of construction.
State				
California Code of Regulations (CCR) §93300-93347 Toxic "Hot Spots" Act	Requires preparation and biennial updating of facility emission inventory of hazardous substances; risk assessments.	SCAQMD with CARB oversight	After project review, issues DOC with conditions limiting emissions.	Health Risk Assessment submitted as part of AFC.
20 CCR §§1752.5, 2300-2309, and Division 2, Chapter 5, Article 1, Appendix B, Part (k) CEC & CARB Memorandum of Understanding	Requires that CEC's decision on AFC include requirements to assure protection of environmental quality; AFC required to address air quality protection, including mitigation.	CEC	After project review, issues Final DOC with conditions limiting emissions.	SCAQMD issues a DOC to the CEC prior to CEC licensing.
Local				
SCAQMD Rule 201Permit to Construct	Establishes an orderly procedure for the review of new and modified sources of air pollution through the issuance of permits	SCAQMD, with CARB and USEPA Region IX oversight	After project review, issues Final DOC with conditions limiting emissions.	SCAQMD permit application submitted concurrently with AFC. Agency approval to be obtained before start of construction.
SCAQMD Regulation XIII Rule 1303 NSR	Combines federal and state NSR requirements. Establishes pre-construction requirements for new or modified facilities. Rule 2005 applies to RECLAIM facilities.	SCAQMD, with CARB and USEPA Region IX oversight	After project review, issues Final DOC with conditions limiting emissions.	Permit application submitted concurrently with AFC. Agency approval to be obtained before start of construction.
SCAQMD Regulation XVII Prevention of Significant Deterioration Program	Requires PSD review and facility permitting for construction of new or modified major stationary sources of air pollution. PSD review applies to pollutants for which ambient concentrations are lower than NAAQS.	USEPA Region IX	SCAQMD has relinquished the PSD program and Regulation XVII no longer applies. The administering agency for the PSD program is USEPA.	See Federal
SCAQMD Rule 212 Standards for Approving Permits	Requires facility to distribute public notice if the source is within 1,000 feet from school, or emissions or risks exceeding applicable thresholds	SCAQMD, with CARB and USEPA Region IX oversight	Agency to prepare and publish notice prior to permit issuance.	Not Applicable.

TABLE 8.1-12
Laws, Ordinances, Regulations, Standards (LORS), and Permits for Protection of Air Quality

LORS	Purpose	Regulating Agency	Permit or Approval	Schedule and Status of Permit
SCAQMD Rule 1401 NSR of Toxic Air Contaminants	Establishes allowable health risks for new or modified sources.	SCAQMD, with CARB oversight	After project review, issues Final DOC with conditions limiting emissions.	Analysis submitted concurrently with AFC. Agency approval to be obtained before start of construction.
Proposed SCAQMD Rule 1401.1 Requirements for New and Relocated Sources Near Schools	Establishes allowable health risks for new or modified sources near schools	SCAQMD, with CARB oversight	SCAQMD to assess compliance during permit review	Not Applicable.
SCAQMD Regulation XXX Title V Permits	Provides for the issuance of federal operating permits mandated by Title V of the Clean Air Act.	SCAQMD, with USEPA Region IX oversight	Agency to issue Title V Permit.	Permit submitted concurrently with AFC. Agency approval to be obtained before start of construction.
SCAQMD Rule 401 Visible Emissions	Establishes limits for visible emissions from stationary sources	SCAQMD, with CARB oversight	After project review, issues Final DOC with conditions limiting emissions.	Agency approval to be obtained before start of construction.
SCAQMD Rule 402 Nuisance	Prohibits the discharge from a facility of air pollutants that cause injury, detriment, nuisance, or annoyance to the public, or that damage business or property.	SCAQMD, with CARB oversight	After project review, issues Final DOC with conditions limiting emissions.	Agency approval to be obtained before start of construction.
SCAQMD Rule 403 Fugitive Dust	Establishes requirements to reduce the amount of particulate matter entrained in the ambient air as a result of man-made fugitive dust sources.	SCAQMD, with CARB oversight	After project review, issues Final DOC with conditions limiting emissions.	Agency approval to be obtained before start of construction.
SCAQMD Rule 404 Particulate Matter—Concentration	Establishes limits for particulate matter emission concentrations.	SCAQMD, with CARB oversight	After project review, issues Final DOC with conditions limiting emissions.	Agency approval to be obtained before start of construction.
SCAQMD Rule 405 Particulate Matter—Weight	Establishes limits for particulate matter mass emission rates.	SCAQMD, with CARB oversight	After project review, issues Final DOC with conditions limiting emissions.	Agency approval to be obtained before start of construction.
SCAQMD Rule 407 Liquid and Gaseous Air Contaminants	Limits CO and SO_x emissions from stationary sources.	SCAQMD, with CARB oversight	After project review, issues Final DOC with conditions limiting emissions.	Agency approval to be obtained before start of construction.

TABLE 8.1-12
Laws, Ordinances, Regulations, Standards (LORS), and Permits for Protection of Air Quality

LORS	Purpose	Regulating Agency	Permit or Approval	Schedule and Status of Permit
SCAQMD Rule 409 Combustion contaminants	Establishes limits for particulate emissions from fuel combustion sources	SCAQMD, with CARB oversight	After project review, issues Final DOC with conditions limiting emissions.	Agency approval to be obtained before start of construction.
SCAQMD Rule 431.1 Sulfur Content of Gaseous Fuels	Establishes limits for the sulfur content of gaseous fuels to reduce SO_x emissions from stationary combustion sources.	SCAQMD, with CARB oversight	After project review, issues Final DOC with conditions limiting emissions.	Agency approval to be obtained before start of construction.
SCAQMD Rule 431.2 Sulfur Content of Liquid Fuels	Limits the sulfur content of diesel fuel to reduce SO_x emissions from stationary combustion sources.	SCAQMD, with CARB oversight	After project review, issues Final DOC with conditions limiting emissions.	Agency approval to be obtained before start of construction.
SCAQMD Rule 474 Fuel Burning Equipment—Oxides of Nitrogen	Limits NO_x emissions from stationary sources.	SCAQMD, with CARB oversight	Not applicable because the facility is subject to RECLAIM	Not applicable
SCAQMD Rule 475 Electric Power Generating Equipment	Establishes limits for combustion contaminant (i.e., PM) emissions from subject equipment.	SCAQMD, with CARB oversight	After project review, issues Final DOC with conditions limiting emissions.	Agency approval to be obtained before start of construction.
SCAQMD Rule 476 Steam Generating Equipment	Limits NO_x and combustion contaminants from stationary combustion sources.	SCAQMD, with CARB	After project review, issues Final DOC with conditions limiting emissions.	Agency approval to be obtained before start of construction.
SCAQMD Rule 1110.2 Emissions form Stationary Internal Combustion Engines	Limits emissions of NO_x, VOC, and CO form stationary internal combustion engines. Engines are exempt from this rule if each is operated less than 200 hours per year. RECLAIM exemption as well for NO_x, requirements of this rule.	SCAQMD, with CARB oversight	After project review, issues Final DOC with conditions limiting emissions.	Agency approval to be obtained before start of construction.
SCAQMD Rule 1134 Emissions of Oxides of Nitrogen from Stationary Gas Turbines)	Limits NO_x from stationary gas turbines.	SCAQMD, with CARB oversight	Not applicable because the facility is subject to RECLAIM	Not applicable
SCAQMD Rule 1135 Emissions of Oxides of Nitrogen from Electric Power Generating Systems	Limits NO_x from electric power generating systems.	SCAQMD, with CARB oversight	Not applicable because the facility is subject to RECLAIM	Not applicable

TABLE 8.1-12
Laws, Ordinances, Regulations, Standards (LORS), and Permits for Protection of Air Quality

LORS	Purpose	Regulating Agency	Permit or Approval	Schedule and Status of Permit
SCAQMD Rule 1146 Emissions of Oxides of Nitrogen from Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters	Limits NO_x and CO from industrial, institutional, and commercial steam generating units. Project exempted from NO_x requirements of this rule through participation in the NO_x RECLAIM program.	SCAQMD, with CARB oversight	Not applicable because there will be no boilers, heaters or steam generators, subject to this rule, at this facility.	Not applicable
SCAQMD Rule 1404 Hexavalent Chromium Emissions from Cooling Towers	Prohibits the use of hexavalent chromium containing water treatment chemicals	SCAQMD, with CARB oversight	After project review, issues Final DOC with conditions limiting emissions.	Agency approval to be obtained before start of construction.
SCAQMD Rule 1470 Requirements for Stationary Diesel Fueled Internal Combustion and Other Compression Ignition engine	Establishes fuel and emissions requirements of diesel engines. Limits non-emergency operating hours for standby engines.	SCAQMD, with CARB oversight	After project review, issues Final DOC with conditions limiting emissions.	Agency approval to be obtained before start of construction.

8.1.6.1.1 Emission Estimates

As discussed in Section 2, the VPP project will consist of three Siemens SGT6-5000F (formally Siemens-Westinghouse 501FD) combustion turbines, rated at 193 MW (gross output at site design conditions); two heat recovery steam generators (HRSGs) equipped with duct burners with a maximum rating of 240 MMBtu/hr (HHV, each); a 365-MW (gross output at site design conditions) condensing steam turbine; one electric auxiliary boiler; a 14-cell cooling tower with a 168,088-gallon-per-minute recirculation rate and high efficiency drift eliminators. Incidental equipment will include a 210 horsepower (hp) emergency diesel fire pump with a 400-gallon fuel tank, 2 oil/water separators each rated at 325 gallons per minute throughput, three selective catalyst reduction systems with ammonia injection systems and associated aqueous ammonia storage tanks. Performance specifications are provided in Appendix 8.1B for the turbines. Natural gas will be the only fuel consumed during plant operation. There will be no distillate fuel oil firing at VPP except in the emergency fire pump engine.

Natural gas combustion results in the formation of NO_x, SO_2, volatile organic compounds (VOC), PM_{10}, and CO. Because natural gas is a clean burning fuel, there will be minimal formation of combustion PM_{10} and SO_2. The combustion turbines will be equipped with ultra-low NO_x combustors that minimize the formation of NO_x and CO. To further reduce NO_x emissions, selective catalytic reduction (SCR) will also be used. In addition, oxidation catalyst control systems will be used to reduce CO and VOC emissions.

Emission Profile

There will be three discrete phases of the project. Each is addressed in this air quality assessment. The first phase will be the construction of the facility, the second phase will be the facility commissioning, and the final phase will be the new facility operation.

Construction Emissions—To evaluate the emissions expected to occur during the 24-month construction period, the emission sources were divided into two categories: activities within the boundary of the proposed power plant site (i.e., onsite) and activities related to the project that occur outside the boundary (i.e., offsite). Onsite construction emissions would be generated during power plant construction. Onsite emission sources include exhaust emissions from construction equipment and motorized vehicles, and fugitive dust emissions. Emissions from construction of the recycled water and potable water lines were included with onsite construction emissions because the pipeline will only be constructed onsite in order to connect to the water mains adjacent to the site.

Offsite emission sources include the exhaust emissions from construction equipment and motorized vehicles used to install the project-related linears (i.e., the natural gas, sewer and transmission lines), as well as, the exhaust emissions from motor vehicles traveling to and from the proposed work site. Minor amounts of fugitive dust would also be generated from vehicle travel on paved roadways. Table 8.1-13 presents the total project emissions and the maximum daily emission rate for each pollutant during construction. The methodology used to estimate the construction emissions are provided in Appendix 8.1A.

TABLE 8.1-13
Total Project Construction Emissions

Total Tons for Project Construction	NO_x	CO	VOC	SO_2	PM_{10}
Onsite Power Plant Construction (tons)	18.8	8.3	2.2	0.070	7.9
Offsite Power Plant Construction Motor Vehicles (tons)[a]	5.4	31.0	3.4	0.024	21.6
Offsite Linear Construction (tons)[b]	7.0	3.99	0.96	0.030	2.9
Total Tons (Onsite plus Offsite)	**31**	**43**	**6.5**	**0.12**	**32**
Maximum Lb/day					
Onsite Power Plant Construction (lbs/day)	123	54.5	13.5	0.30	36.7
Offsite Power Plant Construction Motor Vehicles (lbs/day)	36.6	212	23.2	0.17	148
Offsite Linear Construction (lbs/day)	102	59.1	14.3	0.43	43.7

[a] Offsite motor vehicles includes vehicle emissions from worker commute trips and delivery truck trips to the site.
[b] Offsite linear construction represents emissions from the construction of the natural gas, transmission, and sewer lines.

Commissioning Phase Emissions—Initial operation will occur when VPP undergoes the commissioning period. During this period, the turbines will be operated at various loads with and without the emission control systems fully operational. To reduce emissions during commissioning, CO catalysts will be installed prior to the first firing of the turbines. They will reduce CO and VOC emissions during commissioning of the turbines. In addition, the combustors will be tuned early in the commissioning schedule. Emissions during the commissioning period were estimated based on the commissioning schedule and turbine performance provided by the vendor. Hourly emissions were estimated for each commissioning event, based on turbine operation and a ramping rate of 3 megawatts per minute to the commissioning event load. Emissions during the ramping period were estimated using the emissions at an intermediate load.

Table 8.1-14 presents the maximum hourly per turbine emission rates for NO_x, CO, PM_{10}, SO_2, and VOC. An annual evaluation was not done since the commissioning period is expected to occur for only 99 days. During the commissioning phase, VPP will ensure that air pollutant emissions are reduced to the extent feasible. Appendix 8.1B presents the commissioning schedule, turbine performance, and VPP's estimate of emissions during each commissioning event.

TABLE 8.1-14
Facility Commissioning Emission Rate (per Turbine)*[a]

	NO_x	CO	VOC	SO_2	PM_{10}
Maximum Hourly, lb/hour	142	386	122	1.3	11.9
Maximum Hourly, grams/second	17.91	48.62	15.36	0.16	1.50

***** The maximum hourly NOx emission rate is based on the extended bypass blowdown to condenser and HRSG tuning event. The maximum hourly CO and VOC emission rate is based on CTG testing at full speed no load (FSNL)
See Appendix 8.1B, Table 8.1B.4.

Operational Phase—Operational phase emission estimates were prepared for the two expected operating modes. The first operating mode is the steady state and the second is the startup and shutdown mode. Emission estimates for these two operating modes are based on vendor data and engineering estimates.

- **Steady State Emissions:** The CTG operational emission rates for steady state operations have been estimated from vendor data, project design criteria, and established emission calculation procedures. Maximum emissions, resulting from the highest possible fuel inputs, are used for scenarios with duct burner firing. Operational scenarios without duct burner firing are based on recent vendor test data. Emission estimates and vendor data are provided in Appendix 8.1B. The maximum emission rates for the combustion turbines are shown in Table 8.1-15.

TABLE 8.1-15
Maximum Pollutant Emission Rates, Each Gas Turbine[a]

	Operation without Duct Burners		Operation with Duct Burners	
Pollutant	**ppmvd @ 15% O_2**	**Each Gas Turbine (lb/hr)**	**ppmvd @ 15% O_2**	**Each Gas Turbine (lb/hr)**
NO_x	2	15.4	2	16.5
CO	2	9.4	2	10.0
VOC	1	2.7	2	5.8
PM_{10}[b]	NA[c]	9.8	NA[c]	11.9
SO_2[d]	< 1	1.22	< 1	1.30
Ammonia	5	13.3	5	15.0

[a] Maximum values exclude startups and shutdowns. Maximum emissions without duct burners are based on 35°F baseload. Maximum emissions with duct burners and evaporative cooler are based on the theoretical maximum at 65°F.

[b] 100 percent of particulate matter emissions assumed to be emitted as PM_{10} and $PM_{2.5}$; $PM_{10}/PM_{2.5}$ emissions include both front and back half as those terms are used in USEPA Method 5.

[c] Not available.

[d] SO_2 Emissions using the emission factor 0.6 lb SO_2 per MMCF natural gas based on the SCAQMD AER Program.

See Tables 8.1B.5a and 5e in Appendix 8.1B.

- **Startup and Shutdown Emissions:** The VPP plant systems have been designed using the Siemens SGT6-5000F Gas Turbine, which incorporates a new Fast Start design. This design includes instrumentation and controls that provide a high-level of automation, resulting in a plant that is safe and is easy to operate with a high degree of flexibility throughout its operating range. The Fast Start design incorporates the following features:
  - Properly integrated system design and controls to achieve fast plant starts on a consistent basis
  - A once-through HRSG (Benson Boiler) design with a 100 percent steam bypass system
  - Systems configuration and equipment to facilitate achieving operating chemistry during each start sequence
  - An electric auxiliary boiler

The major benefit of the Fast Start design is to reduce plant startup times in comparison to conventional combined cycle plants. The shorter startup times result in reduced air emissions and fuel savings for every start. An electric auxiliary boiler provides steam to the steam turbine and air removal systems enabling the condenser vacuum to be achieved quicker. This is accomplished using Siemen's highly automated master load controller that operates the plant in a sliding pressure mode in combination with the Benson Boiler and a steam bypass system. This sliding pressure mode allows 100 percent of the steam produced by the HRSGs to bypass the steam turbine and be directed to the condenser. This control mode allows for the gradual heating of the steam turbine by modulating the steam bypass system valves, which directs steam to the steam turbine for heating of the steam turbine consistent with the manufacturer's recommendations. This Fast Start design allows the steam turbine to reach operating temperatures independent of combustion turbine's operating load. This reduces the time the combustion turbines are operated at loads where the emission control system performance is not optimized.

The Fast Start design of the VPP will allow the facility to complete a plant start up within a 1-hour period. There will be two startup scenarios: (1) hot/warm start and (2) cold start. A hot/warm start up is expected to take approximately 33 minutes from fuel initiation until a base load operating rate is achieved. A cold start up is expected to take approximately 29 minutes from fuel initiation until a 70 percent load rate is achieved. The difference between these starting scenarios for VPP is that a cold start ramps from zero load to a 70 percent load (combustion turbine generator load) and then stays at this load for an extended duration in order to heat the steam turbine. Whereas the hot/warm start ramps from zero load to base load, and includes some operation at load rates where the emission control systems are operational, but not achieving the proposed BACT levels for NO_X, CO, and VOC emissions. A cold start is presumed to be completed when the turbine reaches 70 percent load because all emission control systems will be fully operational at this load, and emissions will be in compliance with BACT limits. A shutdown is expected to take approximately 44 minutes for the CTG to ramp from base load to zero load. As with the hot/warm starts, the emission control systems are operational, but not achieving the proposed BACT levels for NO_X, CO, and VOC emissions.

The startup and shutdown emission rates are shown in Table 8.1-16. $PM_{10}/PM_{2.5}$ and SO_2 emissions have not been included in this table because emissions of these pollutants will be lower during a startup or shutdown period than during baseload facility operation. Since startup emissions are expected to be higher at lower temperatures, it was decided to use emission rates at 35°F for all emission calculations for startup scenarios. The methodology used to estimate the startup and shutdown emissions are provided in Appendix 8.1B, Table 8.1B.6a.

TABLE 8.1-16
Facility Startup/Shutdown Emission Rates per Turbine*

	NO_x	CO	VOC
Cold Startup, lb/start	29.2	274.2	32.6
Hot-Warm Startup, lb/start	28.1	265	31.6
Shutdown, lb/shutdown	21.5	87.2	10.2

* Estimated based on vendor data and emissions per startup or shutdown event October 2005. See Appendix 8.1B, Table 8.1B.6a.

8.1.6.1.2 Maximum Fuel Usage

Natural gas will be the only fuel consumed during gas turbine operation; the typical natural gas composition is shown in Table 8.1-17. There will be no distillate fuel oil firing in the CTGs.

Natural gas combustion results in the formation of NO_x, CO, VOC, SO_2, PM_{10}, and $PM_{2.5}$. Because natural gas is a clean-burning fuel, there will be minimal formation of combustion PM_{10}, $PM_{2.5}$, and SO_2. Advanced combustion controls that minimize the formation of NO_x and CO will be installed on the combustion turbines. In addition, NO_x and CO emissions will be further reduced by installing SCR and oxidation catalyst systems in the turbine exhaust ducts.

TABLE 8.1-17
Typical Natural Gas Specifications

Component Analysis		Chemical Analysis	
Component	**Average Concentration, Volume**	**Molecular Weight**	**Weighted Average**
CH_4	97.95	16.04	15.71
C_2H_6	1.149	30.07	0.346
C_4H_{10}	0.0283	58.12	0.016
C_5H_{12}	0.00456	72.15	0.004
C_6H_{14}	0.00382	86.18	0.003
N_2	0.3876	28.01	0.109
CO_2	0.4673	44.01	0.206
		Average	**16.40**

Reference: Siemens Data Sheet, May 2006. See Table 8.1B.5a in Appendix 8.1B.

Table 8.1-18 presents the maximum fuel usage expected for each CTG and all three turbines combined. The maximum fuel usage was estimated based on the maximum CTG firing rate and the annual operating hours for the facility. The daily fuel usage was based on 24 hours per day of operation at the maximum hourly fuel usage rate.

TABLE 8.1-18
Maximum Facility Fuel Use (MMBtu)*

Period	Gas Turbine (each)	Total Fuel Use (all units)
Per Hour	2,200	6,600
Per Day	52,800	158,400
Per Year	19,272,000	57,816,000

* Based on firing rates at 65ºF with duct burner firing and evaporative coolers, 24 hours per day, 365 days per year per turbine. See Table 8.1B.5e in Appendix 8.1B.

8.1.6.1.3 Facility Emissions

Hourly cooling tower emissions were calculated from the maximum design cooling water total dissolved solids (TDS) level of 3,530 mg/L, 5 cycles of concentration, and a design cooling water recirculation rate of 168,088 gallons per minute. The annual cooling tower emissions reflect the average expected TDS levels, 5 cycles of concentration, 168,088 gallons per minute recirculation rate for 24 hours per day, 365 days per year of operations.

The facility turbine emission estimates shown in Table 8.1-19 are based on the emission rates shown in Table 8.1-15, the startup emission rates shown in Table 8.1-16, and the ambient operating conditions that result in the highest emission rates. Maximum hourly emissions for NO_x, CO, and VOC are based on cold start emissions and SO_2 and PM_{10} emissions are based on 100 percent load with duct burner and evaporative cooler at 65°F. Maximum daily turbine emissions are based on one start up and one shutdown per CTG and approximately 23 hours of CTG operation at 100 percent load rate with duct burner and evaporative cooler operating at 65°F. Maximum annual emissions were based on 5,000 hours of normal operating conditions at 65°F with duct burners and evaporative cooler on, plus 192 starts and stops, with the remainder of the annual hours excluding start ups and shutdown hours at 65°F without duct burner operating and with the evaporative cooler operating. Detailed emission estimates are provided in Appendix 8.1B, Tables 8.1B.6a through 8.1.6d, 8.1B.8, and 8.1B.9.

Cooling tower emissions are based on the maximum total dissolved solids concentration expected based on 5 cycles of concentration, the tower's rated recirculation rate, a 0.0005 percent efficient drift eliminator, and 8,760 hours per year operation.

TABLE 8.1-19
VPP Facility Emissions

	NO_x	SO_2	VOC	CO	PM_{10}
Maximum Hourly Emissions per unit, lb/hr[a]					
Turbine	37.2	1.3	34.0	279	12
Cooling Tower	-	-	-	-	1.5
Emergency Fire Pump	0.97	0.001	0.02	0.1	0.02
Emergency Fire Pump Fuel Tank	-	-	0.00007	-	-
Oil/Water Separator	-	-	0.0001	-	-
Total Project (lb/hr)	**38.2**	**1.30**	**34.0**	**279**	**13.5**
Maximum Facility Daily Emissions, lb/day					
Turbines[b]	1,280	92.2	525	1,768	841
Cooling Tower	-	-	-	-	36
Emergency Fire Pump	0.97	0.001	0.02	0.1	0.02
Emergency Fire Pump Fuel Tank	-	-	0.002	-	-
Oil/Water Separators	-	-	0.007	-	-
Total Project (lb/day)	**1,281**	**92.2**	**525**	**1,768**	**877**

TABLE 8.1-19
VPP Facility Emissions

	NO_x	SO_2	VOC	CO	PM_{10}
Maximum Annual Emissions, lbs/year[c]					
Turbines	432,200	32,431	119,860	453,426	282,232
Cooling Tower	-	-	-	-	11,900
Emergency Fire Pump	48.3	0.1	1.0	5.2	0.9
Emergency Fire Pump Fuel Tank	-	-	0.6	-	-
Oil/Water Separators	-	-	2.5	-	-
Total Project (lb/yr)	**432,248**	**32,431**	**119,864**	**453,431**	**294,133**
Total Project (tpy)	**216**	**16.2**	**59.9**	**227**	**147**

[a] Worst case hourly emissions for NO_x, CO, and VOC are from a cold start up, and for PM_{10} and SO_2 are from the steady state operation.

[b] Daily emissions include one startup and one shutdown and 22.8 hours of steady state operation at 65°F with evaporative coolers operating and 240 MMBtu/Hr of duct burners firing.

[c] Annual emissions are based on each CTG operating with 192 startups and shutdowns per year, 5,000 hours of duct burner firing at 65°F with evaporative coolers operating and 240 MMBtu/Hr duct burners firing, and 3,526 hours of 65°F operation at base load with evaporative coolers operating and no duct burner operation. See Appendix 8.1B.

The emergency fire pump emissions were estimated based on one-half hour per day and 50 hours per year of operation. The emergency fire pump fuel tank emissions are based on 800 gallons of fuel use per year.

The oil/water separator emissions were estimated using the USEPA TANKS program, with the rated throughput capacity of each separator of 325 gallons per minute and assuming the stormwater has the same emission characteristics of diesel fuel.

It should be noted that the emissions presented for the daily and annual turbine emissions reflect the maximums, and that daily emissions reflecting the SCAQMD ERC/RTC liability will be estimated based on SCAQMD methodology (as presented in Table 8.1-42).

8.1.6.1.4 Noncriteria Pollutant Emissions

Noncriteria pollutants are compounds that have been identified as pollutants that pose a significant health hazard. Nine of these pollutants are regulated under the federal New Source Review program: lead, asbestos, beryllium, mercury, fluorides, sulfuric acid mist, hydrogen sulfide, total reduced sulfur, and reduced sulfur compounds.[1] In addition to these 9 compounds, the federal Clean Air Act lists 187 substances as potential hazardous air pollutants (Clean Air Act Sec. 112(b)(1)). The SCAQMD has also published a list of compounds it defines as potential toxic air contaminants (Rule 1401). Any pollutant that may be emitted from the project and is on the federal New Source Review list, the federal Clean Air Act list, and/or the SCAQMD Rule 1401 list has been evaluated as part of the AFC. Emission factors were determined by reviewing the available technical data, determining the products of combustion, and/or using material balance calculations.

[1] These pollutants are regulated under federal and state air quality programs; however, they are evaluated as noncriteria pollutants by the California Energy Commission.

Noncriteria pollutant emission factors for the analysis of emissions from the gas turbines were obtained from AP-42 (Table 3.1-3, dated April, 2000, and Table 3.4-1 of the Background Document for Section 3.1). Although the turbines/HRSGs will be equipped with oxidation catalyst systems, only the acrolein, benzene, and formaldehyde emission factors reflect any control.

In conformance with the SCAQMD's guidance, the emergency diesel-fueled fire pump noncriteria pollutant emission factors were taken from data compiled by the Ventura County APCD. The emergency fire pump fuel tank is not expected to generate noncriteria pollutant emissions based on a review of the Material Safety Data Sheet (MSDS) for Arco ECD-1 diesel fuel for noncriteria pollutants.

The maximum hourly and annual cooling tower noncriteria pollutant emissions were calculated from an analysis of cooling tower water supplies. Maximum hourly cooling tower emissions were based on the maximum cooling water design concentrations, and the annual emissions were based on the annual average cooling water design concentrations.

The oil water separators are not expected to generate noncriteria pollutant emissions based on a review of the MSDS for turbine lubricating oil for noncriteria pollutants.

The noncriteria pollutants that may be emitted from the project are shown in Table 8.1-20. Appendix 8.1B, Tables 8.1B.7a through 7d provide the detailed emission calculations for noncriteria pollutants.

TABLE 8.1-20
Noncriteria Pollutant Emissions For The Project (tons per year)

Compound	CTGs[a]	Cooling Tower	Diesel Engine	Total
Ammonia[b]	197	-	-	197
Acetaldehyde	1.1	-	0.0004	1.1
Acrolein	0.1	-	0.00002	0.1
Benzene	0.09	-	0.0001	0.09
1,3-Butadiene	0.01	-	0.0001	0.01
Ethylbenzene	0.9	-	0.00001	0.9
Formaldehyde	9.9	-	0.001	9.9
Naphthalene	0.04	-	0.00001	0.04
PAHs[c]	0.0004	-	0.0000	0.0004
Propylene Oxide	0.8	-	-	0.8
Toluene	3.6	-	0.0001	3.6
Xylene	1.8	-	0.00002	1.8
Chlorine	-	0.009	-	0.01
Manganese (Mn)	-	0.0003	0.000002	0.0003
Cyanide (total)	-	0.00006	-	0.00006
Arsenic	-	0.00001	0.000001	0.00001

TABLE 8.1-20
Noncriteria Pollutant Emissions For The Project (tons per year)

Compound	CTGs[a]	Cooling Tower	Diesel Engine	Total
Cadmium	-	0.00184	0.000001	0.00184
Hexavalent Chromium	-	0.00003	0.0000001	0.00003
Copper	-	0.0005	0.000002	0.0005
Lead	-	0.00001	0.00000	0.00002
Nickel	-	0.0007	0.000002	0.0007
Mercury	-	0.000368	0.000001	0.000369
Silver	-	0.00142	-	0.00142
Zinc	-	0.0005	0.00001	0.0005
Barium	-	0.0004	-	0.0004
Selenium	-	0.000006	0.000001	0.00001
Antimony	-	0.00001	-	0.00001
Beryllium	-	0.000003	-	0.000003
			Total Emissions (including Ammonia)	**215**
			Total HAP Emissions	**18.3**
			Highest Individual HAP - Formaldehyde	**9.9**

Source: Appendix 8.1B, Tables 8.1B.7a through 7d.

[a] Obtained from AP-42 Table 3.1-3 revised April 2000 for natural-gas-fired combustion turbines. Formaldehyde, benzene, and acrolein emission factors are from the Background Document for AP-42 Section 3.1, Table 3.4-1 for a natural-gas-fired combustion turbine with an oxidation catalyst.

[b] Based on an exhaust ammonia limit of 5 ppmv at 15 percent O_2, an F-factor of 8710, and 24 operating hours per day, 365 days per year for each turbine.

[c] Carcinogenic PAHs only; naphthalene considered separately. Emission Factor based on two separate source tests (2002 and 2004) from the Delta Energy Center located in Pittsburg, California.

The health risk analysis conducted for the project assumed the combustion turbines were operated 8,760 hours per year with 5,000 hours of duct burner firing, at the maximum heat input rating for the turbines. By estimating the noncriteria pollutants in this manner, VPP analyzed the public health impacts with a higher potential fuel input and subsequently higher emissions than has been shown to be practical in source testing. This assumption was not used to estimate the ammonia emissions. The ammonia emissions were estimated based on a 5 ppm concentration in the exhaust gases, the maximum turbine heat input rate, an exhaust gas flow rate factor of 8,710 sdcf/MMBtu of fuel combusted, and 24 hours per day, 365 days per year of operation at the maximum turbine heat input rate.

8.1.6.2 Air Quality Impact Analysis

An ambient air quality impact analysis was conducted to compare worst-case ground-level impacts resulting from the construction and operation of the proposed Vernon Power Plant Project with established state and federal AAQSs and applicable SCAQMD significance criteria. The analysis was conducted in accordance with the air quality impact analysis guidelines developed by the USEPA (40 CFR Part 51, Appendix W: *Guideline on Air Quality Models*).

The analysis includes an evaluation of the possible effects of simple, intermediate, and complex terrain, and aerodynamic effects (downwash) due to nearby building(s) and structures on plume dispersion and ground-level concentrations. A basic Gaussian plume model was used in this analysis. The model assumes that the concentrations of emissions within a plume can be characterized by a Gaussian distribution of gaseous concentrations about the plume centerline. Gaussian dispersion models are approved by the USEPA and SCAQMD for regulatory use and are based on conservative assumptions (i.e., the models tend to over predict actual impacts by assuming steady-state conditions, no pollutant loss through conservation of mass, no chemical reactions, etc.).

The following subsections present:

- Modeling methodology for evaluating the impacts on ambient air quality
- Modeling scenarios and source data used to evaluate the impacts on ambient air quality
- Results of the ambient air quality modeling analyses
- Results of the Class I Area impact analysis

8.1.6.2.1 Modeling Methodology for Evaluating Impacts on Ambient Air Quality

This section outlines the air dispersion modeling techniques used to assess the impacts from the construction, commissioning, and operation of the proposed project. The modeling methodology is consistent with the modeling protocol submitted to the CEC and SCAQMD (Appendix 8.1C) and follows the modeling guidance provided in the USEPA's *Guideline on Air Quality Models* (40 CFR Part 51, Appendix W, November 9, 2005) as well as SCAQMD's modeling guidance.

Model Selection

The construction, commissioning, and operational air quality impact analyses were performed using the Industrial Source Complex, Short-Term Model (ISCST3, Version 02035). ISCST3 is a Gaussian dispersion model capable of assessing impacts from a variety of source types in areas of simple, intermediate, and complex terrain. The model can account for area, line, and volume source types; downwash effects; and gradual plume rise as a function of downwind distance. The model is capable of estimating concentrations for averaging periods from one hour to one year. The required emission source data inputs to ISCST3 include source locations, source elevations, stack heights, stack diameters, stack exit temperatures, stack exit velocities, and pollutant emission rates. The source locations are specified for a Cartesian (x,y) coordinate system where x and y are distances east and north in meters, respectively. The Cartesian coordinate system used for these analyses is the Universal Transverse Mercator Projection (UTM), 1927 North American Datum (NAD 27).

Model Options

ISCST3 model options include use of site-specific vertical profiles of wind speed and temperature, consideration of stack and building wake effects, and time-dependent exponential decay of pollutants. Except where explicitly stated (such as the no-calm processing routine), USEPA recommended default values were used for the construction, commissioning, and operational analyses. A number of these default values are required for USEPA and SCAQMD approval and are listed below.

- Urban dispersion coefficients
- Final plume rise
- Stack tip downwash
- Buoyancy induced dispersion
- No calm processing (SCAQMD requirement)
- No missing data processing
- Default wind profile exponents
- Default vertical potential temperature gradients
- 10-meter anemometer height

Pursuant to SCAQMD guidance that urban dispersion mixing should be assumed within the SCAQMD, the urban dispersion mode was used for this air quality impact analysis.

Meteorological Data

The CEC requires one year of meteorological data approved by the CARB or the local air pollution control district to be used in the air modeling. For dispersion modeling analyses in the area of the proposed site, the SCAQMD recommended the use of the 1981 Vernon meteorological data file[2], which has been pre-formatted for use with the Industrial Source Complex – Short Term (ISCST3) model.

Background Data

The background data need not be collected onsite, as long as the data are representative of the air quality in the subject area (40 CFR 51, Appendix W, Section 9.2). The following three criteria were used for determining whether the background data would be representative: (1) location, (2) data quality, and (3) data currentness. These criteria are defined as follows:

- **Location:** The measured data must be representative of the areas where the maximum concentration occurs for the proposed stationary source, existing sources, and a combination of the proposed and existing sources.

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

- **Data Currentness:** The data are current if they have been collected within the preceding three years and are representative of existing conditions.

Based on the criteria above, background concentrations for VPP were taken from the Lynwood monitoring station (11220 Long Beach Boulevard, Lynwood, CA). If data were unavailable for the Lynwood station, background concentrations were taken from the

[2] The surface wind speeds and directions were collected at the SCAQMD's Vernon monitoring station (Station ID 52132), while the upper air sounding data used to estimate hourly mixing heights were collected at the Los Angeles International Airport (LAX) monitoring station.

North Main Street station (1630 North Main Street, Los Angeles, CA). Table 8.1-21 presents the maximum concentrations of NO_2, SO_2, CO, PM_{10}, and $PM_{2.5}$, recorded for the most recent years (2003 through 2005) from the Lynwood and North Main Street stations.

In evaluating the impacts of construction, commissioning and operation on ambient air quality, modeling of the ambient impacts for the project were added to the representative background concentrations in Table 8.1-21, and the results were compared to the state and federal ambient air quality standards for SO_2, NO_2, PM_{10}, and CO. The modeled PM_{10} concentrations for each permit unit were also compared to the allowable increase significance thresholds established by the SCAQMD in Rule 1303.

TABLE 8.1-21
Background Air Concentrations for the Vernon Power Plant [a] 2003 – 2005

Pollutant	Averaging Time	2003		2004		2005		Average	Maximum
		ppm	µg/m³	ppm	µg/m³	ppm	µg/m³	µg/m³	µg/m³
NO_2	1-hour	0.13	245	0.1	188	0.11	207	**213.2**	**245**
	Annual	0.0312	58.7	0.0301	56.6	0.0312	58.7	**58.0**	**58.7**
SO_2	1-hour	0.05	130.9	0.08	209.4	0.07	183.2	**174.5**	**209.4**
	3-hour	0.011	28.8	0.018	47.1	0.016	41.9	**39.3**	**47.1**
	24-hour	0.006	15.7	0.015	39.3	0.01	26.2	**27.0**	**39.3**
	Annual	0.002	5.2	0.003	7.9	0.002	5.2	**6.1**	**7.9**
CO	1-hour	12	13,742	10	11,452	7	8,016	**11,070**	**13,742**
	8-hour	7.3	8,360	6.7	7,673	5.9	6,757	**7,596**	**8,360**
PM_{10}	24-hour		81		72		70	**74**	**81**
	Annual [b]		34.6		32.7		29.6	**32.4**	**34.6**
$PM_{2.5}$	24-hour		54.8		55.8		54.6	**55.2**	**55.8**
	Annual [b]		20.2		18.5		17.5	**14.1**	**20.2**

Sources: SCAQMD, http://www.aqmd.gov/smog/historicaldata.htm; USEPA Air Data, http://www.epa.gov/air/data/monvals.html. The annual SCAQMD ambient air quality data summaries were used as the primary reference. The USEPA AIRS database values were used when SCAQMD data were unavailable.

[a] Conversion from ppm to µg/m³ at 25° Celsius and 760 torr.
[b] Annual Arithmetic Mean

Receptor Data

Cartesian coordinate receptor grids were used to assess the ground-level pollution concentrations surrounding the project area, identify the extent of significant impacts, and identify the maximum impact locations.

For the construction air quality impact analyses, a receptor grid was set up starting from the property boundary and extending to approximately 2 km in all directions. Receptor spacing was 30 meters out to 2 km.

For the commissioning and operational air quality impact analyses, a fine receptor grid (i.e., 30-meter resolution) was used around the fence line and extended out 10 kilometers (km). The fine receptor grid was used for both the screening and detailed modeling analysis. Concentrations within the facility fence line were not calculated.

Receptor elevations, including those around the fenceline, were determined using the 7.5-minute U.S. Geological Survey (USGS) Digital Elevation Model (DEM) data (i.e., 30-meter

spacing between grid nodes). All coordinates were referenced to the UTM Zone 11, NAD27. Source base elevations, which are used in part to determine the height of the plume relative to the receptors, were based on the engineering site grading plan.

Building Downwash and Good Engineering Practice Assessment

For the commissioning and operational analyses, the USEPA's Building Profile Input Program (BPIP) (Dated 04112) was used to calculate the projected building dimensions required for ISCST3 evaluation of impacts from building downwash. The construction site was represented as area source, therefore, an evaluation of the Good Engineering Practice (GEP) or building downwash was not applicable. The required ISCST3 input data and detailed building parameters are located in Appendix 8.1C.

GEP as used in the modeling analyses is the maximum height allowed to ensure that emissions from the stack do not result in excessive concentrations of any air pollutant in the immediate vicinity of the source as a result of atmospheric downwash, eddies, or wakes that may be created by the source itself, nearby structures, or nearby terrain obstacles. In addition, the GEP modeling restriction ensures that any required regulatory control measure is not compromised by the effect of that portion of the stack that exceeds the GEP.

The USEPA guidance ("Guideline for Determination of Good Engineering Practice Stack Height," Revised 6/85) for determining GEP stack height (H_g) is based on the height of a nearby structure(s) measured from the ground-level elevation at the base of the stack (H) and the lesser dimension, height or projected width, of the nearby structure(s) (L) as follows:

$$Hg = H + 1.5L$$

Based on the onsite and offsite building dimensions as input into BPIP, the calculated GEP height for the facility is 72.4 meters. The proposed turbine stack height of 54.9 meters does not exceed GEP stack height.

8.1.6.2.2 Modeling Scenarios and Source Data Used to Evaluate Impacts on Ambient Air Quality

In evaluating the impacts of the proposed project on ambient air quality, modeling of the worst case ambient impacts for the project were added to representative background concentrations from Table 8.1-21, and the results compared to the state and federal ambient air quality standards.

Construction Impacts Analysis

Based on the 24-month construction schedule, project emissions were divided into 3 categories: onsite exhaust, fugitive dust (both from vehicle and construction equipment), and windblown fugitive dust. The Localized Significance Threshold Methodology (SCAQMD, 2003) was used to convert the predicted 1-hour NO_x concentration to NO_2. For the remaining pollutants, the maximum concentrations were added to background concentrations and compared to the applicable standards. The results of the construction modeling analysis are presented in Section 8.1.6.2.3. A detailed summary of the assumptions and emission factors used to estimate the emission rates and the details of the dispersion modeling approach are presented in Appendix 8.1A.

Commissioning Impacts Analysis

During the commissioning period, the CTGs are operated without the emission control systems fully operational. In order to control emissions during this period, VPP will install

the oxidation catalyst system prior to first fire. Based on vendor estimates, this provides a CO control efficiency of 89 percent. The ultra-low NOx combustors and SCR will be tuned as soon as feasible during commissioning period. After this point, NO_x emissions will be at BACT during operations above 60 percent CTG loads when ammonia is fed to the SCR. However, during the commissioning period, emissions of NO_x and CO will be significantly higher than during other operating conditions. Therefore, the Applicant analyzed the ambient air quality impacts during commissioning.

A screening analysis was used to predict the maximum impact for each of the commissioning scenarios. The screening analysis was conducted using a unit emission factor, ISCST3, and the 1981 SCAQMD Vernon meteorological data set. An annual analysis was not conducted because the commissioning phase is expected to occur over a 3-month period. The diesel-fueled fire pump engine and cooling tower emissions were not included as part of the turbine commissioning analysis. A summary of the commissioning scenarios examined in this screening analysis, along with their exhaust and emission characteristics are shown in Appendix 8.1C. The screening analysis was evaluated to determine the maximum impact from each individual unit and the maximum impact for multiple turbines operating simultaneously.

The results of the screening analysis were used to determine the worst-case scenario for each pollutant and averaging period for the detailed modeling analysis. The stack parameters and emission rates used to determine the maximum impacts for the individual turbine units are presented in Table 8.1-22. As shown in Table 8.1-22, several operating scenarios had the same emission rates and exhaust parameters for time periods less than 24 hours.

TABLE 8.1-22
Worst Case Commissioning Scenario Used for Detailed Model Input

Averaging Period	Scenarios	Exit Velocity (m/s)	Exhaust Temp (K)	Emission Rates*							
				NO_x		CO		SO_2		PM_{10}	
				lb/hr	g/s	lb/hr	g/s	lb/hr	g/s	lb/hr	g/s
24-hour (PM_{10}, SO_2)	Performance testing with duct burners (All 3 CTGs)	18.20	364.82	-	-	-	-	1.26	0.159	11.68	1.47
8-hour (CO)	CTG3: CTG Testing (Full Speed No Load, FSNL)	9.43	359.26	-	-	287.8	36.3	-	-	-	-
	CTG1: Extended Bypass Blowdown to Condenser/HRSG Tuning at 25% load	9.58	359.26	-	-	269.5	34.0	-	-	-	-
3-hour (SO_2)	Commissioning Duct Burners, Performance testing with DB, and CAL ISO Certification with DB (All 3 CTGs)	9.58	359.26	-	-	-	-	1.30	0.164	-	-
1-hour (CO)	Performance Testing w/ and w/ out with DB, CAL ISO Certification w/ and w/out DB (All 3 CTGs)	9.58	359.26	-	-	331.5	41.77	-	-	-	-

TABLE 8.1-22
Worst Case Commissioning Scenario Used for Detailed Model Input

Averaging Period	Scenarios	Exit Velocity (m/s)	Exhaust Temp (K)	Emission Rates*							
				NO_x		CO		SO_2		PM_{10}	
				lb/hr	g/s	lb/hr	g/s	lb/hr	g/s	lb/hr	g/s
1-hour (SO_2)	Commissioning Duct Burners, Performance testing with DB, and CAL ISO Certification with DB (All 3 CTGs)	9.58	359.26	-	-	-	-	1.30	0.164	-	-
1-hour (NO_2)	STG Load Test / Combined Cycle (3x1), Combined Cycle Testing, Commissioning Duct Burners (All 3 CTGs)	9.58	359.26	92.1	11.6	-	-	-	-	-	-

* Emission rate given per turbine.
See Appendix 8.1C Table 8.1C-3.
g/s = grams per second
m/s = meter per second
lb/hr = pounds per hour
K = Kelvin

Operation Impacts Analysis (Including Startup/Shutdown Turbine Cycles)

The emissions used for modeling the worst-case impacts were based on maximum short-term emissions that assumed the highest pollutant emission rates based on either load, temperature, or whether the turbine was in a startup or shutdown cycle. For the daily emissions, it was assumed that the turbine would be operating approximately 23 hours under normal operating conditions with an additional one hour of startup and one hour of shutdown. For the annual worst-case impacts, it was assumed 5,000 hours of normal operating conditions at 65°F with duct burners and evaporative cooler on, plus 192 starts and stops, with the remainder of the annual hours (i.e. 3,526 hours) at 65°F without duct burner operating and with the evaporative cooler operating. The cooling tower was assumed to operate at the maximum water recirculation rate for 8,760 hours. The diesel fire pump engine was assumed to operate one half-hour per day and 50 hours per year for maintenance and testing. To ensure the operational impacts were based on maximum emission levels and worst-case dispersion conditions, screening and detailed modeling analyses were conducted.

The screening analysis was used to predict the maximum impact for each of the normal turbine operating conditions and the startup and shutdown cycles. The screening analysis was conducted using a unit emission factor, ISCST3, and the 1981 SCAQMD Vernon meteorological data set. Turbine emissions and stack parameters, such as flow rate and exit temperature, exhibit some variation with ambient temperature and operating load. Therefore, in order to calculate the worst-case air quality impacts, dispersion modeling was conducted with and without duct burner, with and without evaporative coolers, at 50, 60, 70, and 100 (base) percent loads, and at three different ambient temperatures (93°F, 35°F, and 65°F), which represent the design high, low, and annual average ambient temperatures. For the 35°F modeling analysis, the evaporative coolers were not expected to operate. Because the fire pump and cooling tower emissions were independent of the turbine conditions, they were

not included as part of the screening analysis. The screening analysis predicts that the highest pollutant impacts resulted from two operational modes (100 percent load at 65°F with duct burner and with evaporative coolers, and 50 percent load at 35°F with no evaporative cooler) and the cold start-up cycle depending on contaminant and averaging period (Table 8.1-23). It should be noted that the expected CTG operating range is 60 to 100 percent load, and that the City does not intend to operate the CTGs at loads less than 60 percent (except during startups and shutdowns as a transient condition).

TABLE 8.1-23
"Worst Case" Operational Scenario used for Model Input

Averaging Period	Scenario	Exit Velocity (m/s)	Exhaust Temp (K)	Emission Rates*							
				NO_x		CO		SO_2		PM_{10}	
				lb/hr	g/s	lb/hr	g/s	lb/hr	g/s	lb/hr	g/s
Annual (PM_{10}, SO_2, NO_2)	5,000 hours at 65°F w/ DB and evap coolers on. 3,526hours at 65°F w/o DB but with evap coolers on, 192 hrs of start, and 192 hrs of stop	18.20	365	16.2	2.0	-	-	1.2	0.15	10.8	1.4
24-hour (PM_{10}, SO_2)	100% load at 65°F, with DB and evap cooler on	18.20	365	-	-	-	-	1.3	0.16	11.9	1.5
8-hour (CO)	50% load at 93°F, no evap cooler	10.95	362	-	-	51.7	6.5	-	-	-	-
3-hour (SO_2)	100% load at 65°F, with DB and evap cooler on	18.20	365	-	-	-	-	1.3	0.16	-	
1-hour (NO_2 and CO)	Cold Start-Up	12.38	359	37.2	4.7	279	35.2	-	-	-	
1-hour (SO_2)	100% load at 65°F, with DB and evap cooler on	18.20	365	-	-	-	-	1.3	0.16	-	

* Emission rates given per turbine (Assumes all 3 turbines in operation). Start and shutdown emissions included the balance of the hour in steady state operation.

A summary of the operating conditions examined in this screening analysis, along with their exhaust and emission characteristics are shown in Appendix 8.1C, Tables 8.1C-1 and 8.1C-4 (A and B).

The detailed modeling analysis was used to predict the final impact from each of the scenarios identified in the screening analysis using the actual turbine emission rates combined with the fire pump and cooling tower emissions. The stack parameters and emission rates for these operating conditions are presented in Table 8.1-24. In evaluating the impacts of the proposed project on ambient air quality, modeling of the worst case ambient impacts for the project were added to representative background concentrations, and the results compared to the state and federal ambient air quality standards. The results of the detailed modeling analysis are presented in Section 8.1.6.2.3 and Appendix 8.1C.

TABLE 8.1-24
Fire Pump and Cooling Tower Emissions

	NO_x		CO		SO_2		PM_{10}	
	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)
Fire Pump[a]								
1-hour	0.97	0.12	0.10	0.013	0.001	1.3E-04	-	-
3-hour	-	-	-	-	3.6E-04	4.5E-05	-	-
8-hour	-	-	0.013	1.6E-03	-	-	-	-
24-hour	0.040	5.1E-03	-	-	4.5E-05	5.7E-06	7.2E-04	9.1E-05
Annual	0.0055	6.9E-04	-	-	6.2E-06	7.8E-07	9.9E-05	1.2E-05
Cooling Tower[b]								
24-hour	-	-	-	-	-	-	0.11	0.013
Annual	-	-	-	-	-	-	0.11	0.013

[a] Fire Pump will be operated 50 hours per year for maintenance testing at a maximum of 30 minutes of operation per hour.

[b] Cooling tower emission rate is per cell for a total of 14 cells.

8.1.6.2.3 Results Compared to the Ambient Air Quality Standards

Construction Impacts Analysis

The results of the analysis (Table 8.1-25) indicate that the maximum construction impacts will be below the AAQSs for each of the criteria pollutants and averaging periods, with the exception of the 24-hour PM_{10} and $PM_{2.5}$ concentrations and the annual PM_{10} and $PM_{2.5}$ concentrations. For PM_{10}, the annual and 24-hour background concentrations exceed the state AAQSs without adding the modeled concentrations. Because the entire SCAQMD is nonattainment for the state PM_{10} standard, the incremental 24-hour and annual PM_{10} impacts from construction were compared to the SCAQMD allowable change in 24-hour concentration threshold of 10.4 $\mu g/m^3$ (SCAQMD Rule 403 and SCAQMD LST, 2003) and annual concentration threshold of 1 $\mu g/m^3$ (SCAQMD Rule 1303).

TABLE 8.1-25
Maximum Modeled Impacts from Construction and the Ambient Air Quality Standards

Pollutant	Averaging Period	Maximum ISCST3 Concentration ($\mu g/m^3$)	Background Concentration[a] ($\mu g/m^3$)	Total Predicted Concentration ($\mu g/m^3$)	State Standard ($\mu g/m^3$)	Federal Standard ($\mu g/m^3$)
NO_2	1-hour	89.9[b]	244.6	335	470	-
	Annual	21.6	58.7	80	-	100
PM_{10}	24-hour	34.5	81.0	116	50	150
	Annual	10.1	34.6	45	20	50
$PM_{2.5}$[c]	24-hour	11.6	55.8	67	-	65
	Annual	3.2	20.2	23	12	15
CO	1-hour	281.4	13,742	14,024	23,000 (20 ppm)	40,000
	8-hour	74.3	8,360	8,434	10,000 (9 ppm)	10,000

TABLE 8.1-25
Maximum Modeled Impacts from Construction and the Ambient Air Quality Standards

Pollutant	Averaging Period	Maximum ISCST3 Concentration ($\mu g/m^3$)	Background Concentration[a] ($\mu g/m^3$)	Total Predicted Concentration ($\mu g/m^3$)	State Standard ($\mu g/m^3$)	Federal Standard ($\mu g/m^3$)
SO_2	1-hour	3.1	209.4	212	655	-
	3-hour	2.2	47.1	49	-	1,300
	24-hour	0.42	39.3	40	105	365
	Annual	0.09	7.9	8	-	80

[a] Background concentrations were the highest concentrations monitored during 2003 through 2005.

[b] The maximum 1-hour NO_2 concentration was derived from the predicted 1-hour NO_x concentrations at each receptor and the NO_2 to NO_x ratios as a function of downwind distance, as discussed in the SCAQMD Localized Significance Threshold Methodology (LST) (2003).

[c] Reported $PM_{2.5}$ concentration from exhaust and fugitive sources assumes all PM from exhaust emissions are less than 2.5 micron and 21 percent of the fugitive PM emissions are less than 2.5 micron (SCAQMD LST, 2003).

The predicted 24-hour and annual PM_{10} concentrations exceed the SCAQMD allowable change in concentration thresholds. However, based on the results of the analysis, approximately 85 percent of the particulate concentrations would be due to fugitive dust emissions. The assumptions used to estimate the project's fugitive emissions are conservative in nature and the actual fugitive dust control efficiencies are expected to be higher than those used in the emissions estimate. Additionally, the average annual rainfall during the construction period was not factored into the calculations, which would also further reduce the fugitive dust emissions from construction. Because the construction activity is finite and best available emission control techniques will be used throughout the 24-month construction activity period, impacts from construction would be less than significant. A detailed summary of the assumptions and emission factors used to estimate the construction phase emissions and the details of the dispersion modeling approach are presented in Appendix 8.1A.

For $PM_{2.5}$, the annual background concentration exceeds the state and federal AAQSs. The construction impact analysis also predicts a violation of the 24-hour $PM_{2.5}$ AAQS. Similar to the PM_{10} fugitive dust calculations, the assumptions used to estimate the project's fugitive $PM_{2.5}$ emissions are conservative in nature and the actual fugitive dust control efficiencies are expected to be higher than those used in the emissions estimate. Considering these factors, the projected 24-hour $PM_{2.5}$ impacts are expected to be less than significant. Furthermore, project construction impacts would be temporary and finite, as construction activities are expected to occur for 24 months.

Commissioning Impacts Analysis

The ambient air quality impacts of the plant commissioning were assessed based on vendor-provided schedules and emissions. Table 8.1-26 presents a comparison of the maximum modeled project commissioning impacts to the AAQS. The analysis excluded a comparison to the annual averaging period standards or thresholds because commissioning will only occur once during the project lifetime, and is only expected to last approximately 3 months.

TABLE 8.1-26
Turbine Commissioning Impacts Analysis—Maximum Modeled Impacts Compared to the Ambient Air Quality Standards
Simultaneous Turbine Emissions

Pollutant	Averaging Time	Maximum Facility Impact ($\mu g/m^3$)	Background ($\mu g/m^3$)[a]	Total Impact ($\mu g/m^3$)	State Standard ($\mu g/m^3$)	Federal Standard ($\mu g/m^3$)
NO_2	1-hour	120[b]	244.6	364	470	-
SO_2	1-hour	1.7	209.4	211	655	-
	3-hour	1.4	47.1	49	-	1300
	24-hour	0.21	39.3	39	105	365
CO	1-hour	430.0	13,742	14,172	23,000	40,000
	8-hour	87.8	8,360	8,448	10,000	10,000
PM_{10}	24-hour	1.9	81.0	83	50	150

[a] Background concentrations were the highest concentrations monitored during 2003- 2005.
[b] A 100 percent conversion of NO_x to NO_2 was assumed.

Operation Impacts Analysis (Including Startup/Shutdown Turbine Cycles)

The highest modeled concentrations were used to demonstrate compliance with the AAQS. Table 8.1-27 presents a comparison of the maximum VPP Project operational impacts to the ambient air quality standards. For those pollutants and averaging periods where the background concentrations do not exceed the AAQS, the project will not cause or contribute to the violation of a standard. For those pollutants where the background data are already in excess of the standards, the project's impact plus background is above the standard, and would further contribute to an existing violation of the standard absent mitigation. The VPP Project will be providing such mitigation in the form of emission reduction credits. (Note: the results in the Appendix 8.1C, Table 8.1C-4B do not include background concentrations).

TABLE 8.1-27
Normal Operation Impacts Analysis—Maximum Modeled Impacts Compared to the Ambient Air Quality Standards
Facility-Wide Emissions

Pollutant	Averaging Time	Maximum Facility Impact ($\mu g/m^3$)	Background ($\mu g/m^3$)[a]	Total Impact ($\mu g/m^3$)	State Standard ($\mu g/m^3$)	Federal Standard ($\mu g/m^3$)
NO_2	1-hour [b]	53.1	244.6	298	470	-
	Annual [b]	0.68	58.7	59	-	100
SO_2	1-hour	1.3	209.4	211	655	-
	3-hour	1.1	47.1	48	-	1,300
	24-hour	0.22	39.3	39	105	365
	Annual	0.05	7.9	8	-	80
CO	1-hour	331.5	13,742	14,074	23,000	40,000
	8-hour	19.8	8,360	8,380	10,000	10,000
PM_{10}	24-hour	2.35	81.0	83	50	150
	Annual	0.55	34.6	35	20	50
$PM_{2.5}$[c]	24-hour	2.35	55.8	58	-	65
	Annual	0.55	20.2	21	12	15

[a] Background concentrations were the highest concentrations monitored during 2003-2005.
[b] 1-hour NO_2 concentration based on ozone-limiting method (OLM). Annual NO_2 concentration based on 100 percent conversion of NO_x to NO_2
[c] Assumed all particulate is $PM_{2.5}$.

Fumigation Impacts Analysis

Inversion breakup fumigation occurs when a plume is emitted into a stable layer of air and that layer is then mixed to the ground in a short period of time through convective heating and microscale turbulence. Shoreline fumigation occurs when a plume is emitted into a stable layer of air and is then mixed to the surface as a result of advection of the air mass to less stable surroundings. Under these conditions, an exhaust plume may be drawn to the ground with little diffusion, causing high ground-level pollutant concentrations, although typically for periods less than 1 hour.

The USEPA SCREEN3 model (Version 96043) is typically used to evaluate maximum ground-level concentrations for short-term averaging periods (less than 24-hours). However, SCREEN3 is suitable for fumigation modeling analysis only in rural areas. Since the VPP project site is located in an urban area, SCREEN3 fumigation modeling was not performed.

8.1.6.2.4 Results Compared to the SCAQMD New Source Review Requirements

The SCAQMD has two New Source Review rules that require a demonstration of a project's compliance with ambient AAQSs or significant change in air quality concentration criteria on a per unit basis. The first is Rule 1303 (the requirement section of Regulation XIII-NSR) and the second is Rule 2005 (the requirement section of Regulation XX-NSR). This section demonstrates the project's compliance with the modeling aspects of these two rules.

Operation Impacts Analysis (Including Startup/Shutdown Turbine Cycles)

Rule 1303 Compliance—To demonstrate compliance with SCAQMD modeling requirements of Rule 1303, Table 8.1-28 presents the maximum ambient air quality impacts for the VPP facility compared to the SCAQMD's significance thresholds for PM_{10}. Table 8.1-28 shows the maximum facility modeled impacts for PM_{10} will not exceed the SCAQMD significance thresholds. It should be noted that the PM_{10} impacts modeled included PM_{10} emissions from the 3 combustion turbines, cooling tower, and the diesel fire pump engine. Based on the analysis the cooling tower makes up a majority of the 24-hour impact. The maximum individual turbine 24-hour PM_{10} impact is 0.66 $\mu g/m^3$. Therefore, as defined by the SCAQMD, the project's PM_{10} impacts are not considered significant.

TABLE 8.1-28
Normal Operation Impacts Analysis for VPP—SCAQMD Rule 1303 (Maximum Modeled Impacts)
Combined Facility Impact

Pollutant	Averaging Time	Maximum Impact ($\mu g/m^3$)	SCAQMD Rule 1303 Significance Threshold ($\mu g/m^3$)	Significant?
PM_{10}	24-hour	2.4	2.5	No
	Annual	0.55	1.0	No

Rule 2005 Compliance—To determine compliance with the SCAQMD's Rule 2005 (NSR for RECLAIM), the project's ambient air quality impacts are compared to the NO_2 AAQS of 470 $\mu g/m^3$ on a 1-hour basis and 100 $\mu g/m^3$ on an annual basis. As shown in Table 8.1-29, the total NO_2 impacts do not exceed the SCAQMD's Rule 2005 significance threshold. It should be noted that the NO_2 impacts modeled include NO_x emissions from the 3 combustion turbines and the diesel fire pump. Therefore, the project's NO_2 impacts are not considered significant as defined by the SCAQMD.

TABLE 8.1-29
Normal Operation Impacts Analysis for VPP - SCAQMD Rule 2005 (Maximum Modeled Impacts)
Combined Facility Impact

Pollutant	Averaging Time	Maximum Impact Including Background ($\mu g/m^3$)	SCAQMD Rule 2005 Significance Threshold ($\mu g/m^3$)	Significant?
NO_2	1-hour	298	470	No
	Annual	59	100	No

8.1.6.2.5 Results Compared to the PSD Requirements

PSD Increment Consumption

The Prevention of Significant Deterioration (PSD) program was established to allow emission increases (increments of consumption) that do not result in significant deterioration of ambient air quality in areas where criteria pollutants have not exceeded the National Ambient Air Quality Standards (NAAQS). For the purposes of determining applicability of the PSD program requirements, the following regulatory procedure is used.

Project emissions are evaluated to determine whether the potential increase in emissions will be significant. Because this facility is a new major facility, the level of emissions that require an analysis of ambient impacts is determined on a pollutant-specific basis. The emissions increases are those that will result from the proposed new equipment. For new facilities that include large gas turbines with fired HRSGs, USEPA considers a potential increase of 100 tons per year of any of the criteria pollutants to be significant. VPP is considered a new major source for NO_X, CO, and SO_2. Therefore, if the PSD significance levels are exceeded, an analysis is required to demonstrate that the allowable increments will not be exceeded, on a pollutant-specific basis. Increments are the maximum increases in concentration that are allowed to occur above the baseline concentration. Table 8.1-30 compares the maximum modeling impacts to PSD significant impact levels. These comparisons show that these impacts are below all significance thresholds and no further analysis is required.

TABLE 8.1-30
PSD Levels of Significance

Pollutant	Averaging Time	Significant Impact Levels ($\mu g/m^3$)	Maximum Project Impact ($\mu g/m^3$)
NO_2	Annual	1	0.68
SO_2	3-hour	25	1.1
	24-hour	5	0.2
	Annual	1	0.05
CO	1-hour	2,000	332
	8-hour	500	20

Pre-Construction Monitoring

To ensure that the project impacts will not cause or contribute to a violation of an AAQS or an exceedance of a PSD increment, an analysis of the existing air quality in the project area is necessary. Federal regulations require pre-construction ambient air quality monitoring data for the purposes of establishing background pollutant concentrations in the impact area. However, a facility may be exempted from this requirement if the predicted air quality impacts of the facility do not exceed the *de minimis* levels listed in Table 8.1-31. Because the facility-wide impacts are less than the *de minimis* levels, the proposed facility is exempt from the pre-construction monitoring requirement.

TABLE 8.1-31
PSD Pre-construction Monitoring Exemption Levels

Pollutant	Averaging Period	*de minimis* Level	Maximum Facility Impact ($\mu g/m^3$)	Exceeds *de minimis*
CO	8-hour average	575 $\mu g/m^3$	20	No
PM_{10}	24-hour average	10 $\mu g/m^3$	2.4	No
NO_2	Annual average	14 $\mu g/m^3$	0.7	No
SO_2	24-hour average	13 $\mu g/m^3$	0.2	No

8.1.6.3 Health Risk Assessment

Potential health risk impacts associated with emissions of chemical substances of potential concern are evaluated in the Public Health section of the AFC (Subsection 8.6). The risk assessment was prepared using guidelines developed under the SCAQMD's July 2005 *Risk Assessments Procedures for Rules 1401 and 212 Version 7* (SCAQMD, 2005a). For a detailed risk assessment, such as the assessment prepared in this evaluation, these procedures include the *SCAQMD July 2005 Supplemental Guidelines for Preparing Risk Assessments for the Air Toxics "Hot Spots" Information and Assessment Act (AB2588)* (SCAQMD, 2005b). Those guidelines supplement the *Air Toxics Hotspots Program Guidance Manual for Preparation of Health Risk Assessments* (OEHHA, 2003) and the CARB Recommended Interim Risk Management Policy for Inhalation-based Residential Cancer Risk (CARB, 2003).

The evaluation of potential non-cancer health effects from exposure to short-term and long-term concentrations in air was performed by comparing modeled concentrations for the maximum exposed individual (MEI) with reference exposure levels (RELs). Based on this evaluation approach, the maximum resident (MEIR) excess life time cancer risk predicted was 0.568 in a million, and the maximum worker (MEIW) lifetime cancer risk was 0.493 in a million. The maximum hazard index for acute non-carcinogenic substances is 0.0544. The hazard index for chronic non-carcinogenic substances is 0.0222 for the residential MEI and also 0.0222 for the commercial/industrial MEI. The details of the health risk analysis are found in Section 8.6

8.1.6.4 Class I Area Impact Analysis

The Class I area impact modeling analysis was performed using the CALPUFF modeling program. The modeling program used electronic terrain and land use data from USGS and 3 years of meteorological data: mesoscale (i.e., MM5) data, surface station data from 2 sites,

and precipitation data from a minimum of 31 sites. Details of the CALPUFF modeling are contained in the Vernon Power Plant Modeling Protocol (Appendix 8.1C). Five compact diskettes with the electronic modeling files are also being submitted to CEC staff. The protocol and modeling analysis incorporate comments received from the Federal Land Manager, Mike McCorison of the U.S. Forest Service, Southern California.

PSD requires evaluation of impacts to Class I areas. Two types of impacts are required for all Class I areas within 100 km of the proposed project site: Class I PSD increments and impacts to air quality related values (AQRVs), including visibility, acidic deposition, and regional haze. The analyses were conducted based on guidance from the following documents:

- *Interagency Workgroup on Air Quality Modeling Phase 2 Summary Report and Recommendations for Modeling Long range Transport Impacts* (EPA-545/R-98-019) (IWAQM2)
- *Federal Land Managers Air Quality Related Values Work Group Phase I Report* (USFS,NPS, USFWS, 2000) (FLAG)

The Class I areas that are within 100 km of the proposed project site are listed in Table 8.1-32.

TABLE 8.1-32
Nearby Class I Areas

Class I Area	Distance (km)
San Gabriel Wilderness Area	31
Cucamonga Wilderness Area	58

8.1.6.4.1 Source Inputs

Emissions for each modeled source are presented in Table 8.1-33. Source characteristics are summarized in Table 8.1-34. The VPP project is only subject to PSD review for NO_x and potentially CO (if redesignation is granted by the USEPA), due to the emission levels of these pollutants. However, comments received from the Federal Land Manager on the air dispersion modeling protocol requested that SO_2 and PM_{10} emissions also be included in the Class I impact analysis.

TABLE 8.1-33
Emission Rates used in CALPUFF

Source	Emission Rates for SO_2 (lb/hr)	Emission Rates for NO_X (lb/hr)	Emission Rates for PM_{10} (lb/hr)
3-hour Emission Rates			
CTG 1	1.3	*	*
CTG 2	1.3	*	*
CTG 3	1.3	*	*
Fire-Pump	3.60E-04	*	*
Cooling Tower	*	*	*

TABLE 8.1-33
Emission Rates used in CALPUFF

Source	Emission Rates for SO_2 (lb/hr)	Emission Rates for NO_X (lb/hr)	Emission Rates for PM_{10} (lb/hr)
24-hour Emission Rates			
CTG 1	1.3	17.7	11.9
CTG 2	1.3	17.7	11.9
CTG 3	1.3	17.7	11.9
Diesel Fire-Pump Engine	4.49E-05	4.02E-02	7.23E-04
Cooling Tower	*	*	1.06E-01
Annual Emission Rates			
CTG 1	1.2	16.2	10.8
CTG 2	1.2	16.2	10.8
CTG 3	1.2	16.2	10.8
Diesel Fire-Pump	6.16E-06	5.51E-03	9.91E-05
Cooling Tower	*	*	1.06E-01

Note: * Indicates the pollutant is not modeled for that time period.

TABLE 8.1-34
Source Characteristics

				Annual		24-Hour	
Stack Name	Stack ID	Stack Height (m)	Diameter (m)	Velocity (m/s)	Temperature (K)	Velocity (m/s)	Temperature (K)
Combustion Turbine #1	CTG1	54.86	6.09	18.20	365	18.20	365
Combustion Turbine #2	CTG2	54.86	6.09	18.20	365	18.20	365
Combustion Turbine #3	CTG3	54.86	6.09	18.20	365	18.20	365
Diesel Fire-Pump	FP	4.9	0.076	108.8	765	108.8	765
Cooling Tower	CT	17.68	9.14	7.01	307	7.01	307

Note: Annual and 24-hr source characteristics are based on 65°F with Duct Burner Scenario.

Fire pump emissions are based on 30 minutes of testing per day. Cooling tower emissions are based on continuous operation of a 14-cell tower.

Results from Refined CALPUFF

Visibility—As recommended in the Federal Land Managers' Air Quality Related Values Workgroup (FLAG) Phase I Report (December 2000), regional haze analyses were performed for the San Gabriel and Cucamonga Class I areas, which are located within 100 km from the proposed project site. A full, refined CALPUFF modeling analysis was performed to evaluate potential visibility impacts (haze) of the proposed project on the nearest Class I areas, as discussed above.

Ammonia reacts with nitrate and sulfate, but preferentially with sulfate. CALPUFF may overestimate the amount of ammonia nitrate formed due to the limited ammonia available

after reaction with sulfate. The ammonia limiting method was run to correctly apportion the available background ammonia to the number of puffs in each grid cell. This post processing was done in CALPOST so as not to overestimate the amount of ammonium nitrate particles formed and more accurately evaluate the potential visibility impacts.

Emissions—Emissions used in the modeling analysis of visibility impacts are the same as those used for the criteria pollutant modeling analysis. The parameters modeled for the visibility impacts assume that the particulate nitrate (NO_3-) is in the form of ammonium nitrate (NH_4NO_3) and that particulate sulfate (SO_4-) is in the form of ammonium sulfate ($(NH_4)_2SO_4$). The visibility calculation is based on the ambient concentrations of NH_4NO_3, $(NH_4)_2SO_4$, and PM_{10}, along with a representative relative humidity adjustment factor. The PM_{10} was speciated, as recommended by the United States Department of Agriculture, Forest Service (USDA FS), as indicated in Table 8.1-35.

TABLE 8.1-35
PM Speciation for Natural-Gas Fired Combustion Turbine
Provided by USDA FS (October, 2005)

Filterable vs. Condensable		Recommended PM Profile				
Filterable	**Condensable (CPM)**	**SO_4***	**EC**	**SOA**	**PMF**	**PMC**
0.25	0.75	Site-specific data, or 0.33 SO_2*	0.25	CPM-SO_4	0.0	0.0

* SO_4 should be adjusted to account for the molecular weight difference between SO_2 and SO_4 (96/64). SO_4 assumed to be 100 percent of inorganic CPM unless site-specific data indicates otherwise.

Class I Impact Results

The maximum 24-hour visibility impact was generated by taking the maximum 24-hour modeled emission scenario, regardless of the season in which it occurred, and assuming that it is representative of the visibility impact at the Class I areas. Preliminary results showed that in the years 2001 and 2003, the San Gabriel Class I area had 1 day with maximum percent change in extinction greater than 5 percent and that Cucamonga Class I area had zero days with the maximum percent extinction greater than 5 percent. However, year 2002 preliminary results showed San Gabriel had 5 days with maximum percent change in extinction greater than 5 percent and that Cucamonga had 1 day with the maximum percent extinction greater than 5 percent. Modeling results using the Method 2 CALPOST processor indicated that there were zero days with the maximum percent extinction greater than 10 percent for both San Gabriel and Cucamonga Class I areas.

The CALPOST processor includes an option (Method 7 Prime) that uses observed weather or prognostic weather information for background extinction during weather events. The Method 7 Prime option, combined with the observed background extinction values from the Burbank surface station (located 29 km from the San Gabriel Class I area and 66 km from the Cucamonga Class I area), minimizes the effect of natural obscuration due to weather events from the visibility assessment (which are included in the results presented above). Minimizing the effect of visibility degradation due to weather related events (precipitation), shows that San Gabriel would have 1 day in 2001 where the maximum percent change in extinction is greater than 5 and less than 10 percent and Cucamonga would have no days above 5 percent extinction for any of the years analyzed. The Class I visibility impacts with

and without the correction for natural visibility changes due to precipitation are presented in Tables 8.1-36A and 36B.

TABLE 8.1-36A
Class I San Gabriel Visibility Results
Final CALPUFF Modeling Results, Vernon Power Plant Facility

	Modeling Results (Method 2)				Modeling Results with Correction for Natural Change in Visibility (Method 7 Prime)			
Year	No. of Days with Change in Extinction > 5%	No. of Days with Change in Extinction > 10%	Maximum % Change in Extinction	Day of Maximum Extinction	No. of Days with Change in Extinction > 5%	No. of Days with Change in Extinction > 10%	Maximum % Change in Extinction	Day of Maximum Extinction
2001	1	0	7.07	Apr-01	1	0	6.05	Apr-01
2002	5	0	9.89	Apr-02	0	0	2.40	Oct-15
2003	0	0	4.09	Jun-15	0	0	0.47	Jun-15

TABLE 8.1-36B
Class I Cucamonga Visibility Results
Final CALPUFF Modeling Results, Vernon Power Plant Facility

	Modeling Results (Method 2)				Modeling Results with Correction for Natural Change in Visibility (Method 7 Prime)			
Year	No. of Days with Change in Extinction > 5%	No. of Days with Change in Extinction > 10%	Maximum % Change in Extinction	Day of Maximum Extinction	No. of Days with Change in Extinction > 5%	No. of Days with Change in Extinction > 10%	Maximum % Change in Extinction	Day of Maximum Extinction
2001	0	0	4.29	Jan-23	0	0	3.87	Jan-23
2002	1	0	6.32	Oct-15	0	0	2.91	Oct-15
2003	0	0	4.56	June-8	0	0	0.65	June-8

The results of the Class I PSD increment analysis are presented in Tables 8.1-37 and 8.1-38. All maximum modeled concentrations are well below the USEPA proposed Class I significance levels and Class I Increments.

TABLE 8.1-37
Class I PSD Increment Results, San Gabriel
Final CALPUFF Modeling Results, Vernon Power Plant Facility

Year	SO_2 Annual ($\mu g/m^3$)	SO_2 24-hour ($\mu g/m^3$)	SO_2 3-hour ($\mu g/m^3$)	PM_{10} Annual ($\mu g/m^3$)	PM_{10} 24-hour ($\mu g/m^3$)	NO_x Annual ($\mu g/m^3$)
2001	1.10E-03	8.97E-03	2.88E-02	1.59E-02	1.52E-01	6.33E-03
2002	9.93E-04	7.30E-03	2.71E-02	1.56E-02	1.36E-01	4.94E-03
2003	8.74E-04	8.04E-03	2.42E-02	1.26E-02	1.14E-01	4.37E-03
USEPA Proposed Class I Significance Level	0.1	0.2	1	0.2	0.3	0.1
Class I Increment	2	5	25	4	8	2.5

TABLE 8.1-38
Class I PSD Increment Results, Cucamonga
Final CALPUFF Modeling Results, Vernon Power Plant Facility

Year	SO_2 Annual ($\mu g/m^3$)	SO_2 24-hour ($\mu g/m^3$)	SO_2 3-hour ($\mu g/m^3$)	PM_{10} Annual ($\mu g/m^3$)	PM_{10} 24-hour ($\mu g/m^3$)	NO_x Annual ($\mu g/m^3$)
2001	6.88E-04	4.41E-03	1.35E-02	1.18E-02	7.61E-02	3.64E-03
2002	6.68E-04	4.83E-03	1.21E-02	1.25E-02	1.07E-01	2.84E-03
2003	5.44E-04	4.00E-03	1.05E-02	9.32E-03	8.20E-02	2.93E-03
USEPA Proposed Class I Significance Level	0.1	0.2	1	0.2	0.3	0.1
Class I Increment	2	5	25	4	8	2.5

The maximum nitrogen and sulfur deposition rates calculated at the two Class I areas are given in Tables 8.1-39 and 8.1-40.

TABLE 8.1-39
Nitrogen and Sulfur Deposition Results, San Gabriel
Final CALPUFF Modeling Results, Vernon Power Plant Facility

Year	Nitrogen Deposition (kg/ha-yr)	Sulfur Deposition (kg/ha-yr)
2001	1.80E-03	6.04E-04
2002	1.13E-03	4.57E-04
2003	1.329E-03	4.96E-04

TABLE 8.1-40
Nitrogen and Sulfur Deposition Results, Cucamonga
Final CALPUFF Modeling Results, Vernon Power Plant Facility

Year	Nitrogen Deposition (kg/ha-yr)	Sulfur Deposition (kg/ha-yr)
2001	1.04E-03	3.566E-04
2002	7.34E-04	3.19E-04
2003	7.21E-04	2.76E-04

8.1.7 Compliance with Laws, Ordinances, Regulations, and Standards

8.1.7.1 Compliance with Federal Requirements

The SCAQMD has been delegated authority by the USEPA to implement and enforce most federal requirements that are applicable to the project, including the New Source Performance Standards. However, the SCAQMD relinquished its delegated authority for PSD review. Compliance with the SCAQMD regulations ensures compliance and consistency with the corresponding federal requirements. As discussed in AFC Subsection 8.1.5, Laws,

Ordinances, Regulations and Standards, the PSD program requirements apply on a pollutant-specific basis to the following:

- A new major facility that will emit 100 tpy or more, if it is one of the 28 PSD source categories in the federal Clean Air Act, or a new facility that will emit 250 tpy or more; or
- A major modification to an existing major facility that will result in net emissions increases in excess of significant emissions levels.

The proposed project is a new facility that is one of the listed 28 PSD sources; therefore, the 100 TPY threshold applies.

The project will be required to comply with the Federal Acid Rain requirements (Title IV). Since the SCAQMD has received delegation for implementing Title IV through its Title V permit program, the City will secure a SCAQMD Title V permit that incorporates the necessary requirements for compliance with the Title IV Acid Rain provisions.

8.1.7.1.1 New Source Performance Standards, 40 CFR 60 Subpart KKKK

The proposed turbines will use ultra-low-NO_x combustor technology along with an SCR, and will utilize pipeline quality natural gas, so they will comply with both the NO_x and SO_2 limits. The NO_x emissions of the turbine will be 0.08 lb/MW-hr, since NO_x emissions at 100 percent load will be 14.7 lb/hr and the output will be 193 MW. The certified NO_x CEMS will ensure compliance with the standard. Records of natural gas usage will ensure compliance with the SO_2 limit.

8.1.7.1.2 Acid Rain, 40 CFR 75, SCAQMD Regulation XXXI

Applications for Title IV will be made concurrent with the Title V and the NSR applications submitted to the SCAQMD. Monitoring and CEMS requirements imposed to ensure compliance with BACT, Title V and RECLAIM requirements will incorporate the CEMS and monitoring requirements of Title IV. Once the facility begins operation, it will acquire Title IV SO_2 Allowances, as required by this program.

8.1.7.2 Compliance with State Requirements

State law sets up local air pollution control districts and air quality management districts with the principal responsibility for regulating emissions from stationary sources. As discussed above, the Project is under the local jurisdiction of the District, and compliance with SCAQMD regulations will ensure compliance with state air quality requirements.

8.1.7.3 Compliance with Local Requirements: South Coast Air Quality Management District

The SCAQMD has been delegated responsibility for implementing local, state, and federal air quality regulations in the portions of four counties[3] within the SCAQMD. The project is subject to SCAQMD regulations that apply to new sources of emissions, to the prohibitory regulations that specify emission standards for individual equipment categories, and to the requirements for evaluation of impacts from toxic air pollutants. The following subsections include the evaluation of facility compliance with the applicable SCAQMD requirements.

Under the CEC's AFC program, the Project is required to secure a preconstruction Determination of Compliance (DOC) from the SCAQMD. Because of the Title V and NSR

[3] Including the portion of Kern County that is within SCAQMD boundaries.

permitting requirements, the SCAQMD will be requested to provide the CEC with a DOC in addition to processing its own permit applications related to the Project. The preconstruction DOC review includes demonstrating that the project will use BACT and will provide any necessary emission offsets.

Applicable BACT levels are shown in Table 8.1-41, along with anticipated potential facility emissions. SCAQMD Rule 1303 requires the project to apply BACT for emission increases of NO_x, VOC, SO_x, CO, and PM_{10} (criteria pollutants), as well as ammonia. Through long-standing administrative policy, the increase threshold per permit unit for applicability of the BACT requirement is 1 lb/day. As shown in the table, BACT is required for NO_x, VOC, SO_2, CO, PM_{10}, and ammonia. The calculation of facility emissions was discussed in AFC Subsection 8.1.6.1.1.

TABLE 8.1-41
Best Available Control Technology Requirements

Pollutant	Applicability Level	Permit Units Exceeding this Level	BACT Required?
Criteria Pollutants: SCAQMD Rules 1303 and 2005			
VOC	1 lb/day/Permit Unit	CTGs	Yes
NO_x	1 lb/day/Permit Unit	CTGs	Yes
SO_2	1 lb/day/Permit Unit	CTGs	Yes
PM_{10}	1 lb/day/Permit Unit	CTGs	Yes
CO	1 lb/day/ Permit Unit	CTGs	Yes
Ammonia	1 lb/day/ Permit Unit	CTGs	Yes

BACT for NO_x emissions from the gas turbine will be the use of ultra-low NO_x emitting equipment and add-on controls. The Applicant has selected a gas turbine equipped with state-of-the-art ultra-low NO_x combustors. The gas turbine ultra-low NO_x combustors will generate approximately 9 ppmvd NO_x, engine out, corrected to 15 percent O_2. In addition, each turbine will be equipped with a selective catalytic reduction (SCR) system to further reduce NO_x emissions to 2 ppmvd NO_x, corrected to 15 percent O_2 on a 1-hour average basis (excluding startups and shutdowns). The current SCAQMD BACT/LAER requirement for combined cycle gas turbines is 2 ppmvd over a 1-hour averaging period. Therefore, the project will meet the BACT requirements for NO_x. Note that the ANP Blackstone Project, used by the SCAQMD in making its determination, was not equipped with duct burners. Nevertheless, the exhaust from the duct burners in this project will also be controlled by the SCR systems and the entire combined exhaust is being designed to comply with the 2 ppmvd BACT level. The SCAQMD BACT Guideline determination for NO_x from gas turbines is shown in Appendix 8.1D.

BACT for CO emissions will be achieved by use of gas turbines equipped with ultra-low NO_x combustors and an oxidation catalyst. Ultra-low NO_x combustors emit low levels of combustion CO while still maintaining low NO_x formation. In addition, the project will use an oxidation catalyst system to further reduce CO emissions to 2 ppmvd, corrected to 15 percent O_2. The Applicant has specified a CO limit of 2 ppmvd, corrected to 15 percent O_2 on a 3-hour average basis, for base load and part load operation above 60 percent. Based on

the ANP Blackstone Project, the SCAQMD adopted a BACT requirement for combined-cycle gas turbines of 3 ppmvd over a 3-hour averaging period. While the ANP Blackstone Project did not include duct burners, the combined gas turbine and duct burner exhaust from this project will be controlled by the oxidation catalyst to 2 ppmvd at 15 percent O_2, which complies with the SCAQMD BACT level. For all operating levels at and above 60 percent load, the CO emission rate from the gas turbines and duct burners at the outlet of the exhaust stacks will not exceed 2 ppmvd, corrected to 15 percent O_2, except under startup and shutdown conditions. A review of recent BACT determinations for CO from gas turbines is provided in Appendix 8.1D.

BACT for VOC emissions will be achieved by use of the gas turbine ultra low NO_x combustors natural gas fuel and an oxidation catalyst. As in the case of CO emission formation, ultra-low NO_x combustors use air to fuel ratios that result in low combustion VOC while still maintaining low NO_x levels. The oxidation catalyst will further reduce the VOC emissions in the exhaust gases. BACT for VOC emissions from combustion devices has historically been the use of best combustion practices. With the use of the ultra low NO_x combustors and with the duct burner emission level, VOC emissions leaving the stacks will not exceed 2.0 ppmvd, corrected to 15 percent O_2, for base load and part load operation above 60 percent. This level of emissions is consistent with the SCAQMD's BACT guidelines for large gas turbines of 2.0 ppmvd, corrected to 15 percent oxygen over a 1-hour averaging period.

For the turbines and duct burners, BACT for PM_{10} is best combustion practices and the use of gaseous fuels. As mentioned, use of clean burning natural gas fuel will result in minimal particulate emissions.

SO_2 emissions will be kept at a minimum by firing clean burning natural gas fuel.

The SCAQMD imposes an ammonia slip limit of 5 ppmvd as a BACT limit for that pollutant. While offsets are not required for ammonia emissions, the SCAQMD's NSR Rule (Regulation XIII) that regulates emissions of ammonia, requires BACT. The project will be designed and operated to meet the stringent 5 ppmvd ammonia slip requirement. Also, as required by the SCAQMD for aqueous ammonia storage tanks used in SCR service, the storage tank will be equipped with a pressure relief valve and the storage tank will be vented back to the tank on the delivery truck when the storage tank is being filled.

The SCAQMD's BACT Guidelines for emergency internal combustion compression ignition engines specifies that engines in the horsepower size of the VPP project (210 bhp) meet USEPA Off -road Tier 2 emission standards. The Cummins engine used in this analysis is a Tier 2 engine and meets these requirements. As required by the NSR program, BACT cannot be less stringent than other source-specific or prohibitory rules. Rules 431.2 and 1470 will require that fuel supplied to this engine comply with a fuel sulfur limit of 15 ppmvd. Such fuel is readily available in the South Coast Air Basin and this requirement will be met. Rule 1470 also requires that the PM_{10} emissions from the engine be limited to 0.15 gr/bhp-hr. The Tier 2 PM_{10} level is 0.15 gr/bhp-hr and complies with this limit. BACT requirements will be satisfied through use of a Tier 2 engine.

SCAQMD Rule 219 exempts the cooling towers from SCAQMD permitting requirements. Nevertheless, the cooling towers will be designed with a drift eliminator efficiency of

0.0005 percent, which should comply with all BACT requirements. This control efficiency has been proposed by similar projects that have recently been approved.

The oil/water separators, while required to obtain an SCAQMD Permit to Construct, will have daily VOC emissions of less than 1 pound per day. In accord with long-standing SCAQMD administrative policy, increases of criteria pollutant emissions from a new or modified permit unit of less than 1 pound per day are exempted from BACT requirements.

In addition to the BACT requirements, SCAQMD Rule 1303 requires the Applicant to provide full emission offsets when emissions exceed specified levels on a pollutant-specific basis. SCAQMD Rule 2005 requires the Applicant to provide RECLAIM Trading Credits (RTC) for the project's NO_x emissions. As shown in Table 8.1-42, the project will be required to provide emission offsets for CO, SO_2, PM_{10}, and VOC emissions and RTCs for NO_x emissions.

As a Rule 219 permit exempt permit unit, the cooling tower will be exempt from SCAQMD offset requirements by Rule 1304(d)(3). The emergency diesel fire pump will be exempt from Rule 1304(d)(3) offset requirements for CO, VOC, SO_2, and PM_{10}. However, under Rule 2005, the fire pump NO_x emissions are not exempted from offset requirements, and RTCs will be acquired to cover emissions for each year of operation.

Rule 1303(b)(2) requires ERCs to be provided at an offset ratio of 1.2 to 1. Based on the proposed Rule 1309.1, the Priority Reserve Credits for CO, SO_2 and PM_{10} will also be provided at a ratio of 1.2 to 1 when ERCs are obtained from the SCAQMD's Priority Reserve pool of credits. Interpollutant offsets can be allowed, at the discretion of the Air Pollution Control Officer (APCO), primarily in cases where there is a precursor relationship.

TABLE 8.1-42
SCAQMD Offset Requirements and Project Emissions[a]
(ref: Rule 1304(d)(1)(B), Rule 1303(b)(2), Rule 1304, Table A, Regulation 2005)

Pollutant	Offset Threshold	Offsets Required
VOC[a]	4 ton/yr	396 lb/day ERCs
CO[b]	29 ton/yr	1,404 lb/day ERCs
NO_x[c]	4 ton/yr[b]	295,157 lb NO_x RTCs (first year) 329,101 NO_x RTCs (normal operation)
PM_{10}[d]	4 ton/yr	909 lb/day Priority Reserve Credits
SO_2[d]	4 ton/yr	108 lb/day Priority Reserve Credits

[a] Based on 16 starts/shutdowns per month, CTG down for 6 hours for each start, turbine operation at 60 percent load, 65°F for 8 hours per day. Duct burner operating for 8 hours per day. Remaining time at 100 percent load, 65°F temperature with evaporative cooler.

[b] Based on 16 starts/shutdowns per month, CTG down for 6 hours for each start, turbine operation at 100 percent load, 65°F temperature with evaporative cooler. Duct burner operating for 8 hours per day.

[c] First year RTC calculated for 8.58 months with 16 starts/shutdown per month, 137 starts/shutdowns per year, 4 hours/day duct burner firing, 6 hours of downtime per shutdown, turbine operation at 100 percent load, 65°F temperature with evaporative cooler, and a 90 percent capacity factor. Normal operations RTCs include192 starts/shutdowns per year, CTG down for 6 hours for each shutdown, turbine operation at 100 percent load, 65°F temperature with evaporative cooler, duct burner operating for only 4 hours per day, and a 90 percent capacity factor. RTC estimates include fire pump NO_x emissions.

[d] Based on 24 hour per day of CTG operation at 100 percent load, 65°F temperature with evaporative cooler. Duct burner operating for 8 hours per day. No startups or shutdowns during the month.

To ensure that there was an adequate supply of emission offsets for essential public service projects (landfills, waste treatment plants, schools, hospitals, etc.) the SCAQMD created a Priority Reserve pool of credits with the June 1990 amendments to its NSR Regulation, Regulation XIII. As specified in Rule 1309, the SCAQMD maintains and funds this pool of credits that can be accessed at no cost by essential public services at an offset ratio of 1:1. Primarily, because of the severe shortage in PM_{10} ERCs to offset the large emissions increases from new power plants, SCAQMD provided power projects access to purchase necessary offset credits from this pool of Priority Reserves. That initial access expired and the SCAQMD has prepared to modify Rule 1309.1, again, by providing access to the CO, PM_{10} and SO_2 credits in the Priority Reserve. While the cost to purchase those credits has not been finalized, the rule is currently scheduled to be heard by the SCAQMD Governing Board on September 8, 2006. Due to the limited supply of CO, PM_{10}, and SO_2 ERCs in the open market that prompted the SCAQMD to propose reopening access to the Priority Reserve, the City of Vernon plans to purchase its required CO, SO_2, and PM_{10} emission offsets from the Priority Reserve.

Rule 1303 also requires project denial if air quality modeling results indicate emissions will cause a violation or make significantly worse an existing violation of the applicable ambient air quality standards. For nonattainment pollutants, the significant change in air quality concentrations is presented in Rule 1303, Appendix A, Table A-2. The modeling analyses in Subsection 8.1.6.2.3 (Tables 8.1-25 through 27) show that with the exception of PM_{10}, facility emissions will not interfere with the attainment or maintenance of the applicable air quality standards. Because the SCAQMD is currently a nonattainment area for PM_{10}, an increase in PM_{10} emissions has the potential to exacerbate existing violations. However, the City will be providing PM_{10} offsets to mitigate the impact of the emissions increase; as a result, the required finding can be made for PM_{10} as well. Furthermore, comparing the project's impacts with the SCAQMD's significance thresholds shows that the project will not result in a significant PM_{10} ambient air quality impact.

As VPP will be located in Trading Zone 1, better known as the Coastal Zone, Rule 1303 restricts the purchase of ERCs for this project to emission reductions that were generated in the Coastal Zone. The SCAQMD ERC listing in Appendix 8.1E provides the required information for offset identification and amount issued with each certificate. This list contains the current SCAQMD ERCs that may be purchased and used as offset mitigations for project CO and VOC emission increases. The information includes:

- Ownership of emission offset credits; and
- Emission reduction credits granted by the SCAQMD that have been determined to meet the SCAQMD's requirements for bankable offsets. Note that unlike some other California air districts, the SCAQMD goes through a stringent surplus evaluation to discount emission reductions before ERCs are granted. No further reduction, other than the offset ratio, is applied when ERCs are purchased and used as mitigation for project emissions increases.

While a single listing of all NO_x RTCs by year is not presently available from the SCAQMD, a figure obtained from a SCAQMD February 2, 2005 presentation, which lists the NO_x RTCs issued by year on a ton per day basis, is included in Appendix 8.1E. This figure incorporates

the NO_x RTC "shave" that will occur as a result of changes in the RECLAIM program adopted by the SCAQMD in January 2005.

VPP plans to purchase VOC ERCs and NO_x RTCs from the market, through the established broker network that has evolved to serve this market to satisfy the NO_x RTC, and VOC ERC offset requirements. The SCAQMD has requested redesignation for the CO status from non-attainment to attainment. If the basin is redesignated as attainment of the CO standard, then this pollutant will be subject to the PSD regulations. In anticipation of this redesignation, CO has been included in the project's PSD permit application. When the basin is redesignated as attainment of the CO standard, CO ERCs may not be required for the VPP. There has been a recognized shortage of CO, PM_{10}, and SO_2 ERCs. As a result, the SCAQMD has developed proposed modifications to Rule 1309.1, which is presently scheduled to be heard by the SCAQMD Governing Board on September 8, 2006. The proposed rule modification will enable power projects, such as VPP, to access and acquire at cost the necessary PM_{10}, SO_2, and CO (if required) credits to satisfy offset requirements. VPP plans to satisfy its PM_{10}, SO_2, and CO (if required) offset requirements from the Priority Reserve pool of credits upon adoption of the Rule 1309.1 modifications.

Acid Rain Offsets: The Phase II acid rain requirements of Regulation XXXI are also applicable to the facility. As a Phase II Acid Rain facility, the City will be required to provide sufficient allowances for every ton of SO_2 emitted during a calendar year. The City will obtain any necessary allowances on the current open trade market upon operation of the plant.

Rule 1316: The VPP will be a new major source and will not be subject to the requirements of this Rule.

Rule 1401: As demonstrated in Subsection 8.6 of this AFC, the permit units required to be analyzed for compliance with the requirements of this rule will not cause the Acute or Chronic Health Index to exceed 1.0 for any organ group at any offsite receptor location. While controls and operations that would qualify as T-BACT will be employed in the design and operation of this project, excess cancer risk will not exceed a threshold of one in one million. Cancer burden, as required, does not exceed 0.5. Rule 1401 exempts the emergency fire pump engine from the risk assessment requirements, as the engine would be covered under the Rule 1304(a)(4) exemptions from modeling and offsets.

The general prohibitory and source-specific rules of the SCAQMD applicable to the project and the determination of compliance follow.

- **Rule 218**: Each gas turbine will be equipped with a CEMS. These units will comply with all applicable requirements of Rule 218, Rule 2012 (NO_x RECLAIM) and Title IV (Acid Rain—40CFR75).
- **Rule 219**: The cooling tower will be exempted from permitting through Rule 219(e)(3) and Rule 219(s)(2).
- **Rule 401—Visible Emissions:** Because natural gas will be used as a fuel, the Project's turbines will not generate visible emissions as dark as or darker than Ringlemann No. 1 for periods greater than 3 minutes in any hour.

- **Rule 402—Nuisance:** Under normal operation, the facility will not emit significant quantities of odorous or visible substances; therefore, the facility will comply with this regulation.
- **Rule 403—Fugitive Dust:** Establishes requirements to reduce the amount of particulate matter entrained in the ambient air as a result of man-made fugitive dust sources. The site will implement best available control measures to minimize fugitive dust emissions so that they do not result in visible dust emissions beyond the property line.
- **Rule 404—Particulate Matter—Concentration:** This rule does not apply to emissions resulting from the combustion of liquid or gaseous fuels in steam generators or gas turbines.
- **Rule 405—Particulate Matter—Weight:** Because natural gas will be used as a fuel, the equipment is expected to comply with the applicable limits in this rule.
- **Rule 407—Liquid and Gaseous Air Contaminants:** Emissions from the project will be well under 500 ppmv CO. In addition, the site is exempt from the SO_x provisions of this rule because natural gas is used as a fuel.
- **Rule 409—Combustion Contaminants:** The facility will comply with the standards in Rule 409 through the use of natural gas as a fuel.
- **Rule 431.1—Sulfur Content of Gaseous Fuels:** The site will use natural gas that complies with Rule 431.1.
- **Rule 431.2—Sulfur Content of Liquid Fuels:** The site will use diesel fuel that complies with the 15 ppmvd fuel sulfur limit of this rule. Fuel meeting the 15 ppmvd limit is commonly available in the South Coast Air Basin.
- **Rule 475—Electric Power Generating Equipment:** Establishes limits for combustion contaminant (i.e., PM) emissions from subject equipment. Rule 475 prohibits PM emissions that exceed both 11 lb/hr (per emission unit) and 0.01 grains per standard dry cubic foot of exhaust gas (gr/dscf) at 3 percent O_2. During operation of the turbines, PM_{10} emissions will exceed the 11 lb/hr but not the 0.01 gr/dscf at 3 percent O_2 limit (actual PM emission rate is 0.0017 gr/dscf at 3 percent O_2).
- **Rule 476—Steam Generating Equipment:** Because the site will be a NO_x RECLAIM facility, the NO_x requirements for this rule do not apply. Therefore, only the PM provisions of this rule apply. The turbines PM_{10} emissions will exceed the 11-lb/hr limit. Additionally, the highest concentration of particulate matter expected is 0.0017 gr/sdcf of exhaust gas[4], which is below the particulate matter limit of 0.1 gr/sdcf of exhaust gas.
- **Rule 53A—Specific Contaminants:** The equipment used onsite will burn natural gas and, therefore, will comply with the SO_2 and PM limits from Rule 53A.
- **Rule 1110.2—Emissions from Stationary Internal Combustion Engines:** Establishes limits for emission of NO_x, VOC, and CO from the stationary internal combustion

[4] Based on 11.9 lb/hr PM_{10} emissions, 1,125,241 acfm exhaust flow, 197°F temperature, and 9.57 percent exhaust gas moisture content.

reciprocating engines. Emergency standby engines that operate less than 200 hours per year are exempt from this regulation Rule 1110.2(h)(2). Additionally, RECLAIM exempts IC engines from the NO_x provisions in this rule.

- **Rule 1146—Emissions of Oxides of Nitrogen from Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters:** Because the site will be a NO_x RECLAIM facility, the NO_x requirements for this rule do not apply. The auxiliary boiler will be electrically heated. Additionally, boilers used exclusively for generating electricity and waste heat boilers located downstream of gas turbines are specifically not included in the rule applicability (Rule 1146(a)(3) and (b)(1)). This rule does not apply.
- **Rule 1404—Hexavalent Chromium Emissions from Cooling Towers:** No hexavalent chromium will be used in cooling towers.
- **Rule 1470—Requirements for Stationary Diesel Fueled Internal Combustion and Other Compression Ignition Engines:** Establishes fuel and emissions requirements of diesel engines. As of January 1, 2006, all engines need to use CARB Diesel Fuel or an alternative diesel fuel that meets the requirements of the Verification Procedure. The rule sets forth the PM emission limits of 0.15 gram per horsepower hour (g/hp-hr) for new standby engines, and limits the operation time of non-emergency use of the engine. The project will use diesel fuel with a fuel sulfur content of 15 ppmvd in accordance with Rule 431.2 and Rule 1470. Additionally, a Tier 2 engine that meets the 0.15 gr/bhp-hr limit of Rule 1470 will be used.

8.1.8 Cumulative Air Quality Impacts Analysis

An analysis of potential cumulative air quality impacts that may result from the project and other reasonably foreseeable projects is generally required only when project impacts are significant.

The City received a listing of potential cumulative impact sources from the SCAQMD that have submitted permit applications to the SCAQMD or those that have received permits but are not yet in operation. The City transmitted this listing to the CEC for review. The CEC identified those sources it believed were appropriate to include in the cumulative impact analysis. The City reviewed these sources with the SCAQMD permit engineer identified and provided additional information to the CEC staff. The resulting list of potential cumulative impact sources is presented in Appendix 8.1E, which includes a description of the permitting actions. Furthermore, the California Energy Commission staff reviewed the CEQA projects identified by the SCAQMD staff and discounted these projects because of the distance from the VPP project and the emission sources are not appropriate for modeling (volatile organic compound sources). Additionally, a review of the City of Vernon, Los Angeles, and the County of Los Angeles planning departments did not identify any Notices of Preparation for projects that would be expected to emit significant operational emissions (refineries, power plants, engine generators, etc.).

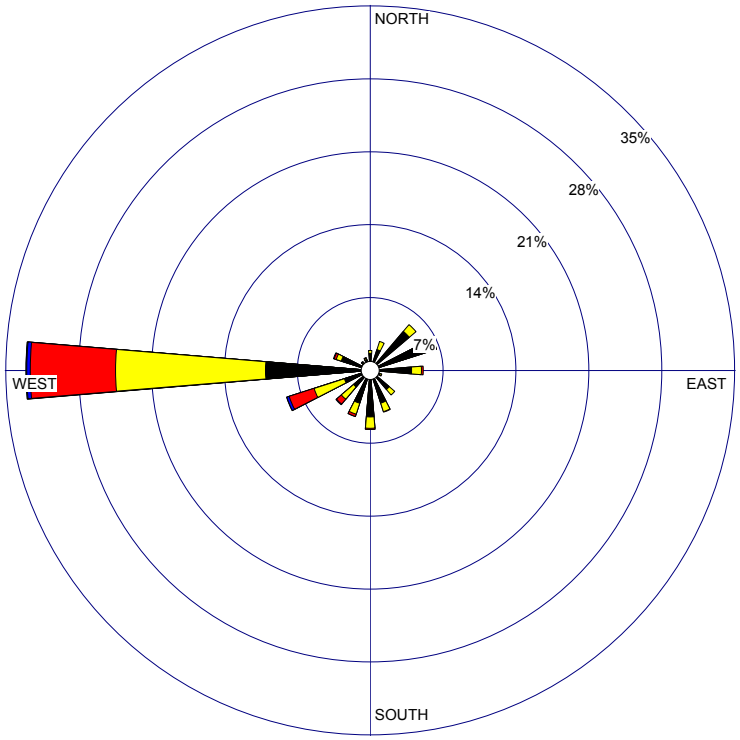
The City has acquired the necessary information on the sources identified by the CEC as appropriate for including the cumulative air quality impact analysis and will be submitting the results of the analysis to the CEC by the end of August 2006.

8.1.9 Mitigation

Mitigation will be provided for all emission increases from the project in the form of offsets and the installation of BACT, as required under SCAQMD regulations. Table 8.1-42 presents the Project's ERC and RTC liability. Through the use of BACT/LAER to control air pollutant emissions, the acquisition of ERCs/RTCs, combined with the results of the air quality impact analysis, the project is not expected to result in significant air quality impacts, and the Applicant believes that no additional operational mitigation is necessary beyond the offsets that will be provided in accordance with SCAQMD requirements. Appendix 8.1D presents the proposed mitigation for the project.

The Applicant proposes to implement the standard construction mitigation measures developed by the CEC over the past few years, including compliance with SCAQMD rules Rule 402 – Nuisance and Rule 403 to mitigate air quality impacts expected during construction.

WIND ROSE PLOT:	DISPLAY:
Vernon Power Plan 1981 - Annual Windrose Jan.1 - Dec. 31 - 00:00 - 23:00	Wind Speed Direction (blowing from)



WIND SPEED
(m/s)

- >= 11.1
- 8.8 - 11.1
- 5.7 - 8.8
- 3.6 - 5.7
- 2.1 - 3.6
- 0.5 - 2.1

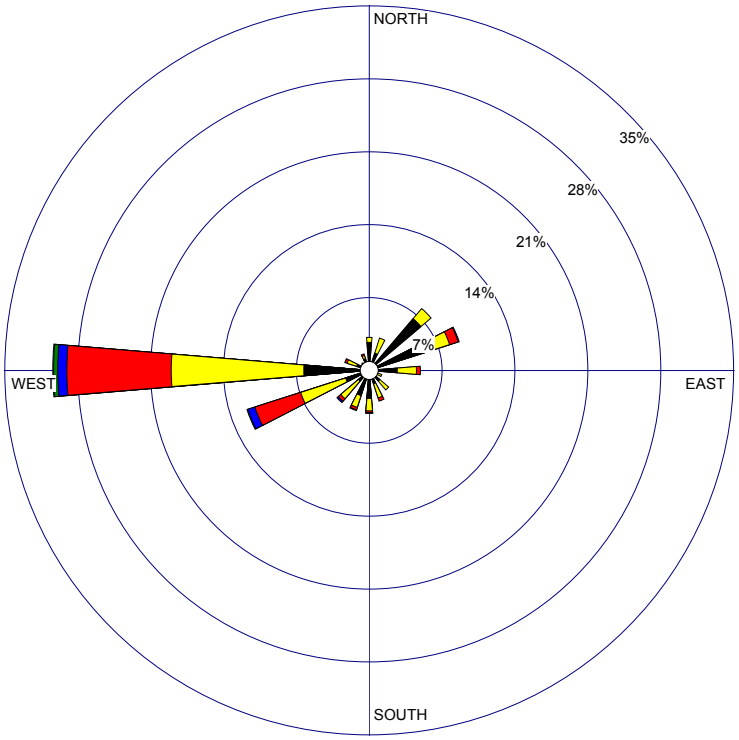
Calms: 7.03%

COMMENTS:	DATA PERIOD:	COMPANY NAME:	
	1981 Jan 1 - Dec 31 00:00 - 23:00	CH2M HILL	
		MODELER:	
	CALM WINDS: 7.03%	TOTAL COUNT: 8760 hrs.	
	AVG. WIND SPEED: 2.10 m/s	DATE: 11/3/2005	PROJECT NO.:

WRPLOT View - Lakes Environmental Software

FIGURE 8.1-1a
ANNUAL WIND ROSE
VERNON POWER PLANT
CITY OF VERNON, CALIFORNIA
CH2MHILL

WIND ROSE PLOT:	DISPLAY:
Vernon Power Plan 1981 - A.M. Winter Windrose Jan.1 - Mar. 31 - 7:00 - 20:00	Wind Speed Direction (blowing from)



WIND SPEED
(m/s)

- >= 11.1
- 8.8 - 11.1
- 5.7 - 8.8
- 3.6 - 5.7
- 2.1 - 3.6
- 0.5 - 2.1

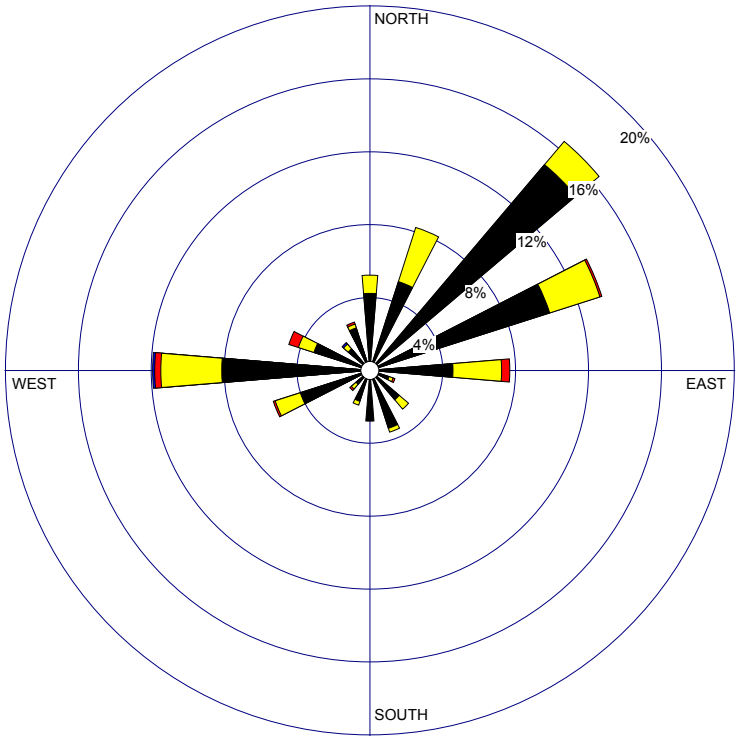
Calms: 5.08%

COMMENTS:	DATA PERIOD:	COMPANY NAME:	
	1981 Jan 1 - Mar 31 07:00 - 20:00	CH2M HILL	
		MODELER:	
	CALM WINDS: 5.08%	TOTAL COUNT: 1260 hrs.	
	AVG. WIND SPEED: 2.50 m/s	DATE: 11/3/2005	PROJECT NO.:

WRPLOT View - Lakes Environmental Software

FIGURE 8.1-1b
WINTER DAYTIME WIND ROSE
VERNON POWER PLANT
CITY OF VERNON, CALIFORNIA
CH2MHILL

WIND ROSE PLOT:	DISPLAY:
Vernon Power Plan 1981 - P.M. Winter Windrose Jan.1 - Mar. 31 - 21:00 - 6:00	Wind Speed Direction (blowing from)



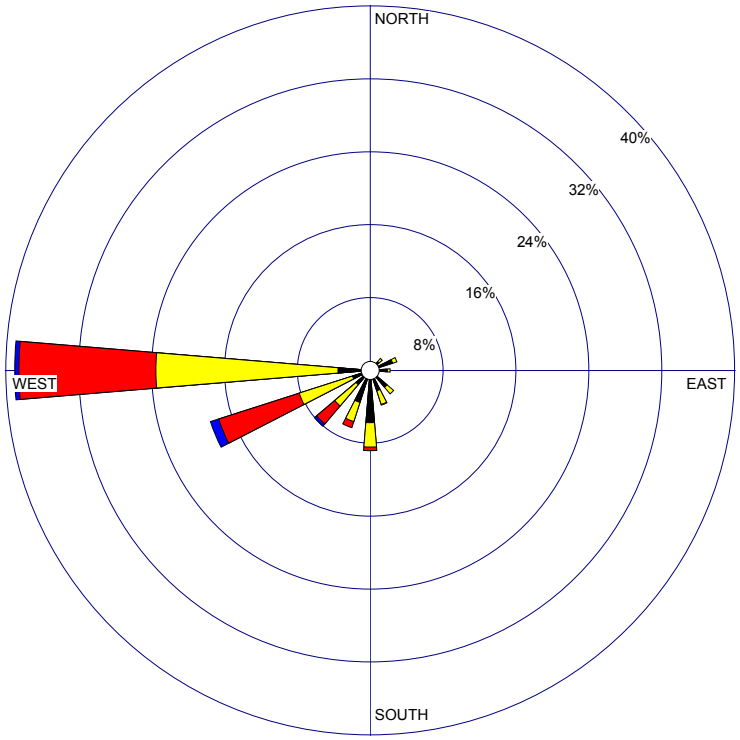
COMMENTS:	DATA PERIOD:	COMPANY NAME:	
	1981 Jan 1 - Mar 31 00:00 - 23:00	CH2M HILL	
		MODELER:	
	CALM WINDS: 8.22%	TOTAL COUNT: 900 hrs.	
	AVG. WIND SPEED: 1.53 m/s	DATE: 11/3/2005	PROJECT NO.:

WRPLOT View - Lakes Environmental Software

FIGURE 8.1-1c
WINTER NIGHTTIME WIND ROSE
VERNON POWER PLANT
CITY OF VERNON, CALIFORNIA

CH2MHILL

WIND ROSE PLOT:	DISPLAY:
Vernon Power Plan 1981 - A.M. Spring Windrose Apr.1 - Jun. 30 - 7:00 - 20:00	Wind Speed Direction (blowing from)



WIND SPEED
(m/s)

- >= 11.1
- 8.8 - 11.1
- 5.7 - 8.8
- 3.6 - 5.7
- 2.1 - 3.6
- 0.5 - 2.1

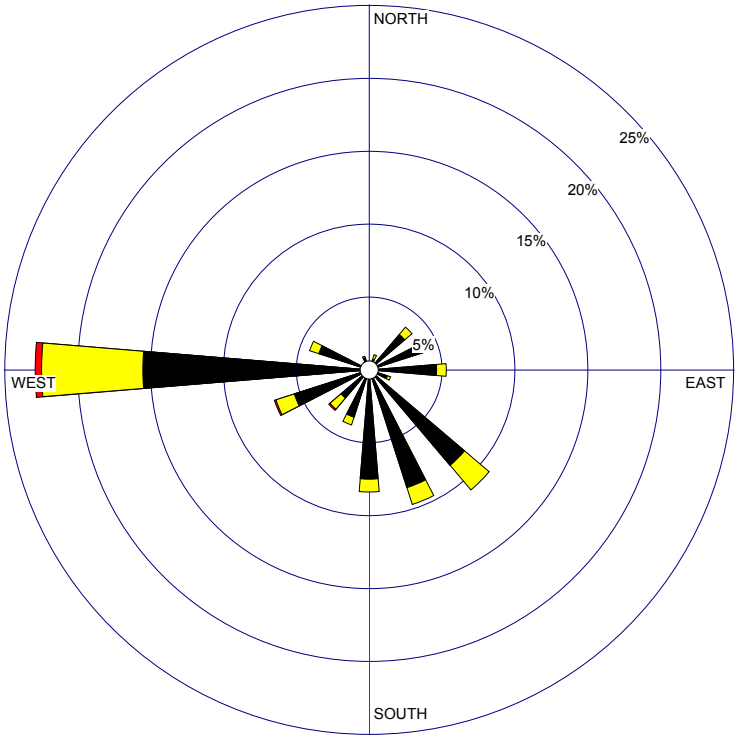
Calms: 2.43%

COMMENTS:	DATA PERIOD:	COMPANY NAME:	
	1981 Apr 1 - Jun 30 07:00 - 20:00	CH2M HILL	
		MODELER:	
	CALM WINDS: 2.43%	TOTAL COUNT: 1274 hrs.	
	AVG. WIND SPEED: 2.92 m/s	DATE: 11/3/2005	PROJECT NO.:

WRPLOT View - Lakes Environmental Software

FIGURE 8.1-1d
SPRING DAYTIME WIND ROSE
VERNON POWER PLANT
CITY OF VERNON, CALIFORNIA
CH2MHILL

WIND ROSE PLOT:	DISPLAY:
Vernon Power Plan 1981 - P.M. Spring Windrose Apr.1 - Jun. 31 - 21:00 - 6:00	Wind Speed Direction (blowing from)



WIND SPEED
(m/s)

- >= 11.1
- 8.8 - 11.1
- 5.7 - 8.8
- 3.6 - 5.7
- 2.1 - 3.6
- 0.5 - 2.1

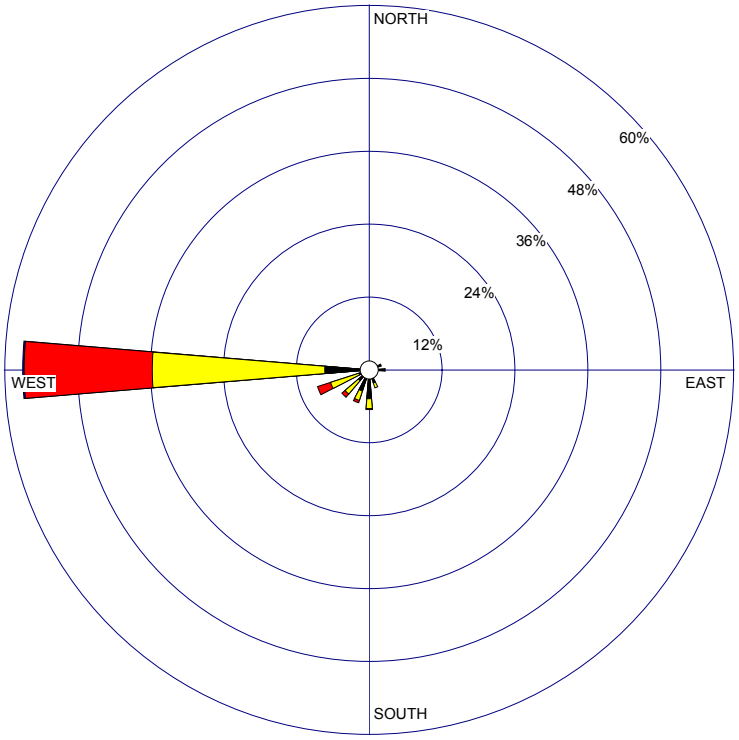
Calms: 11.32%

COMMENTS:	DATA PERIOD:	COMPANY NAME:	
	1981 Apr 1 - Jun 30 00:00 - 23:00	CH2M HILL	
		MODELER:	
	CALM WINDS: 11.32%	TOTAL COUNT: 910 hrs.	
	AVG. WIND SPEED: 1.39 m/s	DATE: 11/3/2005	PROJECT NO.:

WRPLOT View - Lakes Environmental Software

FIGURE 8.1-1e
SPRING NIGHTTIME WIND ROSE
VERNON POWER PLANT
CITY OF VERNON, CALIFORNIA
CH2MHILL

WIND ROSE PLOT:	DISPLAY:
Vernon Power Plan 1981 - A.M. Summer Windrose Jul.1 - Sep. 30 - 7:00 - 20:00	Wind Speed Direction (blowing from)



WIND SPEED
(m/s)

- >= 11.1
- 8.8 - 11.1
- 5.7 - 8.8
- 3.6 - 5.7
- 2.1 - 3.6
- 0.5 - 2.1

Calms: 3.03%

COMMENTS:	DATA PERIOD:	COMPANY NAME:	
	1981 Jul 1 - Sep 30 07:00 - 20:00	CH2M HILL	
		MODELER:	
	CALM WINDS: 3.03%	TOTAL COUNT: 1288 hrs.	
	AVG. WIND SPEED: 2.75 m/s	DATE: 11/3/2005	PROJECT NO.:

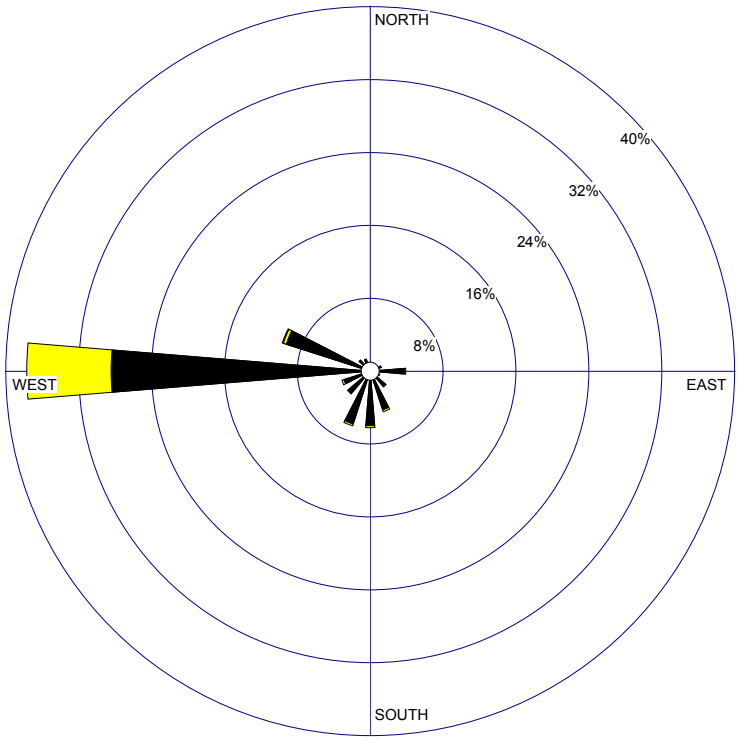
WRPLOT View - Lakes Environmental Software

FIGURE 8.1-1f
SUMMER DAYTIME WIND ROSE
VERNON POWER PLANT
CITY OF VERNON, CALIFORNIA

CH2MHILL

EY052006001SAC figure_8.1-1f.ai 06/02/06 tdaus

WIND ROSE PLOT:	DISPLAY:
Vernon Power Plan 1981 - P.M. Summer Windrose Jul.1 - Sep. 30 - 21:00 - 6:00	Wind Speed Direction (blowing from)



WIND SPEED
(m/s)

- >= 11.1
- 8.8 - 11.1
- 5.7 - 8.8
- 3.6 - 5.7
- 2.1 - 3.6
- 0.5 - 2.1

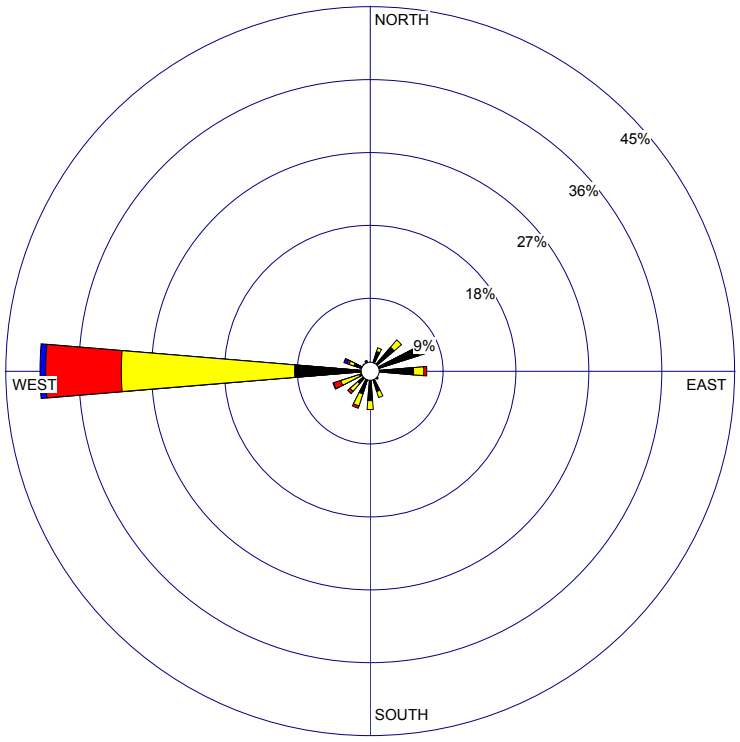
Calms: 14.67%

COMMENTS:	DATA PERIOD:	COMPANY NAME:	
	1981 Jul 1 - Sep 30 00:00 - 23:00	CH2M HILL	
		MODELER:	
	CALM WINDS: 14.67%	TOTAL COUNT: 920 hrs.	
	AVG. WIND SPEED: 1.23 m/s	DATE: 11/3/2005	PROJECT NO.:

WRPLOT View - Lakes Environmental Software

FIGURE 8.1-1g
SUMMER NIGHTTIME WIND ROSE
VERNON POWER PLANT
CITY OF VERNON, CALIFORNIA
CH2MHILL

WIND ROSE PLOT:	DISPLAY:
Vernon Power Plan 1981 - A.M. Autumn Windrose Oct.1 - Dec. 31 - 7:00 - 20:00	Wind Speed Direction (blowing from)



WIND SPEED
(m/s)

- >= 11.1
- 8.8 - 11.1
- 5.7 - 8.8
- 3.6 - 5.7
- 2.1 - 3.6
- 0.5 - 2.1

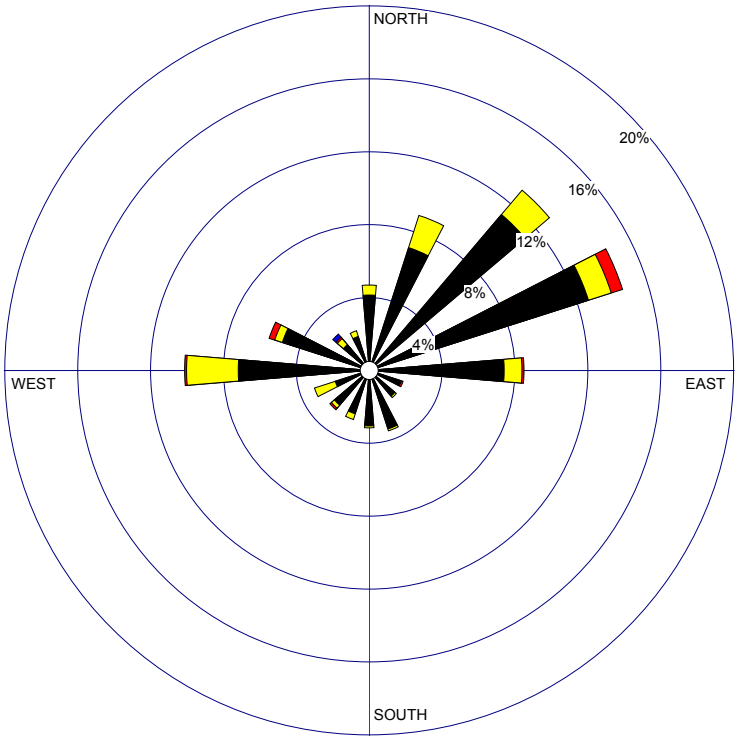
Calms: 5.82%

COMMENTS:	DATA PERIOD:	COMPANY NAME:	
	1981 Oct 1 - Dec 31 07:00 - 20:00	CH2M HILL	
		MODELER:	
	CALM WINDS: 5.82%	TOTAL COUNT: 1288 hrs.	
	AVG. WIND SPEED: 2.27 m/s	DATE: 11/3/2005	PROJECT NO.:

WRPLOT View - Lakes Environmental Software

FIGURE 8.1-1h
AUTUMN DAYTIME WIND ROSE
VERNON POWER PLANT
CITY OF VERNON, CALIFORNIA
CH2MHILL

WIND ROSE PLOT:	DISPLAY:
Vernon Power Plan 1981 - P.M. Autumn Windrose Oct.1 - Dec. 31 - 21:00 - 6:00	Wind Speed Direction (blowing from)



WIND SPEED
(m/s)

- >= 11.1
- 8.8 - 11.1
- 5.7 - 8.8
- 3.6 - 5.7
- 2.1 - 3.6
- 0.5 - 2.1

Calms: 10.33%

COMMENTS:	DATA PERIOD:	COMPANY NAME:	
	1981 Oct 1 - Dec 31 00:00 - 23:00	CH2M HILL	
		MODELER:	
	CALM WINDS: 10.33%	TOTAL COUNT: 920 hrs.	
	AVG. WIND SPEED: 1.38 m/s	DATE: 11/3/2005	PROJECT NO.:

WRPLOT View - Lakes Environmental Software

FIGURE 8.1-1i
AUTUMN NIGHTTIME WIND ROSE
VERNON POWER PLANT
CITY OF VERNON, CALIFORNIA
CH2MHILL

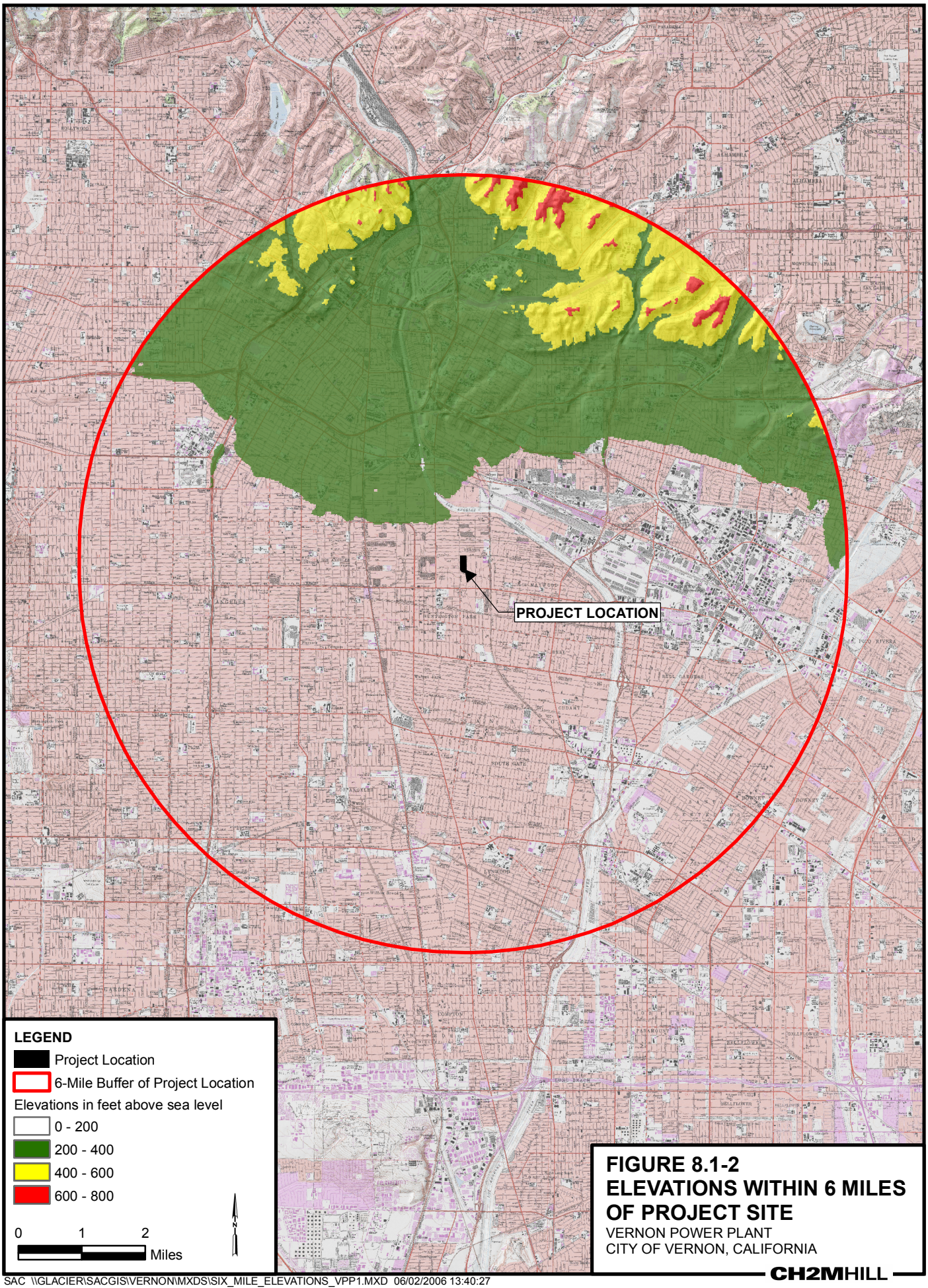


FIGURE 8.1-2
ELEVATIONS WITHIN 6 MILES OF PROJECT SITE
VERNON POWER PLANT
CITY OF VERNON, CALIFORNIA

CH2MHILL

SAC \\GLACIER\SACGIS\VERNON\MXDS\SIX_MILE_ELEVATIONS_VPP1.MXD 06/02/2006 13:40:27