5.1 Air Quality

This section describes existing air quality conditions, maximum potential impacts from construction and operation of the new Carlsbad Energy Center Project (CECP), and mitigation measures that keep these impacts below thresholds of significance. The project will use natural gas-fired combined-cycle gas turbine technology to generate electricity efficiently and cleanly.

Other beneficial environmental aspects of the proposed project that ensure that air quality impacts will not be significant include the following:

- Reduced air emissions by using clean-burning natural gas as fuel,
- Reduced nitrogen oxides (NO_x) emissions with selective catalytic reduction (SCR) control systems and dry low- NO_x combustors on the gas turbines,
- Reduced emissions of carbon monoxide (CO) and toxic air contaminants with dry low-NO_x combustors and oxidation catalyst systems,
- Reduced emissions of particulate matter through the use of dry cooling,
- Reduced emissions during gas turbine startups as compared with traditional combined cycle units with the use of quick start units, and
- Reduced ground-level concentrations of exhaust constituents with an appropriately sized exhaust stack.

This section presents the methodology and results of the air quality analyses performed to assess potential impacts associated with air emissions from construction and operation of the CECP. Potential public health risks posed by emissions of non-criteria pollutants are also addressed in Section 5.9, Public Health.

Section 5.1.1 presents the air quality setting, including geography, topography, climate, and meteorology. Section 5.1.2 provides an overview of air quality standards and health effects. Section 5.1.3 discusses the criteria pollutants and existing air quality in the vicinity of the proposed project. The affected environment is analyzed in Section 5.1.4, and air quality regulatory agencies relevant to the project are identified, along with the Laws, Ordinances, Regulations, and Standards (LORS) that can affect the project and project conformance. Section 5.1.5 discusses the environmental consequences of emissions from the project and presents an overview of approaches for calculating facility impacts, modeling, and analysis. The screening health risk assessment, visibility screening analysis, and construction impacts analysis are also discussed. Section 5.1.6 discusses compliance with LORS applicable to project. A discussion of cumulative effects is presented in Section 5.1.7. Mitigation for project air quality impacts is discussed in Section 5.1.8. A list of references used in preparing the section is provided in Section 5.1.9.

5.1.1 Air Quality Setting

The geography of the potential site, elevations of the surrounding landscape, long-term climatic characteristics, and short-term weather variations all have important effects on the resulting ground-level pollutant concentrations that result from CECP air emissions. The effects of the land and atmospheric variables are discussed separately.

5.1.1.1 Geography and Topography

The CECP will be located at the existing Encina Power Station site. The two new units (designated Units 6 and 7) will be on the northeast area of the existing site, between the existing rail line and I-5 highway, and at the location of three previously existing fuel oil tanks.

5.1.1.2 Climate and Meteorology

The climate of San Diego County is subtropical with large-scale wind and temperature regimes controlled by the proximity of the Pacific Ocean and seasonal migration of the Pacific high-pressure system. As a result, summers are relatively cool and winters are warm in comparison to other locations. Temperatures below freezing occur infrequently, as do temperatures over 100 °F.

The amount of solar radiation is one factor influencing thermal turbulence; the more thermal turbulence, the more dispersion of pollutants. The project area receives significant sunshine throughout the year, even during winter. Annual average sunshine is the percentage of maximum possible time the sun can shine, and is approximately 68 percent in the San Diego area.

Wind speed and direction are key factors influencing the dispersion and transport of pollutants. Wind flows on an annual basis are predominantly westerly. At Camp Pendleton, which is located approximately 10 kilometers north of the project and is the source of the meteorological data used in air dispersion modeling (approved by the San Diego Air Pollution Control District [SDAPCD]), the most frequent wind direction is from the west-northwest during February though October, and from the northeast during November through January. Wind speeds average approximately 7 miles per hour, and the maximum wind speed is approximately 29 miles per hour (NCDC, 1993). Appendix 5.1A contains the quarterly and annual wind roses and wind speed frequency tables for the three years, 2003 through 2005, used in the air dispersion modeling.

Temperatures in the project area range from an average of 57ºF in December and January to 72ºF in August, and relative humidity averages 58 percent during the daytime and 74 percent during the nighttime. Precipitation in the vicinity of the project site averages approximately 10.6 inches per year, with most of the precipitation occurring during winter[1].

Air quality is determined primarily by the type and amount of pollutants emitted into the atmosphere, the topography of the air basin, and local meteorological conditions. The stable atmospheric conditions and light winds in the project area are conducive for accumulation of pollutants in the air basin.

The predominant winds over all of California are shown in Figures 5.1-1 through 5.1-4 for January, April, July, and October, respectively. As indicated in the figures, winds in

1 WorldClimate. Average Rainfall for San Diego Lindbergh, San Diego County, California, USA, taken from NCDC Cooperative Stations for the 46 years 1950 through 1995, http://www.worldclimate.com/cgi-bin/data.pl?ref=N32W117+2200+047740C, accessed January 15, 2006.

California generally are light and easterly in the winter, but strong and westerly in the spring, summer, and fall.

5.1.2 Overview of Air Quality Standards

The U.S. Environmental Protection Agency (USEPA) has established national ambient air quality standards (NAAQS) for ozone, nitrogen dioxide (NO_2), carbon monoxide (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. Areas with ambient levels above these standards are designated by USEPA as "nonattainment areas" subject to planning and pollution control requirements that are more stringent than standard requirements.

The California Air Resources Board (CARB) has established California ambient air quality standards for ozone, CO, NO_2, SO_2, sulfates, PM_{10}, $PM_{2.5}$, airborne lead, hydrogen sulfide, and vinyl chloride at levels designed to protect the most sensitive members of the population, particularly children, the elderly, and people who suffer from lung or heart diseases.

Both state and national air quality standards consist of two parts: an allowable concentration of a pollutant, and an averaging time over which the concentration is to be measured. Allowable concentrations are based on the results of studies of the effects of the pollutants on human health, crops and vegetation, and, in some cases, damage to paint and other materials. The averaging times are based on whether the damage caused by the pollutant is more likely to occur during exposures to a high concentration for a short time (one hour, for instance), 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 5.1-1 presents the NAAQS and California ambient air quality standards for selected pollutants. The California standards are generally set at concentrations lower than the federal standards and, in some cases, have shorter averaging periods.

USEPA's current NAAQS for ozone and fine particulate matter went into effect on September 16, 1997. For ozone, the previous federal one-hour standard of 0.12 parts per million (ppm) was replaced by an eight-hour average standard at a level of 0.08 ppm. Compliance with this standard is based on the three-year average of the annual 4th-highest daily maximum eight-hour average concentration measured at each monitor within an area. The NAAQS for particulates were revised in several respects. First, compliance with the current 24-hour PM_{10} standard is now based on the 99th percentile of 24-hour concentrations at each monitor within an area. Two new $PM_{2.5}$ standards were added: a standard of 15 $\mu g/m^3$, based on the three-year average of annual arithmetic means from single or multiple monitors (as available); and a standard of 35 $\mu g/m^3$, based on the three-year average of the 98th percentile of 24-hour average concentrations at each monitor within an area. Finally, the state adopted a new, lower annual PM_{10} standard of 20 $\mu g/m^3$. The state $PM_{2.5}$ standard is 12 $\mu g/m^3$ on an annual average basis. On April 28, 2005, CARB approved a new 8-hour ozone standard of 0.070 ppm; this new standard became effective on May 17, 2006. Finally, on February 22, 2007, CARB approved a new 1-hour NO_2 standard of 0.18 ppm; final approval of this new standard is expected to occur later in the year.

TABLE 5.1-1
Ambient Air Quality Standards

Pollutant	Averaging Time	California	National
Ozone	1 hour	0.09 ppm	—
	8 hours	0.070 ppm	0.08 ppm[a]
Carbon Monoxide	8 hours	9.0 ppm	9 ppm
	1 hour	20 ppm	35 ppm
Nitrogen Dioxide	Annual Average	0.030 ppm	0.053 ppm
	1 hour	0.18 ppm	—
Sulfur Dioxide	Annual Average	—	80 µg/m^3 (0.03 ppm)
	24 hours	0.04 ppm (105 µg/m^3)	365 µg/m^3 (0.14 ppm)
	3 hours	—	1300[b] µg/m^3 (0.5 ppm)
	1 hour	0.25 ppm	—
Respirable Particulate Matter (10 Micron)	Annual Arithmetic Mean	20 µg/m^3	50 µg/m^3
	24 hours	50 µg/m^3	150 µg/m^3 70 µg/m^3 (proposed by USEPA, Dec 20, 05)
Fine Particulate Matter (2.5 Micron)	Annual Arithmetic Mean	12 µg/m^3	15 µg/m^3 (3-year average)
	24 hours	—	35 µg/m^3 [c]
Sulfates	24 hours	25 µg/m^3	—
Lead	30 days	1.5 µg/m^3	—
	Calendar Quarter	—	1.5 µg/m^3
Hydrogen Sulfide	1-hour	0.03 ppm	—
Vinyl Chloride	24-hour	0.010 ppm	—
Visibility Reducing Particles	8-hour (10am to 6pm PST)	[d]	—

Notes:

[a] 3-year average of annual 4th-highest daily maximum.

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

[c] 3-year average of 98th percentiles.

[d] In sufficient amount to produce an extinction coefficient of 0.23 per kilometer due to particles when the relative humidity is less than 70%.

5.1.3 Existing Air Quality

Data from several ambient air monitoring stations were used to characterize air quality for the CECP site. The Camp Pendleton monitoring station is the nearest ambient air quality monitoring station to the project site. This monitoring station is located approximately 19 kilometers to the northeast from the project site. However, because the Camp Pendleton station only measures ambient ozone and NO_2 levels, for CO, PM_{10}, and $PM_{2.5}$ data collected at the Escondido monitoring station were used. The Escondido monitoring station is located approximately 24 kilometers to the east from the project site. For ambient SO_2 levels, the nearest monitoring station is located in San Diego approximately 55 kilometers to the south from the project site. The nearest sulfate monitor is located in Riverside, Riverside County (approximately 90 kilometers to the northeast from the project site). Sulfate measurements at most monitoring stations in California were discontinued years ago because sulfur dioxide emissions are low enough to prevent sulfate levels from being anywhere near the California ambient air quality standard of 25 $\mu g/m^3$ on a 24-hour average basis. All ambient air quality data presented in this section were taken from CARB publications and data sources or USEPA air quality data tables.

5.1.3.1 Ozone

Ozone is generated by a complex series of chemical reactions between volatile organic compounds (VOC) and NO_x in the presence of ultraviolet radiation. Ambient ozone concentrations follow a seasonal pattern: higher in the summertime and lower in the wintertime. At certain times, the general area can provide ideal conditions for the formation of ozone due to the persistent temperature inversions, clear skies, mountain ranges that trap the air mass, and exhaust emissions from millions of vehicles and stationary sources. Based upon ambient air measurements at stations throughout the area, San Diego County is classified as a serious nonattainment area[2] for the state ozone standard and a nonattainment area for the federal 8-hour ozone standard.

Maximum ozone concentrations at the Camp Pendleton station usually are recorded during the spring and fall months. Table 5.1-2 shows the annual maximum hourly ozone levels recorded at this station during the period 1997 through 2006, as well as the number of days in which the state and federal standards were exceeded.

TABLE 5.1-2
Ozone Levels in San Diego County, Camp Pendleton Monitoring Station, 1997-2006 (ppm)

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Highest 1-Hour Average	0.120	0.113	0.098	0.109	0.113	0.087	0.099	0.110	0.090	0.086
Highest 8-Hour Average	0.096	0.096	0.086	0.099	0.098	0.073	0.084	0.095	0.074	0.073
Number of Days Exceeding:										
State Standard (0.090 ppm, 1-hour)	10	9	1	2	2	0	4	4	0	0
State Standard (0.070 ppm, 8-hour)	3	5	1	2	1	1	0	2	1	1
Federal Standard (0.080 ppm, 8-hour)	3	5	1	2	1	0	1	2	0	0

Source: California Air Quality Data, California Air Resources Board website (http://www.arb.ca.gov/adam/welcome.html; EPA AIRData website. http://www.epa.gov/air/data/index.html.

2 Serious nonattainment is of “mid-range” magnitude in a nonattainment classification system based on the amount by which monitored levels of ozone have exceeded ambient air quality standard during the last 3 years. The classification, in order of increasing magnitude, includes marginal, moderate, serious, severe, and extreme.

The long-term trends of maximum one-hour ozone readings and violations of the state and federal standard are shown in Figure 5.1-5 for this monitoring station. The data show that, on average, the state ozone standards have been exceeded in 9 of the past 10 years. The federal 8-hour ozone standard has been exceeded in 7 of the past 10 years. Trends of maximum and 3-year average of the 4th highest daily concentrations of 8-hour average ozone readings and exceedances of the federal standard are shown in Figure 5.1-6.

5.1.3.2 Nitrogen Dioxide

Atmospheric NO_2 is formed primarily from reactions between nitric oxide (NO) and oxygen or ozone. NO is formed during high temperature combustion processes, when the nitrogen and oxygen in the combustion air combine. Although NO is less harmful than NO_2, it can be converted to NO_2 in the atmosphere within minutes to hours, depending on the composition and temperature of the atmosphere. For purposes of state and federal air quality planning, San Diego County is in attainment for NO_2.

Table 5.1-3 shows the long-term trend of maximum one-hour NO_2 levels recorded at the Camp Pendleton monitoring station during the period from 1997 to 2006, as well as the annual average level for each of those years. During this period there has not been a single violation of either the state one-hour standard or the federal annual average standard.

Figure 5.1-7 shows the historical trend of maximum one-hour NO_2 levels at this monitoring station. Annual average concentrations and trends are shown in Figure 5.1-8.

TABLE 5.1-3
Nitrogen Dioxide Levels in San Diego County, Camp Pendleton Monitoring Station, 1997-2006 (PPM)

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Highest 1-Hour Average	0.134	0.085	0.157	0.117	0.092	0.109	0.095	0.099	0.077	0.081
Annual Average (State Standard = 0.030 ppm) (Federal Standard = 0.053 ppm)	0.012	0.012	0.014	0.014	0.013	0.013	0.012	0.012	0.012	0.011
Number of Days Exceeding:										
State Standard (0.180 ppm, 1-hour)	0	0	0	0	0	0	0	0	0	0

Source: California Air Quality Data, California Air Resources Board website (http://www.arb.ca.gov/adam/welcome.html; EPA AIRData website (http://www.epa.gov/air/data/index.html).

5.1.3.3 Carbon Monoxide

CO is a product of inefficient combustion, principally from automobiles and other mobile sources of pollution. In many areas of California, CO emissions from wood-burning stoves and fireplaces can also be measurable contributors to ambient CO levels. Industrial sources typically contribute less than 10 percent of ambient CO levels. Peak CO levels usually occur during winter due to a combination of higher emission rates and calm weather conditions with strong, ground-based inversions. San Diego County is classified as an attainment area for CO with respect to both state and national standards.

Table 5.1-4 shows the California and National Ambient Air Quality Standards for CO, and the maximum one- and eight-hour average levels recorded at the Escondido monitoring station during the period 1997 through 2006.

TABLE 5.1-4
Carbon Monoxide Levels in San Diego County, Escondido Monitoring Station, 1997-2006 (PPM)

	1997	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
Highest 1-hour average	9.3	10.2	9.9	9.3	8.5	8.5	12.7	6.3	5.9	5.7
Highest 8-hour average	4.9	4.5	5.3	4.9	5.1	3.9	10.6	3.8	3.1	3.6
Number of days exceeding:										
State Standard (20.0 ppm, 1-hr)	0	0	0	0	0	0	0	0	0	0
State Standard (9.0 ppm, 8-hr)	0	0	0	0	0	0	1	0	0	0
Federal Standard (9.3 ppm, 8-hr)	0	0	0	0	0	0	1	0	0	0

Source: California Air Quality Data, California Air Resources Board website http://www.arb.ca.gov/adam/welcome.html; EPA AIRData website http://www.epa.gov/air/data/index.html.

Trends of maximum one- and eight-hour average CO concentrations are shown in Figures 5.1-9 and 5.1-10, which show that, with the exception of 2003, maximum ambient CO levels monitored at the Escondido station have been well below the state standards for the last 10 years.

5.1.3.4 Sulfur Dioxide

SO_2 is produced when any sulfur-containing fuel is burned. It is also emitted by chemical plants that treat, or refine, sulfur or sulfur-containing chemicals. Natural gas contains only a small amount of sulfur, typically about 0.2 grains per standard cubic foot, while fuel oils contain larger amounts, typically in the range of 15 ppm (for ultra-low sulfur Diesel fuel) to 4 percent (for marine bunker fuels). Peak, but low, concentrations of SO_2 occur at different times of the year in different parts of California, depending on local fuel characteristics, weather, and topography. San Diego County is considered to be in attainment for SO_2 for purposes of state and federal air quality planning.

Table 5.1-5 presents the state air quality standard for SO_2 and the maximum levels recorded from 1997 through 2006 at the San Diego monitoring station. The federal 24-hour average standard is 0.14 ppm; during the period shown, the average SO_2 levels measured at this station have been less than approximately 20 percent of the federal standard. Figure 5.1-11 shows that for several years the maximum 24-hour SO_2 levels typically have been less than approximately one-half of the state standard.

TABLE 5.1-5
Sulfur Dioxide Levels in san Diego County, San Diego Monitoring Station, 1997-2006 (PPM)

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Highest 1-Hour Average	0.052	0.040	0.039	0.038	0.052	0.028	0.036	0.042	0.040	0.034
Highest 3-Hour Average	0.032	0.037	0.025	0.029	0.036	0.015	0.019	0.020	0.026	0.030
Highest 24-Hour Average	0.011	0.011	0.008	0.010	0.010	0.007	0.008	0.009	0.009	0.009
Annual Average (Federal Standard = 0.030 ppm)	0.003	0.003	0.002	0.004	0.003	0.003	0.005	0.004	0.003	0.004
Number of days exceeding:										
State Standard (0.040 ppm, 24-hr)	0	0	0	0	0	0	0	0	0	—
Federal Standard (0.140 ppm, 24-hr)	0	0	0	0	0	0	0	0	0	0

Source: California Air Quality Data, California Air Resources Board website (http://www.arb.ca.gov/adam/welcome.html; EPA AIRData website (http://www.epa.gov/air/data/index.html).

5.1.3.5 Respirable Particulate Matter (PM_{10})

Particulates in the air are caused by a combination of wind-blown fugitive dust; particles emitted from combustion sources and manufacturing processes; sea salts; and organic, sulfate, and nitrate aerosols formed in the air from emitted hydrocarbons, sulfur oxides, and nitrogen oxides, respectively. In 1984, CARB adopted standards for PM_{10} and phased out the total suspended particulate (TSP) standards that had been in effect previously. PM_{10} standards were substituted for TSP standards because PM_{10} corresponds to the size range of particulates that can be inhaled into the lungs (respired), and therefore is a better measure to use in assessing potential health effects. In 1987, USEPA also replaced national TSP standards with PM_{10} standards. San Diego County is unclassified for the federal PM_{10} standard and is a nonattainment area for the state standard.

Table 5.1-6 shows the federal and state air quality standards for PM_{10}, maximum levels recorded at the Escondido monitoring station during 1997 through 2006, and arithmetic annual averages for the same period. The maximum 24-hour PM_{10} levels exceed the state standard for several years, but the annual average PM_{10} levels have remained below the Federal standards throughout the period.

The trend of maximum 24-hour average PM_{10} levels is plotted in Figure 5.1-12, and the trend of expected violations of the state 24-hour standard (50 $\mu g/m^3$) is plotted in Figure 5.1-13. Note that since PM_{10} is measured only once every six days, expected violation days are six times the number of measured violations. The trend of maximum annual average PM_{10} readings and the California standard is shown in Figure 5.1-14. Annual average PM_{10} concentrations are above the state standard of 20 $\mu g/m^3$.

TABLE 5.1-6
PM_{10} Levels in San Diego County, Escondido Monitoring Station, 1997-2006 (µg/m³)

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Highest 24-Hour Average	63	51	52	65	74	51	179	57	42	51
Annual Arithmetic Mean (State Standard = 20 µg/m3)	29	19	30	30	31	27	33	28	24	24
Number of Days Exceeding:										
State Standard (50 µg/m3, 24-hour)	19	—	0	12	13	0	31	6	0	6
Federal Standard (150 µg/m3, 24-hour)	0	—	0	0	0	0	3	0	0	0

Source: California Air Quality Data, California Air Resources Board website http://www.arb.ca.gov/adam/welcome.html; EPA AIRData website http://www.epa.gov/air/data/index.html.

5.1.3.6 Fine Particulate Matter ($PM_{2.5}$)

As discussed previously, the NAAQS for particulates were further revised by USEPA with new standards that went into effect on September 16, 1997; two new $PM_{2.5}$ standards were added at that time. In June 2002, CARB established a new annual standard for $PM_{2.5}$. $PM_{2.5}$ data have been collected at the Escondido monitoring station since 1999, and are presented below.

Table 5.1-7 shows the state and federal air quality standards for $PM_{2.5}$, maximum levels recorded at the Escondido monitoring station 1999 through 2006, and 3-year averages for the same period. During the past 10 years, the 24-hour average concentrations have not exceeded the federal standard of 65 µg/m³ established in 1997. However, this standard was reduced to 35 µg/m³ in December 2006. There is not enough data available to draw conclusions regarding trends in the 3-year average of 98th percentile values. During the past 5 years annual average $PM_{2.5}$ levels have generally been below the federal and above the state standards. San Diego County is considered a nonattainment area for the state $PM_{2.5}$ standard, but is unclassified for the federal standard.

The trends of 24-hour and annual average $PM_{2.5}$ levels are plotted in Figures 5.1-15 and 5.1-16, respectively.

TABLE 5.1-7
$PM_{2.5}$ Levels in San Diego County, Escondido Monitoring Station, 1997-2006 (µg/m³)

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Highest 24-Hour Average	—	—	64.0	66.0	60.0	54.0	38.0	67.0	43.0	41.0
Number of Days Exceeding:										
Federal Standard (65 µg/m3, 24-hour)	0	0	0	0	0	0	0	0	0	0
(35 µg/m3, 24-hour effective December 17, 2006)	—	—	—	—	—	—	—	—	—	—

TABLE 5.1-7
$PM_{2.5}$ Levels in San Diego County, Escondido Monitoring Station, 1997-2006 (µg/m^3)

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
98th Percentile	—	—	45.0	48.0	41.0	39.0	34.0	37.0	32.0	28.0
3-yr Average, 98th Percentile	—	—	—	—	44.7	42.7	38.0	36.7	34.3	32.3
Annual Arithmetic Mean	—	—	18.0	15.8	17.5	16.0	14.1	14.1	12.3	11.5
3-yr Annual Average (Federal Std = 15 µg/m3) (State Std = 12 µg/m3)	—	—	—	—	17.1	16.4	15.9	14.7	13.5	12.6

Source: California Air Quality Data, California Air Resources Board website (http://www.arb.ca.gov/adam/welcome.html; EPA AIRData website (http://www.epa.gov/air/data/index.html).

5.1.3.7 Airborne Lead

The majority of lead in the air results from the combustion of fuels that contain lead. Twenty-five years ago, motor gasoline contained relatively large amounts of lead compounds used as octane-rating improvers, and ambient lead levels were relatively high. Beginning with the 1975 model year, new automobiles began to be equipped with exhaust catalysts, which were poisoned by the exhaust products of leaded gasoline. Thus, unleaded gasoline became the required fuel for an increasing fraction of new vehicles, and the phase-out of leaded gasoline began. As a result, ambient lead levels decreased dramatically. San Diego County has been in attainment of state and federal airborne lead levels for air quality planning purposes for a number of years.

The ambient lead levels were monitored in San Diego until the end of 2004. Table 5.1-8 lists the federal air quality standard for airborne lead and the levels recorded in San Diego between 1997 and 2004. Maximum quarterly levels are well below the federal standard.[3]

TABLE 5.1-8
Airborne Lead Levels in San Diego County, San Diego Monitoring Station, 1997-2006 (µg/m^3)

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Highest Quarterly Average	0.03	0.02	0.02	0.02	0.02	0.02	0.01	—	—	—
Number of Days Exceeding:										
Federal Standard (1.5 µg/m3, quarterly)	0	0	0	0	0	0	0	—	—	—

Source: California Air Quality Data, California Air Resources Board website (http://www.arb.ca.gov/adam/welcome.html; EPA AIRData website (http://www.epa.gov/air/data/index.html).

[3] ARB no longer reports summary lead statistics on its website.

5.1.4 Affected Environment

The USEPA has responsibility for enforcing, on a national basis, the requirements of many of the country's environmental and hazardous waste laws. California is under the jurisdiction of USEPA Region 9, which has its offices in San Francisco. Region 9 is responsible for the local administration of USEPA programs for California, Arizona, Nevada, Hawaii, and certain Pacific trust territories. USEPA's activities relative to the California air pollution control program focus principally on reviewing California's submittals for the State Implementation Plan (SIP). The SIP is required by the federal Clean Air Act to demonstrate how all areas of the state will meet the national ambient air quality standards within the federally specified deadlines (42 USC §7409, 7411).

CARB was created in 1968 by the Mulford-Carrell Air Resources Act, through the merger of two other state agencies. 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 (California Health & Safety Code (H&SC) §39500, et seq.).

When the state's air pollution statutes were reorganized in the mid-1960s, local air pollution control districts (APCDs) were required to be established in each county of the state (H&SC §4000 et seq.). 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.

Air pollution control districts and air quality management districts in California have principal responsibility for:

- Developing plans for meeting the state and federal ambient air quality standard;
- Developing control measures for non-vehicular sources of air pollution necessary to achieve and maintain both state and federal air quality standards;
- Implementing permit programs established for the construction, modification, and operation of sources of air pollution; and
- Enforcing air pollution statutes and regulations governing non-vehicular sources and for developing employer-based trip reduction programs.

Each level of government (state, federal, and county/local air district) has adopted specific regulations that limit emissions from stationary combustion sources, several of which are applicable to this proposed project. The air agencies having permitting authority for this project are shown in Table 5.1-9. The applicable federal laws, ordinances, regulations, and standards (LORS) and compliance with these requirements are discussed in more detail in the following sections. The SDAPCD staff will treat the Application for Certification (AFC) as an application for a Determination of Compliance.

TABLE 5.1-9
Air Quality Agencies

Agency	Authority	Contact
USEPA Region 9	Permit issuance and oversight, enforcement	Gerardo Rios, Chief Permits Office USEPA Region 9 75 Hawthorne Street San Francisco, CA 94105 (415) 744-1259
California Air Resources Board	Regulatory oversight	Mike Tollstrup, Chief Project Assessment Branch California Air Resources Board 2020 L Street Sacramento, CA 95814 (916) 322-6026
San Diego Air Pollution Control District	Permit issuance, enforcement	Tom Weeks Chief, Engineering Division 10124 Old Grove Road San Diego, CA 92131 (858) 586-2600

5.1.5 Laws, Ordinances, Regulations, and Standards

Requirements of federal, state, and local jurisdictions are discussed in the following Sections 5.1.4.1.1, 5.1.4.1.2, and 5.1.4.1.3, respectively. Compliance with each of these requirements is addressed in Section 5.1.6.

5.1.5.1 Federal LORS

The USEPA implements and enforces the requirements of many of the federal environmental laws. USEPA Region 9, which has its offices in San Francisco, administers federal air programs in California. The federal Clean Air Act, as most recently amended in 1990, provides USEPA with the legal authority to regulate air pollution from stationary sources such as CECP. USEPA has promulgated the following stationary source regulatory programs to implement the requirements of the Federal Clean Air Act:

- Prevention of Significant Deterioration (PSD);
- New Source Review (NSR);
- Title IV: Acid Rain Program;
- Title V: Operating Permits;
- National Standards of Performance for New Stationary Sources (NSPS) ; and
- National Emission Standards for Hazardous Air Pollutants (NESHAPs).

5.1.5.1.1 Prevention of Significant Deterioration Program

Authority: Clean Air Act §160-169A, 42 USC §7470-7491; 40 CFR Parts 51 and 52

Requirements: Requires pre-construction review and permitting of new or modified major stationary sources of air pollution to prevent significant deterioration of ambient air quality. PSD applies to pollutants for which ambient concentrations do not exceed the corresponding NAAQS (i.e., attainment pollutants). The PSD program allows new sources of air pollution to be constructed, or existing sources to be modified, while preserving the existing ambient air quality levels, protecting public health and welfare, and protecting Class I areas (e.g., national parks and wilderness areas). Although this program is normally implemented at the local level with federal oversight, it is presently implemented in San Diego by USEPA Region 9.

The PSD regulation contains the following elements:

- Air quality monitoring
- BACT
- Air quality impact analysis
- Protection of Class I areas
- Growth, visibility, soils, and vegetation impacts

5.1.5.1.2 Air Quality Monitoring

At its discretion, USEPA Region 9 may require pre-construction and/or post-construction ambient air quality monitoring for PSD sources if representative monitoring data are not already available. Pre-construction monitoring data must be gathered over a one-year period to characterize local ambient air quality. Post-construction air quality monitoring data must be collected as deemed necessary by USEPA Region 9 to characterize the impacts of proposed project emissions on ambient air quality.

5.1.5.1.3 Best Available Control Technology

BACT must be applied to any new or modified major source to minimize the emissions increase of those pollutants exceeding the PSD emission thresholds. BACT is defined below in the discussion of the SDAPCD NSR regulatory requirements.

5.1.5.1.4 Air Quality Impact Analysis

An air quality dispersion analysis must be conducted to evaluate impacts of significant emission increases from new or modified facilities on ambient air quality. PSD source emissions must not cause an exceedance of any ambient air quality standard, and the increase in ambient air concentrations must not exceed the allowable increments shown in Table 5.1-10.

TABLE 5.1-10
PSD Class II Increments +

Pollutant	Averaging Period	Allowable Increment($\mu g/m^3$)
NO_2	Annual	25.0
SO_2	Annual	20.0
	24-Hour	91.0
	3-Hour	512.0
PM_{10}	Annual	17.0
	24-Hour	30.0

+ 40 CFR 52.21.c.

5.1.5.1.5 Protection of Class I Areas

The increase in ambient air quality concentrations for the relevant pollutants (i.e., NO_2, PM_{10}, or SO_2) within Class I areas located in the project area must be characterized if there is a significant emission increase associated with the new or modified PSD source. In addition, a Class I visibility impact analysis must also be performed.

5.1.5.1.6 Growth, Visibility, Soils, and Vegetation Impacts

Impairment to visibility, soils, and vegetation resulting from PSD source emissions as well as associated commercial, residential, industrial, and other growth must also be analyzed. This analysis includes cumulative effects to local ambient air quality.

As discussed in more detail below, the CECP includes the installation of two new gas turbine units and the shutdown of three existing boilers at the existing Encina Power Station. With the shutdown of the existing boilers, the facility-wide net emission change is expected to be below PSD significance thresholds. Hence, the CECP is not subject to the PSD program.

Administering Agency: USEPA Region 9.

5.1.5.1.7 New Source Review

Authority: Clean Air Act §171-193, 42 USC §7501 et seq.; 40 CFR Parts 51 and 52

Requirement: Requires pre-construction review and permitting of new or modified major stationary sources of air pollution to allow industrial growth without interfering with the attainment and maintenance of NAAQS. New source review jurisdiction has been delegated to the SDAPCD for all nonattainment pollutants and is discussed further under local LORS and conformance below.

Administering Agency: SDAPCD, with USEPA Region 9 oversight.

5.1.5.1.8 Acid Rain Program

Authority: Clean Air Act §401 (Title IV), 42 USC §7651

Requirement: Requires the monitoring and reporting of emissions of acidic compounds and their precursors. The principal source of these compounds is the combustion of fossil fuels. Therefore, Title IV established national standards to monitor, record, and in some cases limit SO_2 and NO_x emissions from electrical power generating facilities. These standards are implemented at the local level with federal oversight.

Administering Agency: SDAPCD, with USEPA Region 9 oversight.

5.1.5.1.9 Title V Operating Permits Program

Authority: Clean Air Act §501 (Title V), 42 USC §7661

Requirements: Requires the issuance of operating permits that identify all applicable federal performance, operating, monitoring, recordkeeping, and reporting requirements. Title V applies to major facilities, Phase II acid rain facilities, subject solid waste incinerator facilities, and any facility listed by USEPA as requiring a Title V permit. SDAPCD has received delegation authority for this program.

Administering Agency: SDAPCD, with USEPA Region 9 oversight.

5.1.5.1.10 National Standards of Performance for New Stationary Sources

Authority: Clean Air Act §111, 42 USC §7411; 40 CFR Part 60

Requirements: Establishes standards of performance to limit the emission of criteria pollutants (air pollutants for which USEPA has established national ambient air quality standards [NAAQS]) from new or modified facilities in specific source categories. These standards are implemented at the local level with federal oversight. The applicability of these regulations depends on the equipment size, process rate, and/or the date of construction, modification, or reconstruction of the affected facility. The NSPS for Stationary Gas Turbines and for Stationary Compression Ignition Internal Combustion Engines will be applicable to the proposed project. Regarding the NSPS for Gas Turbines, the new NSPS Subpart KKKK, Standards of Performance for Stationary Gas Turbines (constructed after February 18, 2005), supersedes existing NSPS Subpart GG in setting limits on NO_x and sulfur dioxide (SO_2) emissions from gas turbines. Subpart KKKK limits NO_x and SO_2 emissions from new gas turbines based on power output. The limits for gas turbines greater than 30 MW are 0.39lb NO_x per MW-hr and 0.58lb SO_2 per MW-hr. For the size of engine proposed for the emergency firepump engine, the NSPS Subpart IIII, Standards of Performance for Stationary Compression Ignition Internal Combustion Engines requires facilities to purchase engines meeting the USEPA engine non-road certification level of Tier II or better depending on the year the engine is manufactured/purchased. This regulation also requires the engines to use ultra-low sulfur content Diesel fuel.

Administering Agency: SDAPCD, with USEPA Region 9 oversight.

5.1.5.1.11 National Emission Standards for Hazardous Air Pollutants

Authority: Clean Air Act §112, 42 USC §7412

Requirements: 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 major sources of HAPs in specific source categories.[4] These standards are implemented at the local level with federal oversight. Only the NESHAPs for gas turbines, which limit formaldehyde emissions from gas turbines, are potentially applicable to a new power plant project. However, as discussed further below, the gas turbine NESHAP is not expected to be applicable to the proposed project because the facility would not be a major source of HAPs (i.e., 10 tpy of one HAP or 25 tpy of all HAPs). Thus, NESHAPs requirements will not be addressed further.

Administering Agency: SDAPCD, with USEPA Region 9 oversight.

5.1.5.2 State LORS

CARB was created in 1968 by the Mulford-Carrell Air Resources Act, through the merger of two other state agencies. 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 California Ambient Air Quality Standards (CAAQS); to review the operations of the local air

[4] A major source of HAPs is one that emits more than 10 tons per year (tpy) of any individual HAP, or more than 25 tpy of all HAPs combined.

pollution control districts (APCDs); and to review and coordinate preparation of the SIP for achievement of the NAAQS. CARB has implemented the following state or federal stationary source regulatory programs in accordance with the requirements of the federal Clean Air Act and California Health & Safety Code (H&SC):

- State Implementation Plan
- California Clean Air Act
- Toxic Air Contaminant Program
- Airborne Toxic Control Measure for Stationary Compression-Ignition Engines
- Nuisance Regulation
- Air Toxics "Hot Spots" Act
- CEC and CARB Memorandum of Understanding

5.1.5.2.1 State Implementation Plan (SIP)

Authority: Health & Safety Code (H&SC) §39500 et seq.

Requirements: The SIP demonstrates the means by which all areas of the state will attain and maintain NAAQS within the federally mandated deadlines, as required by the federal Clean Air Act. CARB reviews and coordinates preparation of the SIP. Local districts must adopt new rules or revise existing rules to demonstrate that the resulting emission reductions, in conjunction with reductions in mobile source emissions, will result in attainment of the NAAQS. The relevant SDAPCD Rules and Regulations that have also been incorporated into the SIP are discussed with the local LORS in Section 5.1.4.1.3.

Administering Agency: SDAPCD, with CARB and USEPA Region 9 oversight.

5.1.5.2.2 California Clean Air Act

Authority: H&SC §40910 – 40930

Requirements: Established in 1989, the California Clean Air Act requires local districts to attain and maintain both national and state ambient air quality standards at the "earliest practicable date." Local districts must prepare air quality plans demonstrating the means by which the ambient air quality standards will be attained and maintained. The relevant components of the SDAPCD Air Quality Plan are discussed with the local LORS.

Administering Agency: SDAPCD, with CARB oversight.

5.1.5.2.3 Toxic Air Contaminant Program

Authority: H&SC §39650 – 39675

Requirements: Established in 1983, the Toxic Air Contaminant Identification and Control Act created a two-step process to identify toxic air contaminants (TACs) and control their emissions. CARB identifies and prioritizes the pollutants to be considered for identification as toxic air contaminants. CARB assesses the potential for human exposure to a substance, while the Office of Environmental Health Hazard Assessment evaluates the corresponding health effects. Both agencies collaborate in the preparation of a risk assessment report, which concludes whether a substance poses a significant health risk and should be identified as a toxic air contaminant. In 1993, the Legislature amended the program to include the 187[5] federally identified hazardous air pollutants as toxic air contaminants. CARB reviews the emission sources of an identified toxic air contaminant and, if necessary, develops air toxics control measures to reduce the emissions.

Administering Agency: CARB

5.1.5.2.4 Airborne Toxic Control Measure for Stationary Compression-Ignition Engines

Authority: Title 17, California Code of Regulations, §93115

Requirements: The purpose of the airborne toxic control measure (ATCM) is to reduce diesel particulate matter (DPM) and criteria pollutant emissions from stationary diesel-fueled compression ignition engines. The ATCM applies to stationary compression-ignition engines with a rating greater than 50 brake horsepower. The ATCM requires the use of CARB-certified diesel fuel or equivalent, and limits emissions from, and operations of, compression ignition engines.

Administering Agency: SDAPCD and CARB

5.1.5.2.5 Nuisance Regulation

Authority: CA Health & Safety Code §41700

Requirements: Provides that "no person shall discharge from any source whatsoever such quantities of air contaminants or other material which causes injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause injury or damage to business or property."

Administering Agency: SDAPCD and CARB

5.1.5.2.6 Air Toxic "Hot Spots" Act

Authority: H& SC §44300-44384; 17 CCR §93300-93347

Requirements: Established in 1987, the Air Toxics "Hot Spots" Information and Assessment Act supplements the toxic air contaminant program, by requiring the development of a statewide inventory of air toxics emissions from stationary sources. The program requires affected facilities to prepare: (1) an emissions inventory plan that identifies relevant air toxics and sources of air toxics emissions; (2) an emissions inventory report quantifying air toxics emissions; and (3) a health risk assessment, if necessary, to characterize the health risks to the exposed public. Facilities whose air toxics emissions are deemed to pose a significant health risk must issue notices to the exposed population. In 1992, the Legislature amended the program to further require facilities whose air toxics emissions are deemed to pose a significant health risk to implement risk management plans to reduce the associated health risks. This program is implemented at the local level with state oversight.

Administering Agency: SDAPCD and CARB

5.1.5.2.7 CEC and CARB Memorandum of Understanding

Authority: CA Pub. Res. Code §25523(a); 20 CCR §1752, 1752.5, 2300-2309 and Div. 2, Chap. 5, Art. 1, Appendix B, Part (k)

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[5] Methyl ethyl ketone was removed from the list on December 19, 2005, http://www.epa.gov/ttn/atw/pollutants/atwsmod.html, accessed April 9, 2006).

Requirements: Provides for the inclusion of requirements in the CEC's decision on an AFC to assure protection of environmental quality; the application is required to include information concerning air quality protection.

Administering Agency: CEC

5.1.5.3 Local LORS

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 (including the SDAPCD), 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. Local districts have principal responsibility for the following:

- Developing plans for meeting the NAAQS and California ambient air quality standards;
- Developing control measures for non-vehicular sources of air pollution necessary to achieve and maintain both state and federal air quality standards;
- Implementing permit programs established for the construction, modification, and operation of sources of air pollution;
- Enforcing air pollution statutes and regulations governing non-vehicular sources; and
- Developing programs to reduce emissions from indirect sources.

5.1.5.3.1 San Diego Air Quality Plans

Authority: H&SC §40914

Requirements: Air quality plans define the proposed strategies, including stationary source and transportation control measures and new source review rules that will be implemented to attain and maintain the state ambient air quality standards. The relevant stationary source control measures and new source review requirements are discussed with SDAPCD Rules and Regulations.

Administering Agency: SDAPCD with USEPA Region 9 and CARB oversight.

5.1.5.3.2 San Diego Air Pollution Control District Rules and Regulations

Authority: H&SC §4000 et seq., H&SC §40200 et seq., indicated SDAPCD Rules

Requirements: Establishes procedures and standards for issuing permits; establishes standards and limitations on a source-specific basis.

Administering Agency: SDAPCD with USEPA Region 9 and CARB oversight.

5.1.5.3.3 Authority to Construct

Rule 10 (Permits Required) specifies that any facility installing nonexempt equipment that causes or controls the emission of air pollutants must first obtain an Authority to Construct from the SDAPCD. Under Rule 20.5 (h) (Power Plants), the District's Final Determination of Compliance acts as an authority to construct for a power plant upon approval of the proposed project by the CEC.

5.1.5.3.4 Review of New or Modified Sources

Rule 20.3 (New Source Review, Major Stationary Sources and PSD Sources) implements the federal NSR and PSD programs, as well as the new source review requirements of the California Clean Air Act. The rule contains the following elements:

- Best Available Control Technology (BACT) and Lowest Achievable Emission Rates (LAER)
- Emission offsets
- Air quality impact analysis (AQIA)

5.1.5.3.5 Best Available Control Technology

BACT must be applied to any new or modified source resulting in an emissions increase exceeding any SDAPCD BACT threshold shown in Table 5.1-11.

TABLE 5.1-11
SDAPCD BACT and LAER Emission Thresholds

Pollutant	BACT Threshold (lb/day)	LAER Major Source Threshold (tpy)	LAER Major Modification Threshold (tpy)
CO	N/A[a]	N/A[b]	N/A[b]
NO_x	10	50	25
PM_{10}	10	100	15
SO_2	10	100	40
VOC	10	50	25

Notes:

[a] SDAPCD regulates BACT for CO under the PSD component of Rule 20.3

[b] CO is an attainment pollutant, and hence, not subject to LAER requirements

The SDAPCD defines BACT as the most stringent emission limitation or control technique that:

- Has been proven in field application and that is cost-effective unless not achievable; or
- Has been demonstrated, but not necessarily proven, in field applications, and that is cost-effective; or
- Is any control equipment, process modification, changes in raw material including alternate fuels, and substitution of equipment or processes with any equipment or processes (or any combination of these) determined to be technologically feasible and cost-effective; or
- Is contained in any SIP approved by USEPA for such emission unit category, unless demonstrated to not be proven in field application, not be technologically feasible, or not be cost-effective.

LAER must be applied to any federal nonattainment pollutants (or their precursors) at new major sources or major modifications exceeding any emission threshold shown in Table 5.1-11. LAER is more stringent than BACT because it does not contain restrictions for cost-effectiveness. Only NO_x and VOCs are federal nonattainment precursors in SDAPCD and, therefore, potentially subject to LAER. The SDAPCD defines LAER as:

- The most stringent emission limitation that is achieved in practice by such class or category of emission unit; or
- The most stringent emission limitation, or most effective emission control device or technique, contained in any SIP approved by the USEPA for such emission unit class or category unless demonstrated to not be achievable; or
- BACT.

5.1.5.3.6 Emission Offsets

A new or modified source resulting in emission increases above the major source or major modification emission thresholds, as shown in Table 5.1-12, must offset emission increases of federal nonattainment pollutants (and their precursors) at a ratio of 1.2-to-1. If existing equipment is shut down at a source as part of a facility modification, the reductions in emissions from those shutdowns are subtracted from the increases associated with the new equipment to determine the net emissions increase subject to offset requirements. San Diego County is classified as a federal nonattainment area for the 8-hour ozone standard. Therefore, emissions of NO_x and VOCs, as precursors to ozone are subject to the emission offset requirements. VOC emission reductions may be used to offset NO_x emission increases at an offset ratio of 2 to 1.

TABLE 5.1-12
SDAPCD Offset Emission Thresholds

Pollutant	Major Source Threshold [a], tpy	Major Modification Threshold [b], tpy
NO_x	50	25
SO_x	N/A[c]	N/A[c]
CO	N/A[c]	N/A[c]
VOC	50	25
PM_{10}	N/A[c]	N/A[c]

Notes:

[a] SDAPCD Regulation II, Rule 20.1, Table 20.1-6

[b] SDAPCD Regulation II, Rule 20.1, Table 20.1-5

[c] Not applicable because CO, SO_x, and PM_{10} are federal attainment pollutants, and hence, are not subject to offset requirements.

5.1.5.3.7 Air Quality Impact Analysis (AQIA)

An AQIA must be conducted to evaluate impacts on ambient air quality of emission increases from new or modified projects exceeding any AQIA threshold shown in Table 5.1-13. Project emissions must not cause a new exceedance or contribute significantly to an existing exceedance of any ambient air quality standard.

TABLE 5.1-13
SDAPCD AQIA Emission Thresholds*

Pollutant	Emission Thresholds		
	lb/hr	lb/day	tpy
CO	100	550	100
NO_x	25	250	40
PM_{10}	N/A	100	15
SO_x	25	250	40

Note:

* SDAPCD Regulation II, Rule 20.3, Table 20.3-1.

5.1.5.3.8 Toxic Risk Management

Rule 1200 (Toxic Air Contaminants, New Source Review) provides a mechanism for evaluating the potential impact of toxic air contaminant (TAC, also called non-criteria pollutants) air emissions from new, modified, and relocated sources in the SDAPCD. The rule requires a demonstration that the source will not exceed the risk thresholds summarized in Table 5.1-14. As shown in this table, there are different acceptable risk levels depending upon whether a project uses Toxics-Best Available Control Technology (T-BACT). The proposed CECP will use T-BACT with the use of natural gas, dry-low NO_x combustors, and installation of an oxidation catalyst system.

TABLE 5.1-14
SDAPCD Health Risk Thresholds

Risk Criterion	Risk Threshold
Cancer Risk with T-BACT	1 x 10-5
Cancer Risk without T-BACT	1×10^{-6}
Acute Noncarcinogenic Health Hazard Index	1
Chronic Noncarcinogenic Health Hazard Index	1

5.1.5.3.9 CEC Review

Rule 20.5 establishes a procedure for coordinating SDAPCD review of power plant projects with the CEC's AFC, and Small Power Plant Exemption (SPPE) processes. Under this rule, the SDAPCD reviews the AFC/SPPE and issues a Determination of Compliance for a proposed project. Upon approval of the proposed project by the CEC, this Determination of Compliance is equivalent to an Authority to Construct. A Permit to Operate is issued following demonstration of compliance with all permit conditions.

5.1.5.3.10 Prevention of Significant Deterioration

Rule 20.3 (New Source Review, Major Stationary Sources and PSD Sources) implements the federal NSR and PSD programs. Currently the PSD program in the SDAPCD is implemented by USEPA Region 9 based on the federal version of the PSD regulations. Consequently the applicability of Rule 20.3 will not be discussed further.

5.1.5.3.11 Acid Rain Permit

Rule 1412 (Federal Acid Rain Program Requirements) adopts, by reference, the federal requirements of 40 CFR Part 72, which requires that certain subject facilities comply with maximum operating emissions levels for SO_2 and NO_x, and monitor SO_2, NO_x, and carbon dioxide emissions and exhaust gas flow rates. A Phase II acid rain facility, such as a new power plant project, must obtain an acid rain permit. A permit application must be submitted to the SDAPCD at least 24 months before operation of the new unit commences. The application must present all relevant Phase II sources at the facility, a compliance plan for each unit, applicable standards, and an estimated commencement date of operations. The proposed project will be a modification to an existing Phase II facility. Consequently, an application for a modification to the existing acid rain permit will be submitted according to the timeframe discussed above.

5.1.5.3.12 Federal Operating Permit

Rule 1414 (Applications) requires new or modified major facilities, NSPS sources, NESHAP sources, and/or Phase II acid rain facilities to obtain an operating permit containing the federally enforceable requirements mandated by Title V of the 1990 Clean Air Act Amendments. A permit application for a new or modified source must be submitted to the SDAPCD within 12 months of commencing operation. The application must present a process description, all new stationary sources at the facility, applicable regulations, estimated emissions, associated operating conditions, alternative operating scenarios, a facility compliance plan, and a compliance certification. The proposed project will be a modification to an existing Title V facility. Consequently, an application for a modification to the existing Title V permit will be submitted according to the timeframe discussed above.

5.1.5.3.13 New Source Performance Standards

Regulation X (Standards of Performance for New Stationary Sources) adopts, by reference, the federal standards of performance for new or modified stationary sources. The applicability of the New Source Performance Standards is discussed above under the Federal regulations.

5.1.5.3.14 SDAPCD Prohibitory Rules

The general prohibitory rules of the SDAPCD applicable to the proposed project include the following:

5.1.5.3.15 *Rule 50 – Visible Emissions*

Prohibits visible emissions as dark as, or darker than, Ringelmann No. 1 for periods greater than three minutes in any hour.

5.1.5.3.16 Rule 51 – 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.

5.1.5.3.17 Rule 52 – Particulate Matter Emission Standards

Prohibits PM emissions in excess of 0.10 grains per dry standard cubic foot (gr/dscf).

5.1.5.3.18 Rule 53 – Combustion Contaminants

Prohibits sulfur emissions, calculated as SO_2, in excess of 0.05% by volume (500 parts per million by volume (ppmv), and combustion particulate emissions in excess of 0.10 gr/dscf at 12 percent CO_2.

5.1.5.3.19 Rule 62 – Sulfur Content of Fuels

Prohibits the burning of gaseous fuel with a sulfur content of more than 10 gr/100 scf and liquid fuel with a sulfur content of more than 0.05 percent sulfur by weight.

5.1.5.3.20 Rule 69.3.1 – Stationary Gas Turbines

Limits NO_x emissions from stationary gas turbines rated greater than or equal to 10 MW with post-combustion controls to 9 ppmv (at 15 percent O_2, corrected for efficiency).

5.1.5.3.21 Rule 69.4.1 – Stationary Reciprocating Internal Combustion Engines

Limits CO, NO_x, and VOC emissions from stationary reciprocating internal combustion engines rated greater than or equal to 50 bhp. However, emergency equipment operating less than or equal to 52 hours per year for testing or maintenance purposes and less than or equal to 200 hours per year for any purpose are exempt from the emission limits of Rule 69.4.1.

All applicable LORS are summarized in Table 5.1-15 along with identification of the section that discusses compliance with each requirement.

TABLE 5.1-15
Laws, Ordinances, Regulations, Standards and Permits for Protection of Air Quality

LORS	Purpose	Regulating Agency	Permit or Approval	Schedule and Status of Permit	Conformance (Sections)
Federal					
Clean Air Act (CAA) §160-169A and implementing regulations, Title 42 United States Code (USC) §7470-7491 (42 USC §7470-7491), Title 40 Code of Federal Regulations (CFR) Parts 51 & 52 (Prevention of Significant Deterioration Program)	Requires prevention of significant deterioration (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	PSD Permit for a New Major Source or major modification.	CECP is exempt from this regulation.	5.1.6.1
CAA §171-193, 42 USC §7501 et seq. (New Source Review)	Requires new source review (NSR) facility permitting for construction or modification of specified stationary sources. NSR applies to pollutants for which ambient concentration levels are higher than NAAQS.	SDAPCD with USEPA oversight	Determination of Compliance (DOC) with conditions limiting emissions.	Agency approval to be obtained before start of construction.	5.1.6.1
CAA §401 (Title IV), 42 USC §7651 (Acid Rain Program)	Requires reductions in NO_x and SO_2 emissions.	SDAPCD with USEPA oversight	Acid Rain program requirements included in Determination of Compliance, Permit to Operate, and Title V permit.	Meet compliance deadlines listed in regulations.	5.1.6.1
CAA §501 (Title V), 42 USC §7661 (Federal Operating Permits Program)	Establishes comprehensive permit program for major stationary sources.	SDAPCD with USEPA oversight	Modified Title V permit after review of application.	Permit application to modify existing Title V permit will be submitted within 12 months after commencement of operation.	5.1.6.1
CAA §111, 42 USC §7411, 40 CFR Part 60 (New Source Performance Standards [NSPS])	Establishes national standards of performance for new stationary sources.	SDAPCD with USEPA oversight	DOC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	5.1.6.1

TABLE 5.1-15
Laws, Ordinances, Regulations, Standards and Permits for Protection of Air Quality

LORS	Purpose	Regulating Agency	Permit or Approval	Schedule and Status of Permit	Conformance (Sections)
State					
H&SC §44300-44384; 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.	SDAPCD with CARB oversight	DOC with conditions limiting emissions.	Screening HRA submitted as part of AFC.	5.1.6.2
California Public Resources Code §25523(a); 20 CCR §§1752, 2300-2309 (CEC and 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.	CEC	Final Certification with conditions limiting emissions.	SDAPCD issuance of DOC precedes CEC approval of AFC.	5.1.6.2
17 CCR § 93115 (ATCM for Stationary Compression Ignition Engines)	Establishes emission and operational limits for diesel-fueled stationary compression ignition engines.	SDAPCD and CARB	DOC with conditions limiting emissions and operation.	Agency approval to be obtained before start of construction.	5.1.6.2
Local					
SDAPCD Rule 20.3 (New Source Review – Major Stationary Sources and PSD Sources)	NSR: Requires that pre-construction review be conducted for all proposed new or modified sources of air pollution, including BACT, emissions offsets, and air quality impact analysis.	SDAPCD with CARB oversight	DOC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	5.1.6.3
SDAPCD Rule 1200 (Toxics, New Source Review)	Requires that pre-construction review be conducted for all proposed new or modified sources of toxic air contaminants, including T-BACT, and a health risk assessment.	SDAPCD with USEPA oversight	DOC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	5.1.6.3
SDAPCD Rule 1414 (Title V Applications)	Implements operating permits requirements of CAA Title V.	SDAPCD with USEPA oversight	Issues modified Title V permit after review of application.	Agency approval to be obtained before start of construction.	5.1.6.3

TABLE 5.1-15
Laws, Ordinances, Regulations, Standards and Permits for Protection of Air Quality

LORS	Purpose	Regulating Agency	Permit or Approval	Schedule and Status of Permit	Conformance (Sections)
SDAPCD Rule 1412 (Federal Acid Rain Program Requirements)	Implements acid rain regulations of CAA Title IV.	SDAPCD with USEPA oversight	Title IV requirements included in DOC, Permit to Operate, and Title V permit.	Application to be made within 12 months of start of facility operation.	5.1.6.3
SDAPCD Rule 50 (Visible Emissions)	Limits visible emissions to no darker than Ringelmann No. 1 for periods greater than 3 minutes in any hour.	SDAPCD with CARB oversight	DOC with conditions limiting emissions.	Agency approval to be obtained prior to commencement of operation.	5.1.6. 3.3
SDAPCD Rule 51 (Nuisance)	Prohibits emissions in quantities that adversely affect public health, other businesses, or property.	SDAPCD with CARB oversight	DOC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	5.1.6.3.3
SDAPCD Rule 52 (Particulate Matter)	Limits PM emissions from stationary sources.	SDAPCD with CARB oversight	DOC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	5.1.6.3.3
SDAPCD Rule 53 (Combustion Contaminants)	Limits SO_2 emissions from stationary sources.	SDAPCD with CARB oversight	DOC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	5.1.6.3.3
SDAPCD Rule 62 (Sulfur Content of Fuels)	Limits the sulfur content of fuels combusted in stationary sources.	SDAPCD with CARB oversight	DOC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	5.1.6.3.3
SDAPCD Rule 69.3.1 (Stationary Gas Turbines)	Limits NO_x emissions from stationary gas turbines.	SDAPCD with CARB oversight	DOC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	5.1.6.3.3
SDAPCD Rule 69.4.1 (Stationary Reciprocating Internal Combustion Engines)	Limits CO, NO_x, and VOC emissions from stationary reciprocating internal combustion engines.	SDAPCD with CARB oversight	DOC with conditions limiting emissions.	Proposed new engine is exempt from this regulation due to operating limits.	5.1.6.3.3

TABLE 5.1-15
Laws, Ordinances, Regulations, Standards and Permits for Protection of Air Quality

LORS	Purpose	Regulating Agency	Permit or Approval	Schedule and Status of Permit	Conformance (Sections)
SDAPCD Regulation X (New Source Performance Standards: Subpart KKKK, Stationary Gas Turbines)	Requires monitoring of fuel, other operating parameters; limits NO_x, SO_2, and PM emissions, requires source testing, emissions monitoring, and recordkeeping.	SDAPCD with CARB oversight	DOC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	5.1.6.3.3
SDAPCD Regulation X (New Source Performance Standards: Subpart IIII, Stationary Compression Ignition Internal Combustion Engines)	Limits VOC, NO_x, CO, and PM emissions and requires recordkeeping.	SDAPCD with CARB oversight	DOC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	5.1.6.3.3

5.1.5.3.22 Attainment Status

Based on the measured existing air quality described in Section 5.1.3, the ambient air quality standards presented in Table 5.1-1, and the responsibilities of the USEPA and the CARB discussed in Sections 5.1.4.1.1 and 5.1.4.1.2, respectively, the resulting attainment status of the San Diego Air Basin is shown in Table 5.1-16.

TABLE 5.1-16
Ambient Air Quality Standard Attainment Status in San Diego Air Basin

Pollutant	Averaging Time	California	National
Ozone	1 hour 8 hours	Nonattainment Designation pending	Attainment Nonattainment
Carbon Monoxide	8 hours 1 hour	Attainment Attainment	Attainment Attainment
Nitrogen Dioxide	Annual Average 1 hour	No CAAQS Attainment	Attainment No NAAQS
Sulfur Dioxide	Annual Average 24 hours 3 hours 1 hour	No CAAQS Attainment No CAAQS Attainment	Attainment Attainment Attainment No NAAQS
Respirable Particulate Matter (10 Micron)	Annual Arithmetic Mean 24 hours	Nonattainment Nonattainment	Unclassifiable Unclassifiable
Fine Particulate Matter (2.5 Micron)	Annual Arithmetic Mean 24 hours	Nonattainment No CAAQS	Attainment Attainment
Sulfates	24 hours	Attainment	No NAAQS
Lead	30 days Calendar Quarter	Attainment No CAAQS	No NAAQS Attainment
Hydrogen Sulfide	1-hour	Unclassified	No NAAQS
Vinyl Chloride	24-hour	Unclassified	No NAAQS
Visibility Reducing Particles	8-hour (10am to 6pm PST)	Unclassified	No NAAQS

5.1.6 Environmental Analysis

Ambient air quality impact analyses for the CECP have been conducted to satisfy the SDAPCD, USEPA, and CEC requirements for analysis of impacts from criteria pollutants (NO_2, CO, PM_{10}, and SO_2) and noncriteria pollutants during project construction and operation. The analyses cover each phase of the project. Section 5.1.5.1 gives an overview of the analytical approach. Section 5.1.5.2 presents the emissions for operation of the CECP, and Section 5.1.5.3 gives the ambient air quality impacts of operation. Section 5.1.5.4 gives the analysis for construction of the CECP.

5.1.6.1 Overview of the Analytical Approach to Estimating Facility Impacts

The following sections describe the emission sources that have been evaluated, the results of the ambient impact analyses, and the evaluation of the CECP compliance with the applicable air quality regulations, including the District's NSR requirements. These analyses are designed to confirm that the project's design features lead to less-than–significant impacts even with the following conservative analysis assumptions and procedures: maximum allowable emission rates, project operating schedules that lead to maximum emissions, worst-case meteorological conditions, and adding the worst-observed existing air quality to the highest potential ground-level impact from modeling, even when all of these situations could not physically occur at the same time.

5.1.6.1.1 Emitting Units

The new CECP combined-cycle gas turbine plant will be made up of two Siemens Rapid Response SGT6-5000F Combined Cycle (R2C2) combustion turbine generators (CTGs) arranged as one CTG-on-one steam turbine. The gas turbines will be equipped with steam power augmentation and evaporative cooling. Each gas turbine will be followed by an unfired heat recovery steam generator (HRSG), one condensing steam turbine generator (STG), an air-cooled fin-fan cooler, and associated support equipment. The two units will provide a total nominal generating capacity of 558 MW gross/540 MW net. Each unit combines the fast starting capability of a simple cycle gas turbine and the efficiency of a combined cycle plant. Each unit is designed to start and ramp up to 150 MW in ten minutes and still be capable of operating with combined-cycle efficiency.

Each gas turbine will be equipped with dry low- NO_x combustors and a selective catalytic reduction (SCR) system for NO_x control. An oxidation catalyst will be used to reduce CO emissions. Particulate and VOC emission will be minimized through the use of natural gas as the fuel. Emissions control systems will operate full time except during startups and shutdowns. Specifications for the new gas turbines are summarized in Table 5.1-17.

TABLE 5.1-17
New Combined-Cycle Gas Turbine Design Specifications

Manufacturer	Siemens
Model	SGT6-5000F
Fuel	Natural gas
Design Ambient Temperature *	37°F
Maximum Gas Turbine Heat Input Rate*	2,085 MMBtu/hr @ HHV (each turbine)
Maximum Gas Turbine Power Generation Rate	219 MW (nominal gross each CTG)
Maximum Steam Turbine Power Generation Rate	60 MW (nominal gross each STG)
Stack Exhaust Temperature*	371°F (after HRSG)
Exhaust Flow Rate*	1,487,415 acfm
Exhaust O_2 Concentration, dry volume*	13.69%
Exhaust CO_2 Concentration, dry volume*	3.83%
Exhaust Moisture Content, wet volume*	7.72%
Emission Controls	Dry Low- NO_x Combustor and SCR; oxidation catalyst

* Low-temperature baseload operating scenario corresponds to maximum heat input rate.

As discussed above, the use of natural gas as the sole fuel will minimize emissions of VOC, SO_x and PM_{10}. A typical analysis for the natural gas fuel to be used by the gas turbines is summarized in Table 5.1-18.

TABLE 5.1-18
Nominal Fuel Properties – Natural Gas

Component Analysis		**Chemical Analysis**	
Component	**Average Concentration, Volume**	**Constituent**	**Percent by Weight**
Methane (CH_4)	95.776%	Carbon (C)	72.92 %
Ethane (C_2H_6)	1.806%	Hydrogen (H)	23.84 %
Propane (C_3H_8)	0.335%	Nitrogen (N)	1.13 %
Butane C_4H_{10})	0.122%	Oxygen (O)	2.11 %
Pentane (C_5H_{12})	0.043 %	Sulfur (S)	0.75 gr/100 scf (short term average) 0.25 gr/100 scf (long term average)
Hexane (C_6H_{14})	0.026%	Higher Heating Value	1,019 Btu/scf 22,848 Btu/lb
Nitrogen (N_2)	0.682%		
Carbon Dioxide (CO_2)	1.112%		
Sulfur (S)	<0.00%		

The CECP will also include the installation of a new diesel emergency firepump engine rated at 246 horsepower with a maximum fuel consumption rate of 12.2 gallons per hour. The auxiliary equipment associated with the CECP will also include the installation of two 10,000 gallon aqueous ammonia (19 percent) storage tanks.

5.1.6.1.2 Facility Operations

Gas turbine performance specifications were developed for four temperature scenarios: extreme hot temperature (104°F), summer average temperature (74°F), annual average temperature (61°F), and extreme low temperature (37°F). The low-temperature scenario was used to characterize maximum hourly emissions because it has the highest hourly heat input and emission rates. The plant may be operated under a wide variety of conditions over its life. Maximum daily operations are based on extreme low temperature full-load operation of both CTGs for 24 hours and the emergency firepump engine operating for 1 hour. Maximum annual emissions for the CTGs/HRSGs were based on operating 4,100 hours per year at the annual average full-load operation of both CTGs. Annual emissions for the emergency firepump engine were based on operating 50 hours per year.

Heat input levels for the CTGs/HRSGs, as summarized in Table 5.1-19, correspond to the calculated unit and project emission levels.

Emissions and operating parameters for the CTGs/HRSGs under various loads and ambient conditions are shown in Appendix 5.1B. Emissions and operating parameters for the emergency firepump engine are shown in Appendix 5.1B.

TABLE 5.1-19
Maximum Proposed Project Fuel Use – CTGs (MMBtu)*

Period	Gas Turbines (each)	Total Fuel Use (both units)
Per Hour	2,085	4,170
Per Day	50,040	100,080
Per Year	7,999,510	15,999,020

Note:

* MMBtu: million Btu

5.1.6.2 Emissions Calculations

This section presents calculations of emissions increases from the CECP generating and auxiliary equipment and of the emissions reductions from the shutdown of the existing boilers Units 1, 2, and 3 at the Encina Power Station for the purpose of demonstrating rule compliance. Tables containing the detailed calculations are included in Appendix 5.1B.

5.1.6.2.1 Criteria Pollutant Emissions: CECP

The CTG/HRSG and emergency firepump engine emission rates have been calculated from vendor data, project design criteria, and established emission calculation procedures. The emission rates for the CTGs and firepump engine are shown in the following tables. The detailed emission calculations for these units are shown in Appendix 5.1B.

CTG Emissions during Normal Operations

Emissions of NO_x, CO, and VOC were calculated from emission limits (in ppmv @ 15% O_2) and the exhaust flow rates. The NO_x emission limit reflects the application of SCR. The VOC and CO emission limits reflect the use of good combustion practices and, for CO, an oxidation catalyst. SO_x, $PM_{10,}$ and $PM_{2.5}$ emission rates are based on the use of natural gas as the fuel and good combustion practices. Emissions are based on the heat input rates shown in Table 5.1-19.

SO_x emissions were calculated from the heat input (in MMBtu) and a SO_x emission factor (in lb/MMBtu). The short-term SO_x emission factor of 0.0021 lb/MMBtu was derived from the maximum allowable (i.e., tariff limit) fuel sulfur content of 0.75 grains per 100 standard cubic feet (gr/100 scf). The annual average SO_x emissions were based on the expected annual average sulfur grain loading of 0.25 gr/100 scf.

Maximum hourly PM_{10} emissions are based on vendor supplied emission levels. $PM_{2.5}$ emissions were determined based on the assumption that all gas turbine exhaust particulate is less than 2.5 microns in diameter.

Emissions for the CTGs are summarized in Table 5.1-20. The BACT analysis upon which the emission factors are based is presented in Appendix 5.1C and summarized in Section 5.1.6.3.

TABLE 5.1-20
Maximum Hourly Emission Rates: CTGs/HRSGS

Pollutant	ppmvd @ 15% O_2	Lb/MMBtu	lb/hr
Each Gas Turbine[a]			
NO_x	2.0[b]	0.0072	15.1
SO_2	0.42 (short term) 0.14 (long term)	0.0021 0.0007	4.4 1.5
CO	2.0	0.0044	9.2
VOC	2.0	0.0025	5.3
PM_{10}[c]	n/a	0.0045	9.5

Notes:

[a] Emission rates shown reflect the highest value at any operating load. For NO_x, CO, and VOC, emission levels exclude startups and shutdowns.

[b] Applicant is requesting that the permit allow hourly average NO_x concentrations to exceed 2.0 ppmc under certain limited conditions. See text following table.

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

The Applicant believes that there may be transient load conditions, such as rapid load changes, which may result in short-term elevated NO_x emissions from the combined cycle unit. The Applicant proposes the inclusion of the following NO_x emissions excursion language in the CEC's conditions of certification:

> Compliance with the NO_x emission limitations shall not be required during short-term excursions limited to a cumulative total of 15 hours per calendar year. Short-term excursions are defined as 15-minute periods designated by the owner/operator and approved by the APCO that are the direct result of transient load conditions, not to exceed four consecutive 15-minute periods, when the 15-minute average NO_x concentration exceeds 2.0 ppmvd @ 15% O_2. The maximum 3-hour average NO_x concentration for periods that include short-term excursions shall not exceed 30 ppmvd @ 15% O_2. Examples of transient load conditions include but are not limited to the following: (1) rapid gas turbine load changes initiated by the California ISO or a successor entity when the plant is operating under Automatic Generation Control; or (2) rapid combustion load changes due to activation of a plant automatic safety or equipment protection system. All emissions during short-term excursions shall accrue towards the daily and annual emissions limitations of this permit and shall be included in all calculations of daily and annual mass emission rates as required by this permit.

CTG Emissions During Startup and Shutdown

Maximum emission rates expected to occur during a CTG startup or shutdown are shown in Table 5.1-21. PM_{10} and SO_2 emissions are not included in this table because emissions of these pollutants will not be higher during startup and shutdown than during normal gas turbine operation. During a CTG startup, there are approximately 22 minutes with elevated emissions (emissions higher then during normal operation). Consequently, the hourly emission rates during CTG startups are based on 22 minutes of elevated emissions followed by 38 minutes of normal operating emission levels. During a CTG shutdown, there are approximately seven minutes with elevated emissions (emissions higher then during normal operation). Consequently, the hourly emission rates during CTG shutdowns are based on 53 minutes of normal operating emission levels followed by 7 minutes of elevated emission levels. The Applicant also expects that periodically there could be an hour when both a startup and shutdown occurs. For this hour, there would be 22 minutes of elevated emissions due to the startup, 31 minutes of normal operation emissions, followed by 7 minutes of elevated emissions due to a shutdown. While this situation is expected to occur very infrequently, from an hourly emission standpoint this would represent worst case hourly emissions, and as such it is included in the ambient air impact analysis for the project. The detailed CTG startup hourly emission calculations are shown in Appendix 5.1B. Included in this appendix are the CTG vendor supplied startup/shutdown emission levels for the Siemens CTGs.

TABLE 5.1-21
CTG Startup and Shutdown Emission Rates*

	NO_x	CO	VOC
CTG Startup, lbs/hr, per gas turbine	69	546	16
CTG Shutdown, lbs/hr, per gas turbine	47	286	10
CTG Startup/Shutdown, lbs/hr, per gas turbine	86	814	21

Note:

* Emission rates shown are maximum short term average emission levels. Lower emission levels are expected when averaged annually.

CECP Criteria Pollutant Emissions Summary

The calculation of maximum project emissions shown in Table 5.1-22 is based on the CTG emission rates and heat input levels shown in the above tables and the following assumptions:

- Each CTG may operate up to 24 hours per day.
- Each CTG may have up to 6 hours per day containing a startup and/or shutdown.
- Annual emissions are based on 4,100 hours of operation for each CTG.
- The emergency firepump engine may operate up to 1 hours per day and 50 hours per year for testing and maintenance (the engine will not be operated during a CTG startup/shutdown).

The assumptions used in calculating maximum hourly, daily and annual emissions from the new facility are shown in Appendix 5.1B.

TABLE 5.1-22
Maximum Emissions from New Equipment

Emissions/Equipment	Pollutant				
	NO_x	SO_2	CO	VOC	PM_{10}
Maximum Hourly Emissions[a]					
Gas Turbines[a]	171.3	8.8	1,627.0	41.4	19.0
Diesel Firepump Engine[b]	n/a	0.00	n/a	n/a	0.04
Total, pounds per hour	**171.3**	**8.8**	**1,627.0**	**41.4**	**19.0**
Maximum Daily Emissions[a]					
Gas Turbines	1,754.1	211.1	10,204.5	438.7	456.0
Diesel Firepump Engine	2.1	0.00	0.24	0.05	0.04
Total, pounds per day	**1,756.2**	**211.1**	**10,204.8**	**438.8**	**456.0**
Maximum Annual Emissions[a]					
Gas Turbines	75.5	5.6	217.3	25.0	39.0
Diesel Firepump Engine	0.05	0.0	0.0	0.0	0.0
Total, tons per year	**75.6**	**5.6**	**217.3**	**25.0**	**39.0**

Notes:

[a] Maximum hourly, daily and annual NO_x, VOC and CO CTG emission rates include emissions during startups/shutdowns.

[b] The Diesel firepump engine will not be operated during a gas turbine startup and/or shutdown. Consequently, n/a is shown for NO_x, CO, and VOC because maximum CTG emissions for these pollutants occur during startups/shutdowns.

The maximum hourly, daily and annual emissions in Table 5.1-22 are used in the air dispersion modeling to calculate the maximum potential ground-level concentrations contributed by the proposed project to the ambient air.

5.1.6.2.2 Emissions for Existing Boilers at the Encina Power Station

The Encina Power Station consists of five dual-fuel steam boilers (Units 1-5), and one simple-cycle gas turbine, rated at the following nominal levels: 113 MW, 109 MW, 115 MW, 293 MW, 315 MW, and 18 MW, respectively. The boilers are normally fired on natural gas, but can be fired on fuel oil as well. Fuel oil firing of the boilers rarely occurs, and then only for testing or during curtailment of natural gas supplies to the power plant. The gas turbine is normally fired on natural gas, but is also permitted to be operated on Diesel fuel and up to 876 hours per year on either fuel. As part of the CECP, the existing boiler Units 1, 2, and 3 at the Encina Power Station will be shut down and retired prior to the commercial operation of the new equipment. Since it is possible that there could be up to a 6-month stagger between the initial commercial operation dates of the two new CTGs, there may be a corresponding staged shutdown of the three existing boilers with Unit 1 shutting down at the commercial operation of the first new CTG, followed by the shutdown of Units 2 and 3 at the commercial operation of the second new CTG. During the staged shutdown of the three existing boilers, there will be no simultaneous operation of the new CTGs and the existing Units 1 through 3. The emissions reductions from the shutdown of the existing units are based on historical baseline operations and emissions during the most representative consecutive two-year period during the five years preceding the filing of the

AFC for the proposed project (2002 to 2006). The emission reductions associated with the shutdown of Units 1, 2, and 3 are shown in Table 5.1-23. Also shown for regulatory applicability purposes are the 2-year average baseline emissions for Units 4, 5, and the simple cycle gas turbine. The detailed calculation of the historical baseline emissions for the existing units at the Encina Power Station is included in Appendix 5.1B.

TABLE 5.1-23
Emissions for Existing Units

Emissions/Equipment	Pollutant				
	NO_x	SO_2	CO	VOC	PM_{10}
Annual Emissions Units 1, 2, and 3					
Unit 1	13.9	2.6	97.8	5.2	9.8
Unit 2	18.5	5.8	122.6	6.1	13.4
Unit 3	22.5	3.1	140.9	8.7	15.8
Subtotal, tons per year	**54.9**	**11.5**	**361.3**	**20.0**	**39.0**
Annual Emissions Units 4, 5, and Gas Turbine					
Unit 4	88.8	4.2	610.6	32.4	62.0
Unit 5	100.6	4.5	701.6	33.3	56.4
Gas Turbine	3.0	0.2	0.8	0.2	0.3
Subtotal, tons per year	**192.4**	**8.9**	**1,313.0**	**65.9**	**118.7**
Annual Emissions Facility Wide					
Total, tons per year	**247.3**	**20.4**	**1,674.3**	**85.9**	**157.7**

5.1.6.2.3 Net Changes in Criteria Pollutant Emissions for the Proposed Project

Net emissions changes as a result of the project are calculated on an annual basis for federal PSD, SDAPCD NSR, and CEQA purposes. These net emission changes are shown in Table 5.1-24 below.

TABLE 5.1-24
Net Emissions Change for Proposed Project

Emissions/Equipment	Pollutant				
	NO_x	SO_2	CO	VOC	PM_{10}
Potential to Emit for New Equipment	75.6	5.6	217.3	25.0	39.0
Reductions from Shutdown of Units 1, 2, and 3	-54.9	-11.5	-361.3	-20.0	-39.0
Net Emission Change, tons per year	**20.1**	**-5.9**	**-144.0**	**5.0**	**0.0**

5.1.6.2.4 Non-Criteria Pollutant Emissions

Noncriteria pollutant (toxic air contaminant [TAC]) emissions were estimated for the proposed CTGs/HRSGs and emergency firepump engine. These emissions are summarized in Table 5.1-25. The detailed noncriteria pollutant emissions calculations and the associated screening level health risk assessment are included in the Public Health Impact Section (see Section 5.9). Also shown below in Table 5.1-26 is a summary of the maximum potential to emit for noncriteria pollutants for the existing units at the facility. This information is provided for regulatory applicability purposes. The detailed noncriteria pollutant emission calculations for the existing units are included in the Public Health Impact Section (see Section 5.9).

TABLE 5.1-25
Non-criteria Pollutant Emissions for the New Equipment

Compound	Maximum Proposed Emissions (tpy)
Gas Turbines and HRSGs (two units)	
Ammonia (not a HAPs)	53.62
Propylene (not a HAPs)	6.47
Acetaldehyde	0.34
Acrolein	0.03
Benzene	0.03
1,3-Butadiene	0.00
Ethylbenzene	0.27
Formaldehyde	3.08
Hexane	2.17
Naphthalene	0.01
PAHs (other)	0.00
Propylene Oxide	0.25
Toluene	1.12
Xylene	0.55
Total HAPs (CTGs/HRSGs)	7.85
Emergency Firepump Engine	
Diesel PM (not a HAPs)	0.00
Acrolein	0.00
Arsenic	0.00
Benzene	0.00
Copper (not a HAPs)	0.00
Formaldehyde	0.00
Hydrogen Chloride	0.00
Mercury	0.00
Nickel	0.00
Toluene	0.00
Xylene	0.00
Total HAPs (Firepump Engine)	0.00
Total HAPs (Proposed Project)	**7.85**

TABLE 5.1-26
Non-criteria Pollutant Emissions for the Existing Boiler Units 1, 2, 3, 4, 5, and Gas Turbine

Compound	Maximum Potential Emissions (tpy)
Boilers (Units 1, 2, 3, 4, and 5)	
Benzene	0.08
Formaldehyde	3.17
Hexane	0.06
Naphthalene	0.03
Dichlorobenzene	0.05
Toluene	0.15
Total HAPs (Boilers)	3.54
Gas Turbine	
Acetaldehyde	0.06
Acrolein	0.01
Benzene	0.02
Formaldehyde	0.99
Ethylbenzene	0.04
Toluene	0.18
PAHs (other)	0.00
Xylene	0.09
Total HAPs (Gas Turbine)	1.39
Total HAPs (Existing Facility)	**4.93**

5.1.6.2.5 Greenhouse Gas Emissions

The CECP will emit greenhouse gas emissions. These emissions are summarized below in the Cumulative Effects section.

5.1.6.3 Air Quality Impact Analysis

The SDAPCD new source review regulations require the Applicant to provide ambient air quality modeling analyses and other impact assessments. An ambient air quality impact assessment is also required by the CEC for CEQA review. These analyses are presented in this section.

5.1.6.3.1 Air Quality Modeling Methodology

An assessment of impacts from the CECP on ambient air quality has been conducted using the USEPA-approved air quality dispersion models. These models use a mathematical description of atmospheric turbulent entrainment and dispersion to simulate the actual processes by which a pollutant emission is transported to potential ground-level impact areas.

Using the most stringent and conservative assumptions, the modeling was used to determine the maximum ground-level impacts of the CECP. The results were compared with state and federal ambient air quality standards and PSD significance levels. If the standards are not exceeded in the analysis, then the facility will cause no exceedances under any operating or ambient conditions, at any location, under any meteorological conditions. In accordance with the air quality impact analysis guidelines developed by USEPA[6] and CARB[7], the ground-level impact analysis includes the following assessments:

- Impacts in simple, intermediate, and complex terrain
- Aerodynamic effects (downwash) due to nearby building(s) and structures
- Impacts from inversion breakup (fumigation)

Simple, intermediate, and complex terrain impacts were assessed for all meteorological conditions that would limit the amount of final plume rise. Plume impaction on elevated terrain, such as on the slope of a nearby hill, can cause high ground-level concentrations, especially under stable atmospheric conditions. Another dispersion condition that can cause high ground-level pollutant concentrations is caused by building downwash. A stack plume can be downwashed when wind speeds are high and a sufficiently tall building or structure is in close proximity to the emission stack. This can result in building wake effects where the plume is drawn down toward the ground by the lower pressure region that exists in the lee (downwind) side of the building or structure.

Fumigation conditions occur when the plume is emitted into a layer of stable air (inversion) that then becomes unstable from below, resulting in a rapid mixing of pollutants out of the stable layer and towards the ground in the unstable layer underneath. The low mixing height that results from this condition allows little diffusion of the stack plume before it is carried downwind to the ground. Although fumigation conditions are short-term, rarely lasting as long as an hour, relatively high ground-level concentrations may be reached during that period. Fumigation tends to occur under clear skies and light winds, and is more prevalent in summer.

Two types of fumigation are analyzed: inversion breakup and shoreline. Inversion breakup fumigation occurs under low-wind conditions when a rising morning mixing height caps a stack and “fumigates” the air below.

Shoreline fumigation occurs when a roughness boundary (generally a beach) causes turbulent dispersion to be much more enhanced near the ground, once again fumigating the air below. For shoreline fumigation, the lens-shape of the wedge of turbulent air rising from the beach is governed by several factors, which are summarized by use of what are called TIBL (turbulence-induced boundary layer) factors. TIBL factors usually cover the range of what is expected. For screening modeling purposes, usually TIBL = 6 is the worst-case, and hence, is used for SCREEN3 modeling here. Impacts are also governed by the distance of the stack from the beach.

The basic model equation used in this analysis assumes that the concentrations of emissions within a plume can be characterized by a Gaussian (statistical) distribution around the

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[6] EPA. Guideline on Air Quality Models, 40 CFR Part 51, Appendix W.

[7] ARB. Reference Document for California Statewide Modeling Guideline, April 1989.

centerline of the plume. Concentrations at any location downwind of a point source such as a stack can be determined from the following equation:

$$C(x,y,z,H) = \left(\frac{Q}{2\pi\sigma_y\sigma_z u}\right) * \left(e^{-1/2(y/\sigma_y)^2}\right) * \left[\left\{e^{-1/2(z-H/\sigma_z)^2}\right\} + \left\{e^{-1/2(z+H/\sigma_z)^2}\right\}\right] \quad \text{(Eq. 1)}$$

where

- C = pollutant concentration in the air
- Q = pollutant emission rate
- $\sigma_y \sigma_z$ = horizontal and vertical dispersion coefficients, respectively, at downwind distance x
- u = wind speed at the height of the plume center
- x,y,z = variables that define the downwind, crosswind, and vertical distances from the center of the base of the stack in the model's 3-dimensional Cartesian coordinate system
- H = the height of the plume above the stack base (the sum of the height of the stack and the vertical distance that the plume rises due to the momentum and thermal buoyancy of the plume)

Gaussian dispersion models are approved by USEPA 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). The USEPA models were used to determine if ambient air quality standards would be exceeded, and whether a more accurate and sophisticated modeling procedure would be warranted to make the impact determination. The following sections describe:

- Gas turbine screening modeling;
- Refined air quality impact analysis;
- Specialized modeling analyses;
- Results of the ambient air quality modeling analyses; and
- PSD significance levels.

Modeling for the CECP was performed in accordance with the modeling protocol submitted to the SDAPCD and CEC. The modeling procedures used for each type of modeling analysis are described in more detail in the following sections.

Two different USEPA guideline models were used for different meteorological conditions in the ambient air quality impact analysis.

The USEPA-approved AERMOD[8] model was used to evaluate impacts in simple, intermediate, and complex terrain. AERMOD 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 settling and dry deposition of particulates; area,

[8] The acronym AERMOD was derived from American Meteorological Society/Environmental Protection Agency Regulatory Model.

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 a wide range of averaging times (from one hour to one year), and was applied with three years of actual meteorological data recorded at the Camp Pendleton monitoring station. AERMOD replaces the previous USEPA-recommended model, Industrial Source Complex, Version 3 (ISCST3), which has been used for many years for air quality impact analyses in CEC AFCs. The analysis using the AERMOD model is discussed in more detail below.

The SCREEN3 model was used to evaluate gas turbine impacts under inversion breakup and shoreline fumigation conditions because these are special cases of meteorological conditions. The SCREEN3 model uses a range of meteorological conditions that could occur under inversion breakup and shoreline fumigation. Since the emissions from the emergency firepump engine are so small compared to the gas turbine emissions, they are excluded from this single-source model used for the fumigation analysis. The fumigation analysis is discussed in more detail below.

Gas Turbine Screening Modeling

The screening and refined air quality impact analyses were performed using the AERMOD model. The screening modeling is performed to determine the combination of ambient temperature and CTG operating conditions that generates the highest ambient air quality levels for each pollutant and averaging period. The refined modeling uses the stack parameters that the screening level modeling shows produced the highest ambient impacts (per pollutant and averaging period).

- Inputs required by AERMOD include the following:
- Model options
- Meteorological data
- Source data
- Receptor data

Standard AERMOD control parameters were used, including stack tip downwash, non-screening mode, non-flat terrain, and sequential meteorological data check. Stack-tip downwash, which adjusts the effective stack height downward following the methods of Briggs (1972) for cases where the stack exit velocity is less than 1.5 times the wind speed at stack top, were selected per USEPA guidance. As directed by the District,[9] the rural default option will be used by not invoking the URBANOPT option.[10] The use of the rural default in modeling for the proposed project is consistent with District policy and guidance[11] for past modeling using ISCST3.

The required emission source data inputs to both models used in this analysis include source locations, source elevations, stack heights, stack diameters, stack exit temperatures and velocities, and 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

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9 Personal communication, Ralph DeSiena, September 14, 2006.

10 The rural vs. urban option in AERMOD is primarily designed to set the fraction of incident heat flux that is transferred into the atmosphere. This fraction becomes important in urban areas having an appreciable “urban heat island” effect due to a large presence of land covered by concrete, asphalt, and buildings. This situation does not exist for the proposed project site.

11 SDAPCD. *Use of Rural vs Urban Modeling Coefficients*, Memorandum from Richard J. Smith, Deputy Director, to Judith M. Lake, Chief, Monitoring and Technical Services, October 29, 1996.

Cartesian coordinate system used is the Universal Transverse Mercator Projection (UTM). The stack height that can be used in the model is limited by federal Good Engineering Practice (GEP) stack height restrictions, discussed in more detail below. In addition, Building Profile Input Program – Plume Rise Model Enhancements (BPIP-PRIME, current version 04274) requires nearby building dimension data to calculate the impacts of building downwash.

For the purposes of modeling, a stack height beyond what is required by Good Engineering Practices (GEP) is not allowed. However, this requirement does not place a limit on the actual constructed height of a stack. GEP as used in modeling is the height necessary to assure 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 assures that any required regulatory control measure is not compromised by the effect of that portion of the stack that exceeds the GEP. USEPA guidance[12] for determining GEP stack height indicates that GEP is the greater of 65 meters or H_g, where H_g is calculated as follows:

$$H_g = H + 1.5L$$

where:

H_g = Good Engineering Practice stack height, measured from the ground-level elevation at the base of the stack

H = height of nearby structure(s) measured from the ground-level elevation at the base of the stack

L = lesser dimension, height or maximum projected width, of nearby structure(s)

In using this equation, the guidance document indicates that both the height and width of the structure are determined from the frontal area of the structure, projected onto a plane perpendicular to the direction of the wind.

For the new gas turbine stacks, the nearby (influencing) structures are the HRSGs for the new units, which are 88 feet (26.8 m) high, 131.5 feet (40.1 m) long and 26.8 feet (8.2 m) wide. Thus H = L = 88 feet, and H_g = 2.5 * 88 = 220 feet (67.1 m). The proposed stack height of 100 feet (30.5 m) does not exceed GEP stack height of 220 feet (67.1 m), and consequently satisfies the USEPA requirement.

For regulatory applications, a building is considered sufficiently close to a stack to cause wake effects when the downwind distance between the stack and the nearest part of the building is less than or equal to five times the lesser of the height or the projected width of the building. Building dimensions for the buildings analyzed as downwash structures were obtained from plot plans. The building dimensions were analyzed using the BPIP-PRIME to calculate 36 wind-direction-specific building heights and projected building widths for use in building wake calculations. The building dimensions used in the GEP analysis are shown in Appendix 5.1D.

[12] EPA. Guideline for Determination of Good Engineering Practice Stack Height, Revised June 1985.

Screening Procedures and Unit Impact Modeling

Screening modeling was performed to select the worst-case gas turbine operating mode for each pollutant and averaging period. The modeling used emissions data based on an annual average temperature (61°F), average summer temperature (74°F), maximum temperature (104°F), and minimum temperature (37°F), and at nominal minimum and maximum gas turbine operating load points of 60 percent and 100 percent. The determination of the worst-case gas turbine operating condition depends on how changes in emissions rates and stack characteristics (plume rise characteristics) interact with terrain features. For example, lower mass emissions resulting from lower load operations may cause higher concentrations than other operating conditions because lower final plume height may have a greater significant interaction with terrain features.

Initial AERMOD modeling runs were performed using normalized emission rates to assess the zone of impact and relative magnitude of the impacts. For the AERMOD gas turbine screening modeling, each gas turbine was modeled with a unit emission rate of 1 gram per second to obtain maximum 1-hour, 3-hour, 8-hour, 24-hour, and annual average concentration to emission rate (χ/Q in units of $\mu g/m^3$ per g/s) values. These χ/Q values were multiplied by the actual emission rate in grams per second from the gas turbine to calculate ambient impacts for NO_2, CO, SO_2, and $PM_{10}/PM_{2.5}$ in units of $\mu g/m^3$. Stack characteristics used in the screening modeling analysis are shown in Appendix 5.1D.

The results of the screening analysis are shown in the Appendix 5.1D. The stack parameters and emission rates corresponding to the operating case that produced the maximum impacts in the gas turbine screening analysis for each pollutant and averaging period were used in the refined modeling analysis to evaluate the impacts of the new units. For the unit impacts analysis, the CEC staff's recommendation regarding receptor grid spacing has been followed.[13]

Refined Air Quality Impact Analysis

In simple, intermediate and complex terrain, AERMOD was used to estimate project impacts. The AERMOD model was used to calculate 1-hour, 3-hour, 8-hour, 24-hour, and annual average concentrations.

Refined modeling was performed in two phases: coarse grid modeling and fine grid modeling. Preliminary modeling was performed with the coarse grid to locate the areas of maximum concentration. Fine grids were used to refine the location of the maximum concentrations.

The stack parameters and emission rates used to model combined impacts from all new equipment at the facility are shown in Appendix 5.1D. The model receptor grids were derived from U.S. Geological Survey (USGS) 30-meter Digitized Elevation Map (DEM) data. CEC guidance was used to locate receptors. Twenty-five-meter refined receptor grids were used in areas where the coarse grid analyses indicated modeled maxima would be located. A map showing the layout of the receptor grids used for the refined modeling is included in Appendix 5.1D.

[13] 25-meter resolution along the facility fenceline to 100 meters from the fenceline; 100 meter resolution from 100 meters to 1,000 meters from the fenceline; and 250-meter spacing out to as far as 10 kilometers from the site.

Terrain features were taken from the following 7.5-minute USGS Digital Elevation Model (DEM) quadrangles in California:

- Bonsall
- Las Pulgas Canyon
- Morro Hill
- Rancho Santa Fe
- San Marcos
- Encinitas
- Oceanside
- San Luis Rey

These terrain data are included in the modeling CD that was submitted to the CEC as part of this AFC.

5.1.6.3.2 Specialized Modeling Analyses

Fumigation Modeling

Fumigation occurs when a stable layer of air lies a short distance above the release point of a plume and unstable air lies below. Under these conditions, an exhaust plume may cause high ground-level pollutant concentrations because the plume is unable to rise upwards normally due to the stable layer capping it from above, and be drawn to the ground by turbulence within the unstable layer. Although fumigation conditions rarely last as long as one hour, relatively high ground-level concentrations may be reached during that time. For this analysis, fumigation was assumed to occur for up to 90 minutes as required by USEPA guidance.

The SCREEN3 model was used to evaluate maximum ground-level concentrations for short-term averaging periods (24 hours or less). Guidance from the USEPA[14] was followed in evaluating fumigation impacts. The maximum fumigation impact from the gas turbine occurred approximately 10 to 23 kilometers from the CECP site. This analysis, which is shown in more detail in Appendix 5.1D, showed that impacts under fumigation conditions are less then the maximum impacts during normal equipment operation.

Shoreline Fumigation Modeling

Shoreline fumigation modeling is used to determine the impacts as a result of over-water plume dispersion. Because land surfaces tend to both heat and cool more rapidly than water, shoreline fumigation tends to occur on sunny days when the denser cooler air over water displaces the warmer, lighter air over land. During an inland sea breeze, the unstable air over land gradually increases in depth with inland distance. The boundary between stable air over the water and unstable air over the land and the wind speed determine whether the plume will loop down before much dispersion of the pollutants has occurred.

SCREEN3 can examine sources within 3000 meters of a large body of water, and was used to calculate the maximum shoreline fumigation impact. The model uses a stable onshore flow and a wind speed of 2.5 meters per second; the maximum ground-level shoreline fumigation concentration is assumed by the model to occur where the top of the stable plume intersects the top of the well-mixed thermal inversion boundary layer (TIBL). The

[14] EPA, October 1992.

model TIBL height was varied between 2 and 6 to determine the highest shoreline fumigation impact. The worst-case (highest) impact was used in determining facility impacts due to shoreline fumigation. Shoreline breakup fumigation was assumed to persist for up to 3 hours. The shoreline fumigation analysis is shown in more detail in Appendix 5.1D.

Gas Turbine Startup

CECP site impacts were also evaluated during simultaneous startup of the two new gas turbines to evaluate short-term impacts under worst-case startup emissions. Gas turbine exhaust parameters used to characterize gas turbine exhaust during startup and the CO and NO_x emission rates are shown in Appendix 5.1D.

Ozone Limiting

In accordance with the procedure followed for similar projects, one-hour NO_2 impacts during project operation were modeled using the Plume Volume Molar Ratio Method (PVMRM) adaptation of the Ozone Limiting Method (Cole and Summerhays, 1979). AERMOD PVMRM was used to calculate the NO_2 concentration based on the PVMRM method, and hourly ozone data. Hourly ozone data collected at the Camp Pendleton monitoring station during the years 2003 through 2005 were used in conjunction with PVMRM to calculate hourly NO_2 concentrations from hourly NO_x concentrations. Missing hourly ozone data were substituted prior to use with day-appropriate values (e.g., from the previous day, or the next day, for the same hour). Any other missing hourly ozone data were substituted with 40 ppb ozone (typical ozone tropospheric background level). The PVMRM involves an initial comparison of the estimated maximum NO_x concentration and the ambient O_3 concentration left in the plume after reaction of NO with O_3 to determine which is the limiting factor to NO_2 formation. If the remaining O_3 concentration is greater than the maximum NO_x concentration, total conversion is assumed. If the NO_x concentration is greater than the remaining O_3 concentration, the formation of NO_2 is limited by the remaining ambient O_3 concentration. In this case, the NO_2 concentration is set equal to the O_3 concentration plus a correction factor that accounts for in-stack and near-stack thermal conversion.

Annual NO_x impacts were converted to NO_2 using the USEPA-guidance Ambient Ratio Method and the nationwide default conversion rate of 0.75.

Gas Turbine Commissioning

Gas turbine commissioning is the process initial startup, turning and adjustment of the new CTGs and auxiliary equipment and of the emission control systems. The commissioning process consists of sequential test operation of each of the two gas turbines up through increasing load levels, and with successive application of the air pollution control systems. The total set of commissioning tests will require approximately 49 days with approximately 415 operating hours for each CTG. With the simultaneous testing of the two gas turbines, the overall length of the commissioning period would remain at approximately 49 days. Commissioning of the project may be phased into two separate commissioning periods each approximately 49 days long and each approximately one to six months apart, as described in the project description. During the commissioning phase of the project, the existing boilers Units 1, 2, and 3 at the Encina Power Station will remain available for operation, but these boilers will not be operated simultaneously with a CTG undergoing a commissioning test.

There are several emissions scenarios possible during commissioning. The first is the period prior to SCR system installation, when the combustor is being tuned. Under this scenario, the NO_x emissions control system would not be functioning and the combustor would not be tuned for optimum performance. CO emissions would also affected because combustor performance would not be optimized. The second emissions scenario will occur when the combustor has been tuned but the SCR installation is not complete, and other parts of the gas turbine operating system are being checked out. Since the combustor would be tuned but the control system installation would not be complete, NO_x and CO levels could again be affected. Commissioning activities and expected emissions are discussed in more detail below.

5.1.6.3.3 Impacts during Normal Operation

The maximum impacts during the normal operation of CECP, calculated from the refined, startup/shutdown and fumigation modeling analyses described above, are summarized in Table 5.1-27.

TABLE 5.1-27
Normal Operation Air Quality Modeling Results for new equipment

		Modeled Maximum Concentrations ($\mu g/m^3$)			
Pollutant	Averaging Time	Normal Operations AERMOD	Startup/Shutdown AERMOD	Fumigation SCREEN3	Shoreline Fumigation SCREEN3
Combined Impacts Both CTGs					
NO_2	1-hour	13.8	87.4	2.8	19.4
	Annual	0.2	a	c	c
SO_2	1-hour	4.5	b	0.8	5.6
	3-hour	2.5	b	0.7	2.8
	24-hour	0.7	b	0.3	0.4
	Annual	0.0	b	c	c
CO	1-hour	9.4	1127.2	1.7	11.8
	8-hour	3.7	470.5	1.0	2.3
$PM_{2.5}/PM_{10}$	24-hour	2.2	b	0.6	0.9
	Annual	0.1	b	c	c
Firepump Engine					
NO_2	1-hour	83.8	d	e	e
	Annual	0.0	d	e	e
SO_2	1-hour	0.2	d	e	e
	3-hour	0.0	d	e	e
	24-hour	0.0	d	e	e
	Annual	0.0	d	e	e
CO	1-hour	17.5	d	e	e
	8-hour	4.6	d	e	e
$PM_{2.5}/PM_{10}$	24-hour	0.0	d	e	e
	Annual	0.0	d	e	e

TABLE 5.1-27
Normal Operation Air Quality Modeling Results for new equipment

Pollutant	Averaging Time	Modeled Maximum Concentrations ($\mu g/m^3$) Normal Operations AERMOD	Startup/Shutdown AERMOD	Fumigation SCREEN3	Shoreline Fumigation SCREEN3
Combined Impacts New Equipment					
NO_2	1-hour	83.8	f	f	f
	Annual	0.2	f	f	f
SO_2	1-hour	4.5	f	f	f
	3-hour	2.5	f	f	f
	24-hour	0.7	f	f	f
	Annual	0.0	f	f	f
CO	1-hour	17.5	f	f	f
	8-hour	4.6	f	f	f
$PM_{2.5}/PM_{10}$	24-hour	2.2	f	f	f
	Annual	0.1	f	f	f

Notes:

a = applicable, because startup/shutdown emissions are included in the modeling for annual average.

b = Not applicable, because emissions are not elevated above normal operation levels during startups/shutdowns.

c = Not applicable, because inversion breakup is a short-term phenomenon and as such is evaluated only for short-term averaging periods.

d = Not applicable, because engine will not operate during CTG startups/shutdowns.

e = Not applicable, this type of modeling is not performed for small combustion sources with relatively short stacks.

f = Impacts are the same as shown for CTGs.

5.1.6.3.4 Impacts During Gas Turbine Commissioning

During the gas turbine commissioning phase, NO_2 and CO impacts may be higher than under the operating conditions evaluated above. The commissioning period is comprised of equipment tests and verification. These tests and the associated NO_x and CO emissions are briefly summarized below. The emissions calculations are shown in more detail in Appendix 5.1B.

- **Full Speed No Load Tests (FSNL) –** The tests include a test of the gas turbine ignition system, a test to assure that the CTG is synchronized with its electric generator, and a test of the CTG's overspeed system.

- **Minimum Load Tests –** These tests will occur over several days. During this testing period, the CTG combustor will be tuned to minimize emissions and other checks will be performed. This test period will allow for complete combustion path warm-up, required for removing all debris that could potentially damage the SCR catalyst.

- **Multiple Load Tests (SCR/Oxidation Catalyst Operational at Various Levels) –** These tests will occur over several days. By the beginning of this test period, the control systems will be installed and will be tuned to achieve NO_x and CO control at design levels.

- **Performance Tests (SCR/Oxidation Catalyst at Full Control) –** These tests will also occur over a several-day period, with the CTGs operating from minimum to maximum load.

It is assumed that the maximum modeled NO_2 and CO impact during commissioning will occur under the gas turbine operating conditions that are least favorable for dispersion. These conditions are expected to occur under low-load conditions.

Emission rates and stack parameters for the gas turbines during commissioning are shown in Appendix 5.1D. Modeled impacts during commissioning are summarized in Table 5.1-28. Because there will be a staggered commissioning schedule for the project, the two CTGs will not undergo commissioning simultaneously. Consequently, the impacts shown in Table 5.1-28 are based on one CTG undergoing commissioning and the second CTG undergoing a normal startup/shutdown.

TABLE 5.1-28
Modeled Impacts During Commissioning (Combined Impacts Both CTGS)

Pollutant/Averaging Period	Modeled Concentration, $\mu g/m^3$
NO_2 – 1-hour	129.2
CO – 1-hour	3321.7
CO – 8-hour	1363.6

5.1.6.3.5 Ambient Air Quality Impacts from the Proposed Project

To determine a project's air quality impacts, the modeled concentrations are added to the maximum background ambient air concentrations and then compared to the applicable ambient air quality standards. The maximum background ambient concentrations are listed in the following text and tables. A discussion of why the data collected at these stations are representative of ambient concentrations in the vicinity of the proposed project was provided above.

Table 5.1-29 presents the maximum concentrations of NO_2, CO, SO_2, PM_{10}, and $PM_{2.5}$ recorded between 2004 and 2006 from nearby monitoring stations, as required by Appendix B(g)(8)(G) of the CEC guidelines.

TABLE 5.1-29
Maximum Background Concentrations[a], Project Area, 2004-2006 (µG/M^3)

Pollutant	Averaging Time	2004	2005	2006
NO_2 (Camp Pendleton)	1-hour	**185.9**	144.6	152.1
	Annual	**22.5**	22.5	20.7
SO_2 (San Diego)	1-hour	**110.0**	94.3	89.1
	3-hour	52.4	68.1	**78.6**
	24-hour	**23.6**	23.6	23.5
	Annual	**10.5**	7.9	10.5
CO (Escondido)	1-hour	**6,300**	5,900	5,700
	8-hour	**3,800**	3,100	3,600
PM_{10} (Escondido)	24-hour	**57**	42	51
	Annual	**28**	24	24
$PM_{2.5}$ (Escondido)	24-hour[b]	37	32	28
	Annual	**14.1**	12.3	11.5

Notes:
[a] With the exception of 24-hr $PM_{2.5}$, bolded values are the highest during the three years and are used to represent background concentrations.
[b] 24-hour average $PM_{2.5}$ concentrations shown are 98th percentile values rather than highest values because compliance with the ambient air quality standards is based on 98th percentile readings. Since the ambient standard is based on a 3-year average of the 98th percentile readings, the 3-year average of the 2004 to 2006 98th percentile readings was used to represent the background concentration.

Source:
California Air Quality Data, California Air Resources Board website; EPA AIRData website. Reported values have been rounded to the nearest tenth of a µg/m^3 except for PM_{10} which were already rounded to the nearest integer.

The maximum modeled concentrations in Tables 5.1-27 and 5.1-28 are combined with the maximum background ambient concentrations in Table 5.1-29 and compared with the state and federal ambient air quality standards in Table 5.1-30. Using the conservative assumptions described earlier, the results indicate that the CECP will not cause or contribute to violations of state or federal air quality standards, with the exception of the state PM_{10} and $PM_{2.5}$ standards. For these pollutants, existing 24-hour average PM_{10} background concentrations and PM_{10} and $PM_{2.5}$ annual background concentrations already exceed state standards. The following discussion demonstrates that impacts from the proposed project will not exceed significant impact levels.

TABLE 5.1-30
Modeled Maximum proposed Project Impacts

Pollutant	Averaging Time	Maximum Project Impact (µg/m^3)	Background (µg/m^3)	Total Impact (µg/m^3)	State Standard (µg/m^3)	Federal Standard (µg/m^3)
NO_2	1-hour Annual	83.8 0.2	185.9 22.5	270 23	338 56	— 100
SO_2	1-hour	4.5	110.0	115	650	—
	3-hour	2.5	78.6	81	—	1300
	24-hour	0.7	23.6	24	109	365
	Annual	0.0	10.5	11	—	80
CO	1-hour	3,321.7	6,300	9,622	23,000	40,000
	8-hour	1,363.6	3,800	5,164	10,000	10,000
PM_{10}	24-hour	2.2	57	59	50	150
	Annual	0.1	28	28	20	—
$PM_{2.5}$	24-hour	2.2	32.2	34	—	35
	Annual	0.1	14.1	14	12	15

PSD Significance Levels

The Prevention of Significant Deterioration (PSD) program was established to allow emission increases that do not result in significant deterioration of ambient air quality in areas where criteria pollutants have not exceeded the NAAQS. The net emission increase shown later in Table 5.1-33 shows that although the CECP will be a major source, the net increases resulting from the project will not exceed regulatory significance thresholds with the shutdown of the existing Units 1, 2, and 3 at the Encina Power Station. Consequently, the project will not be subject to PSD review. While the project will not trigger a PSD review, an analysis was conducted to determine whether the ambient impacts of the project exceed the PSD significance thresholds, as these thresholds are generally used as one measure of whether the project's ambient impacts will be significant. Modeled project impacts during normal operation are compared with the PSD significance thresholds in Table 5.1-31 below. As shown in this table, the maximum impacts for the project during normal operation are below the PSD significance thresholds.

TABLE 5.1-31
Comparison of Maximum Modeled Impacts and PSD Significant Impact Levels

Pollutant	Averaging Time	Significant Impact Level, μg/m^3	Maximum Modeled Impact for CECP, μg/m^3	Exceed Significant Impact Level?
NO_2	Annual	1	0.2	No
SO_2	3-hour	25	2.5	No
	24-Hour	5	0.7	
	Annual	1	0.0	
CO	1-Hour	2000	1127	No
	8-Hour	500	471	
PM_{10}	24-Hour	5	2.2	No
	Annual	1	0.1	

5.1.6.4 Screening Health Risk Assessment

A screening health risk assessment (SHRA) was conducted to determine expected impacts on public health of the noncriteria pollutant emissions from the operation of two CTGs/HRSGs and emergency firepump engine. The SHRA was conducted in accordance with the OEHHA's "Air Toxics Hot Spots Program Guidance Manual For Preparation Of Health Risk Assessments" (October 2003) and the March 2005 SDAPCD Supplemental Guidelines for Submission of Air Toxics "Hot Spots" Program Health Risk Assessments (HRAs).

Following SDAPCD Rule 1200 (Toxics New Source Review) guidance, the SHRA estimated the offsite potential Maximum Incremental Cancer Risk (MICR) at the point of maximum impact, at the location (e.g., residence) of the maximally exposed individual (MEI) and to the maximally exposed worker (MEW), and the potential long-term (chronic) and short-term (acute) non-carcinogenic health impacts from non-carcinogenic emissions. The CARB/OEHHA-approved Hotspots Analysis and Reporting Program (HARP) (Version 1.3, October 18, 2005) computer program was used to evaluate multipathway exposure to non-criteria pollutant emissions. The individual pollutant carcinogenic risks are assumed to be additive. Because of the conservatism (overprediction) built into the established risk analysis methodology, the actual risks will be lower than those estimated.

The potential health risks are presented in Table 5.1-32, and a detailed discussion of the approach used for the screening level risk assessment including the detailed non-criteria-pollutant calculations is provided in the Public Health Impact Section 5.9.

TABLE 5.1-32
Potential Health Risks from the Operation of CECP

	Significance Thresholds	CECP	Significant?
Maximum Incremental Cancer Risk (MICR) at Point of Maximum Impact *	10 In one million	**0.16**	No
Acute Inhalation Health Hazard Index	1.0	**0.10**	No
Chronic Inhalation Health Hazard Index	1.0	**0.005**	No

Note:

* The Diesel firepump engine is responsible for the majority of the cancer risk.

The acute and chronic health hazard indices are well below 1.0, and hence, are not significant. The MICR is 0.16 in one million, well below the ten in one million limit for the project proposed with Toxics-BACT. The CECP will not pose a significant health risk at any location, under any weather conditions, under any operating conditions.

5.1.6.5 Construction Impacts Analysis

The overall construction phase of the proposed project is scheduled to occur over approximately a 19-month period provided that both CTGs units are constructed simultaneously (Single Phase Construction). If the construction of the two CTGs is staggered, the overall construction schedule would increase to approximately 25 months (Phased Construction). Emissions due to the construction phase of the project have been estimated, including an assessment of emissions from vehicle and equipment exhaust and the fugitive dust generated from material handling. A dispersion modeling analysis was conducted based on these emissions. A detailed analysis of the emissions and ambient impacts is included in Appendix 5.1E. The results of the analysis indicate that the direct maximum construction impacts will be below the state and federal ambient air quality standards for criteria pollutants. The best available emission control techniques will be used.

Combustion diesel PM_{10} emission impacts from delivery trucks and other construction equipment have also been evaluated to demonstrate that the carcinogenic risk from construction activities will be below ten in one million at all receptors. This screening health risk assessment is included in the Section 5.9, Public Health Impact.

5.1.7 Consistency with Laws, Ordinances, Regulations, and Standards

This section considers consistency separately for federal, state and local requirements.

5.1.7.1 Consistency with Federal Requirements

The SDAPCD has been delegated authority by the USEPA to implement and enforce most federal requirements that may be applicable to the proposed project, including new source performance standards and new source review for nonattainment pollutants. The project will also be required to comply with the Federal Acid Rain requirements (Title IV). Because the SDAPCD is delegated authority to implement Title IV through its Title V permit program, the modified Title V Federal Operating Permit that will be issued as a result of the project will include the necessary requirements for compliance with the Title IV Acid Rain provisions. Because the SDAPCD has not been delegated the authority to implement the PSD program, USEPA Region 9 retains responsible for this regulatory program for purposes of the project.

5.1.7.1.1 PSD Program

USEPA has promulgated PSD regulations for areas that are in compliance with national ambient air quality standards (40 CFR 52.21). The PSD program allows new sources of air pollution to be constructed, or existing sources to be modified, while preserving the existing ambient air quality levels, protecting public health and welfare, and protecting Class I areas (e.g., specific national parks and wilderness areas). There are five principal areas of the PSD program: (1) Applicability; (2) Best Available Control Technology; (3) Pre-construction Monitoring; (4) Increments Analysis; and (5) Air Quality Impact Analysis. Although issuance of the PSD permit will be the responsibility of USEPA Region 9, the protection of Class I areas is still the responsibility of the Federal Land Managers (FLMs).

The federal 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 stationary source. (These terms are defined in federal regulations.) (40 CFR 52.21) Since the Encina Power Station is an existing major source, the determination of applicability is based on evaluating the emissions changes associated with the proposed project in addition to all other emissions changes at the facility over a 5-year lookback period. In Table 5.1-33 the net emission change at the Encina Power Station, based on the emissions from the new equipment and the shutdown of the existing units, are compared to the regulatory significance thresholds. As shown in this table, the net emission changes associated with the project are below these significance thresholds, and thus the proposed project is not subject to PSD review. Consequently, the requirements of this regulation will not be discussed further.

TABLE 5.1-33
Net Emission Change and PSD Applicability

Pollutant	Facility Net Increase (tpy)	PSD Significance Levels (tpy)	Are Increases Significant?
NO_x	20.1	40	No
SO_2	-5.9	40	No
VOC	5.0	N/A*	N/A*
CO	-144.0	100	No
PM_{10}	0.0	15	No

Note:

* Since the project area is classified as a federal nonattainment for ozone, this pollutant is not subject to the PSD regulations.

5.1.7.2 Consistency with State Requirements

As discussed in Section 5.1.4.1.2, State law set up local air pollution control districts and air quality management districts with the principal responsibility for regulating emissions from stationary sources. The CECP is under the local jurisdiction of the SDAPCD, and hence, compliance with District regulations will assure compliance with state air quality requirements.

5.1.7.3 Consistency with Local Requirements: SDAPCD.

The SDAPCD has been delegated responsibility for implementing local, state, and Federal air quality regulations in the San Diego Air Basin. The project is subject to District regulations that apply to new stationary sources, to the prohibitory regulations that specify emission standards for individual equipment categories, and to the requirements for evaluation of impacts from non-criteria pollutants. The following sections include the evaluation of the CECP compliance with applicable District requirements.

5.1.7.3.1 New Source Review Requirements

Under the regulations that govern new sources of emissions, the project is required to secure a preconstruction Determination of Compliance from the SDAPCD, as well as demonstrate continued compliance with regulatory limits when the new equipment becomes operational. The preconstruction review includes demonstrating that subject new equipment will use best available control technology (BACT), will provide any necessary emission offsets, and will perform an ambient air quality impact analysis. The requirements of each of these elements of the SDAPCD's new source review program are discussed below.

5.1.7.3.2 Best Available Control Technology (BACT)

BACT must be applied to a new or modified emissions unit resulting in an emissions increase exceeding SDAPCD BACT threshold levels. In Table 5.1-34, the maximum daily emissions from each gas turbine and the firepump engine are compared with the BACT thresholds. As shown in this table, the CTGs/HRSGs are subject to BACT for NO_x, VOC, SO_x, and PM_{10}. However, emissions from the emergency firepump engine are below the BACT trigger levels, so the engine is not required to use BACT.

TABLE 5.1-34
SDAPCD BACT Emission Thresholds

Pollutant*	Threshold (lbs/day)	CECP Emission Rates (lbs/day)	
		Each CTG/HRSG	Firepump Engine
PM_{10}	10	228.0	0.0
NO_x	10	877.0	2.1
SO_x	10	105.5	0.0
VOC	10	219.4	0.1

Note:

* SDAPCD Rule 20.3 does not include a BACT requirement for CO.

BACT for the applicable pollutants was determined by reviewing SDAPCD BACT Guidance,[15] the South Coast Air Quality Management District BACT Guidelines Manual,[16]

[15] SDAPCD. New Source Review Requirements for Best Available Control Technology (BACT) Guidance Document, May 2002.

[16] SCAQMD. BACT Guidelines, http://www.aqmd.gov/bact/BACTGuidelines.htm.

the most recent Compilation of California BACT Determinations,[17] CAPCOA (2nd Ed., November 1993), and USEPA's RACT/BACT/LAER Clearinghouse.[18] For the gas turbines, the SDAPCD considers BACT to be the most stringent level of demonstrated emission control that is feasible. The detailed BACT analysis is included in Appendix 5.1C. The CECP gas turbines will use the BACT measures discussed below.

- BACT for NO_x emissions from the gas turbine will be the use of low-NO_x emitting equipment and add-on controls. The project will use SCR and dry low-NO_x combustion to reduce NO_x emissions to 2.0 ppmvd NO_x, corrected to 15 percent O_2 (ppmc).
- BACT for CO emissions will be achieved by using good combustion practices and an oxidation catalyst to achieve CO emissions of 2.0 ppmc.
- BACT for VOC emissions will be achieved by use of good combustion practices in the gas turbines to achieve VOC emissions of 2.0 ppmc.
- BACT for PM_{10} and SO_x is best combustion practices and the use of natural gas. The proposed CTGs will burn exclusively PUC-regulated natural gas with a maximum short-term sulfur content of 0.75 grains per 100 scf (gr/100 scf), and an annual average level of 0.25 gr/100 scf.

5.1.7.3.3 Emission Offsets

Because the Encina Power Station is an existing major facility, emission offsets are required for net emission increases that occur at the facility above SDAPCD offset threshold levels. Emission offsets are required only for federal nonattainment pollutants. Since the District is classified as a federal nonattainment area for ozone, the pollutants regulated under the emission offset section of the District new source review program are the ozone precursors NO_x and VOC. As shown in Table 5.1-35, net increases in NO_x and VOC associated with the installation of the new equipment and shutdown of existing units are below the emission offset trigger levels. Therefore, the project does not trigger the SDAPCD emission offset requirements.

TABLE 5.1-35
SDAPCD Nonattainment Pollutant Emission Offset Thresholds (tpy)

Pollutant	Emission Offset Trigger Level*	Net Emission Change	Emission Offsets Required?
NO_x	25	20.1	No
VOC	25	5.0	No

Note:
* SDAQPD Rule 20.1, Table 20.1-5.

5.1.7.3.4 Air Quality Impact Analysis

Under the SDACPD new source review regulations, an air quality impact analysis must be performed if new or modified emission units result in emission increases above specific trigger levels. This analysis must confirm that the above emission increases will not interfere with the attainment or maintenance of an applicable ambient air quality standard or cause

[17] ARB. Statewide Best Available Control Technology (BACT) Clearinghouse, http://www.arb.ca.gov/bact/bact.htm, August 16, 2005.
[18] EPA. RACT/BACT/LAER Clearinghouse, http://cfpub.epa.gov/rblc/htm/bl02.cfm.

additional violations of a standard anywhere the standard is already exceeded. As shown in Table 5.1-36, the emissions for the new equipment are above the air quality impact analysis trigger levels for NO_x, CO, and PM_{10}. Consequently, an air quality impact analysis must be performed for these pollutants. The modeling analyses presented in Section 5.1.5.3 show that the project will not interfere with the attainment or maintenance of the applicable air quality standards or cause additional violations of any standards.

TABLE 5.1-36
Air Quality Impact Analysis (AQIA) Trigger Levels

Pollutant	Emissions for New Equipment	Trigger Level*	AQIA Required?
Hourly Emissions			
NO_x	171 lbs/hr	25 lbs/hr	Yes
CO	1,627 lbs/hr	100 lbs/hr	Yes
PM_{10}	N/A	—	N/A
SO_x	9 lbs/hr	25 lbs/hr	No
Daily Emissions			
NO_x	1,756 lbs/day	250 lbs/day	Yes
CO	10,205 lbs/day	550 lbs/day	Yes
PM_{10}	456 lbs/day	100 lbs/day	Yes
SO_x	211 lbs/day	250 lbs/day	No
Annual Emissions			
NO_x	76 tpy	40 tpy	Yes
CO	217 tpy	100 tpy	Yes
PM_{10}	39 tpy	15 tpy	Yes
SO_x	6 tpy	40 tpy	No

Note:
* SDAPCD Rule 20.3, Table 20.3-1.

5.1.7.3.5 SDAPCD Prohibitory Rules
The general prohibitory rules of the SDAPCD applicable to the project include the following:

5.1.7.3.6 Rule 50 – Visible Emissions
Prohibits visible emissions as dark as, or darker than, Ringelmann No. 1 for periods greater than three minutes in any hour. The CECP use of natural gas would eliminate the possibility of a dark visible emission.

5.1.7.3.7 Rule 51 – 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. The CECP would not emit odorous pollutants, and the screening health risk assessment demonstrated that the potential health risks from the emissions are less than significant.

5.1.7.3.8 Rule 52 – Particulate Matter Emission Standards

Prohibits PM emissions in excess of 0.10 grains per dry standard cubic foot (gr/dscf). The proposed PM_{10} emission rate for the CTGs will limit PM emissions to less than 0.002 gr/dscf.

5.1.7.3.9 Rule 53 – Combustion Contaminants

Prohibits sulfur emissions, calculated as SO_2, in excess of 0.05 percent by volume (500 ppmv), and combustion particulate emissions in excess of 0.10 gr/dscf at 12 percent CO_2. SO_2 emissions from the project will be below 0.5 ppmv, based on the fuel sulfur content levels of 0.75 gr/100 scf (short-term average) and 0.25 gr/100 scf (long-term average). Compliance with Rule 52 will assure compliance with the grain loading limit of Rule 53.

5.1.7.3.10 Rule 62 – Sulfur Content of Fuels

Prohibits the burning of gaseous fuel with a sulfur content of more than 10 gr/100 scf and liquid fuel with a sulfur content of more than 0.05 percent sulfur by weight. The natural gas that would be used in the CECP will have a sulfur content that will be less than 0.75 gr S/100 scf (short-term average) and 0.25 gr S/100 scf (long-term average). The Diesel fuel used in the Diesel firepump engine will comply with current CARB fuel sulfur limit of 15 ppm, or 0.0015 percent, well below the limit of this rule.

5.1.7.3.11 Rule 69.3.1 – Stationary Gas Turbine

Limits NO_x emissions from stationary gas turbines rated greater than or equal to 10 MW with post-combustion controls to 9 ppmv (at 15 percent O_2, corrected for efficiency). The NO_x emissions from the CECP gas turbines will be limited to 2 ppmv.

5.1.7.3.12 Rule 69.4.1 – Stationary Reciprocating Internal Combustion Engines

Limits CO, NO_x, and VOC emissions from stationary reciprocating internal combustion engines rated greater than or equal to 50 bhp. However, emergency equipment operating less than or equal to 52 hours per year for testing or maintenance purposes and less than or equal to 200 hours per year for any purpose are exempt from the emission limits of Rule 69.4.1. Therefore, with an annual operating limit of 50 hours per year for testing/maintenance, the new emergency firepump engine is exempt from these emission limits.

5.1.7.3.13 40 CFR Part 60, Subpart KKKK (Standards of Performance for Stationary Combustion Turbines)

This new source performance standard applies to gas turbines with a heat input in excess of 1 MMBtu/hr that commence construction after February 18, 2005, and hence, it is applicable to the CECP CTGs. Subpart KKKK limits NO_x and SO_2 emissions from new gas turbines based on power output. The limits for gas turbines greater than 30 MW are 0.39 lb NO_x per MW-hr and 0.58 lb SO_2 per MW-hr. The emission limits of 2.0 ppmc NO_x and 0.4 ppmc SO_2 proposed for the CECP are well below the Subpart KKKK limits, as shown in Table 5.1-37.

TABLE 5.1-37
Compliance with 40 CFR 60 Subpart KKKK

Pollutant	Proposed Permit Limits			Subpart KKKK Limit, lb/MW-hr
	ppmc	lb/hr	lb/MW-hr (Max)	
NO_x	2.0	15.1	0.05	0.39
SO_2	0.4	4.4	0.02	**0.59**

Compliance with the NSPS limits must be demonstrated through an initial performance test. Because the CECP gas turbines will be equipped with a continuous NO_x emissions monitor, ongoing annual performance testing will not be required under the NSPS.

5.1.7.3.14 40 CFR Part 60, Subpart IIII (Standards of Performance for Stationary Compression Ignition Internal Combustion Engines)

The new emergency diesel firepump engine will be subject to this NSPS. For engines in this size range, the NSPS requires manufacturers to provide engines that are certified to meet the NSPS emission standards (depending on the year an engine is manufactured). The CECP will comply with the emission limitations of the NSPS by purchasing an engine certified for this application.

The NSPS also requires engines in this size range to use fuel with a sulfur content not to exceed 15 ppm. The new emergency firepump engine will comply with this requirement by using only CARB diesel fuel.

5.1.8 Cumulative Air Quality Impacts Analysis

An analysis of potential cumulative air quality impacts that may result from the CECP and other reasonably foreseeable projects is required by the SDAPCD and the CEC.

5.1.8.1 Criteria Pollutant Cumulative Effects Analysis

Cumulative air quality impacts from the CECP and other reasonably foreseeable projects will be both regional and localized in nature. Regional air quality impacts are possible for pollutants such as ozone, which is formed through a photochemical process that can take hours to occur. Carbon monoxide, NO_x, and SO_x impacts are generally localized in the area in which they are emitted. PM_{10} can create a local air quality problem in the vicinity of its emission source, but can also be a regional issue when it is formed in the atmosphere from VOC, SO_x, and NO_x.

The cumulative effects analysis will consider the potential for both regional and localized impacts due to emissions from operation of CECP. Regional impacts will be evaluated by comparing maximum daily and annual emissions from CECP with emissions of ozone and PM_{10} precursors in San Diego County. Localized impacts will be evaluated by looking at other local sources of pollutants that are not included in the background air quality data to determine whether these sources in combination with CECP would be expected to cause significant cumulative air quality impacts.

5.1.8.1.1 Regional Impacts

Regional impacts are evaluated by assessing CECP's contribution to regional emissions. Although the relative importance of VOC and NO_x emissions in ozone formation differs from region to region and from day to day, state law requires reductions in emissions of both precursors to reduce overall ozone levels. The change in the sum of emissions of these pollutants, equally weighted, provides a rough estimate of the impact of CECP on regional ozone levels. Similarly, a comparison of the emissions of PM_{10} precursor emissions from CECP with regional PM_{10} precursor emissions provides an estimate of the impact of CECP on regional PM_{10} levels.

Table 5.1-38 summarizes these comparisons; detailed calculations for the CECP and the emission reductions for the shutdown and retirement of the existing boiler Units 1, 2, and 3 at the Encina Power Station are shown in Appendix 5.1B. CECP emissions are compared with regional emissions in 2010, as the project is expected to begin operation in this year. San Diego County emissions projections for 2010 were taken from the Air Resources Board's web-based emission inventory projection software, available at www.arb.ca.gov/app/emsinv/emssumcat.php.

These comparisons show that the total ozone and PM_{10} precursor emissions reductions from the shutdown and retirement of the existing boilers (Units 1, 2, and 3) at the Encina Power Station will be larger than the maximum potential emissions for the CECP. Therefore, CECP will have an overall positive impact on regional ozone and PM_{10} formation.

TABLE 5.1-38
Comparison of CECP Emissions to Regional Precursor Emissions in 2010: Annual Basis[a]

Ozone Precursors – Annual Basis	
Total San Diego County Ozone Precursors, tons/year	121,399
Total CECP Ozone Precursor Emissions, tons/year	100.6
CECP Ozone Precursor Emissions as Percent of Regional Total	0.08%
Reductions from Shutdown of Boilers, tons/year[b]	-351.0
CECP Net Ozone Precursor Emissions with Boiler Shutdowns, tons/year	-250.4
CECP Net Ozone Precursor Emissions as Percent of Regional Total, with Boiler Shutdowns	Net Benefit
PM_{10} Precursors – Annual Basis	
Total San Diego County PM_{10} Precursors, tons/year	172,134
Total CECP PM_{10} Precursor Emissions, tons/year	145.2
CECP PM_{10} Precursor Emissions as Percent of Regional Total	0.08%
Reductions from Shutdown of Boilers, tons/year	-462.1
CECP Net PM_{10} Precursor Emissions with Boiler Shutdowns, tons/year	-316.9
CECP Net PM_{10} Precursor Emissions as Percent of Regional Total, with Boiler Shutdowns	Net Benefit

Notes:
[a] County-wide emissions calculated as 365 times daily emissions.
[b] Based on maximum 2-year average emissions during a 10-year lookback period.

5.1.8.1.2 Localized Impacts

To evaluate potential cumulative effects of CECP in combination with other projects in the area, projects within a radius of 6 kilometers of the project were examined for the cumulative localized impacts analysis.

Within this search area, three categories of projects with combustion sources were used as criteria for identification:

- Existing projects that have been in operation since at least 2006.
- Projects for which air pollution permits to construct have been issued and that began operation after 2006.
- Projects for which air pollution permits to construct have not been issued, but that are reasonably foreseeable.

Existing projects that have been in operation since at least 2006 are reflected in the ambient air quality data that has been used to represent background concentrations for the CECP; consequently, no further analysis of the emissions from this category of facilities was performed.

Projects for which air pollution permits to construct have been issued but that were not operational in 2006 were identified through a request of permit records from the SDAPCD. The SDAPCD performed a search of its permit computer tracking system for permits issued after January 1, 2006 for projects located within six miles of the CECP. This search also included permit application packages the SDACPD is currently processing for projects located within six miles of the CECP. Enclosed as Appendix 5.1F is a copy of the list of projects provided by the SDAPCD. As shown on this list, only one project has CO, NO_x, SO_x, or PM_{10} emissions above the CEC established de minimis level of 5 tons/year: an emergency generator engine at Hunter Industries located in San Marcos, California. The SDACPD modeling group reviewed this list of projects and concluded that since the above engine is located more than 6 miles from the CECP, there was no need to perform a localized cumulative impact modeling analysis for the CECP. Consequently, no localized cumulative impact modeling analysis was performed for the project.

5.1.8.2 Greenhouse Gas Cumulative Effects Analysis

Greenhouse gas (GHG) emissions have received increasing attention; most significantly, in 2006 the Governor signed the California Global Warming Solutions Act of 2006. Combustion of natural gas in the proposed project's gas turbines and diesel combustion in the emergency firepump engine will result in the emissions of the following GHG: carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). These emissions from the CECP join the emissions of the same GHG from the combustion of fossil fuels from all sources (e.g., home natural gas heaters, coal-fired power plants). To the extent that anthropogenic sources of GHGs contribute to climate change, these impacts are global; the project-emitted amount of GHG does not cause a direct significant impact on the environment.

GHG emissions of CO_2, CH_4, and N_2O for the project are summarized in Table 5.1-39. The detailed GHG emission calculations for the CECP are included in Appendix 5.1B.

TABLE 5.1-39
GHG Emissions Project

Pollutant	Gas Turbines MMT CO_2e *	Firepump Engine MMT CO_2e *	Total MMT CO_2e *
CO_2	8.46×10^5	6.19×10^0	8.46×10^5
CH_4	2.16×10^3	5.84×10^{-4}	2.16×10^3
N_2O	4.96×10^2	2.62×10^{-3}	4.96×10^2
Total	**8.50×10^5**	**6.19×10^0**	**8.50×10^5**

Note:
* Million metric tons of carbon dioxide equivalent.

GHG emissions from the CECP will be offset in part by the shutdown and retirement of Encina Power Station Units 1, 2, and 3. The net GHG emission increase is shown below in Table 5.1-40 based on a 10-year lookback period for Units 1, 2, and 3. The detailed GHG emission calculations for the Encina Units 1-3 are included in Appendix 5.1B. Further, the CECP will likely result in a reduction of overall operation of less efficient units regionally because these fast starting and more efficient CECP units can be relied upon to provide quick electrical resources when needed. Historically, less efficient steam generating units in San Diego have operated at minimum load during off-peak hours in order to be available for quick response when demand rises. This practice will occur less once the fast starting CECP units are available, which will have a corresponding benefit of reduction in GHG emissions regionally and improvement in overall GHG emission performance per megawatt-hour of production. The exact level of regional GHG emission reductions attributed to this is difficult to calculate, however, this benefit is expected to occur regardless.

TABLE 5.1-40
Net GHG Emissions Change for Proposed Project

Equipment	Total MMT CO_2e*
Reductions from Shutdown of Existing Boilers	
Unit 1	1.80×10^5
Unit 2	1.92×10^5
Unit 3	2.70×10^5
Subtotal	**6.42×10^5**
New Equipment	
Gas Turbines and Firepump Engine	8.50×10^5
Net Emission Change	**2.08×10^5**

Note:
* Million metric tons of carbon dioxide equivalent.

Because GHG emissions can affect climate change on only a global basis, and the project's GHG emissions are not substantial compared to global emissions, the cumulative impact of the project's GHG emissions is less than significant. The project's emissions will be subject to regulation pursuant to AB 32; through the implementation of this statute, any remaining cumulative effects will be mitigated. Nonetheless, through the use of advanced, efficient generating technology for the production of electrical power, the project reasonably minimizes GHG emissions associated with this type of activity.

5.1.9 Mitigation

Mitigation will be provided for all emissions increases from the CECP in the form of emission reductions from the shutdown and retirement of existing boilers (Units 1, 2, and 3) at the Encina Power Station and the installation of BACT for the new equipment, as required under SDAPCD regulations. The demonstration of compliance with the BACT requirement is provided in Appendix 5.1C.

As discussed in Section 5.1.6.3.2 above, the emissions increases from the CECP will be offset through the reductions achieved by shutting down the existing boiler Units 1, 2, and 3 at the Encina Power Station. Table 5.1-35 demonstrated that the project will result in a net reduction in emissions of CO and SO_x, no net increase in PM_{10} emissions, and increases in NO_x and VOC emissions that are below SDAPCD regulatory offset thresholds. Table 5.1-38 demonstrated that when a 10-year lookback is used to develop the baseline emissions for boiler Units 1, 2, and 3, the project will result in a net reduction in emissions of ozone and PM_{10} precursors with the shutdown of Units 1, 2, and 3. Therefore, no further mitigation will be needed for the CECP.

5.1.10 References

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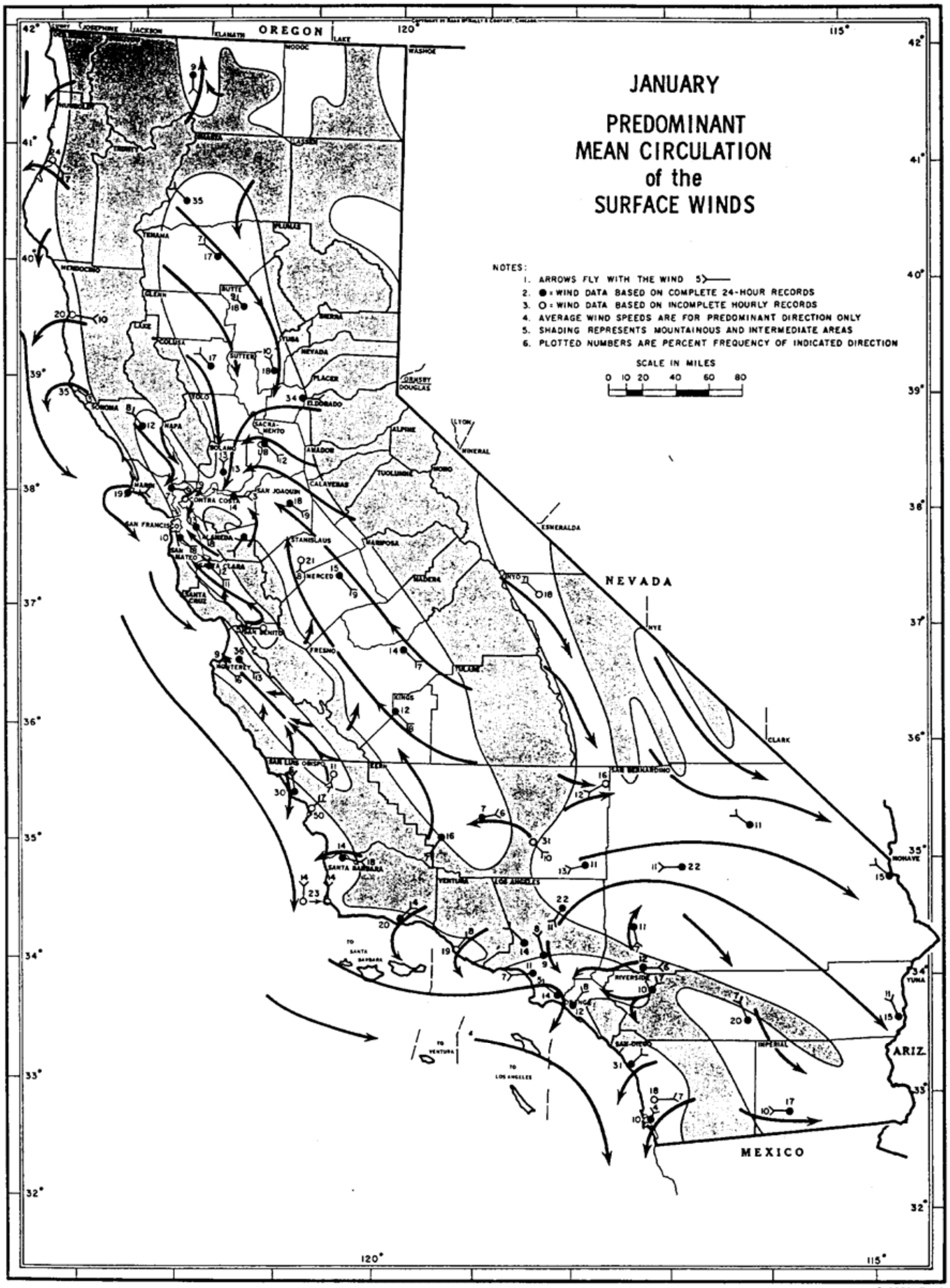

FIGURE 5.1-1
January Predominant Mean Circulation of the Surface Winds

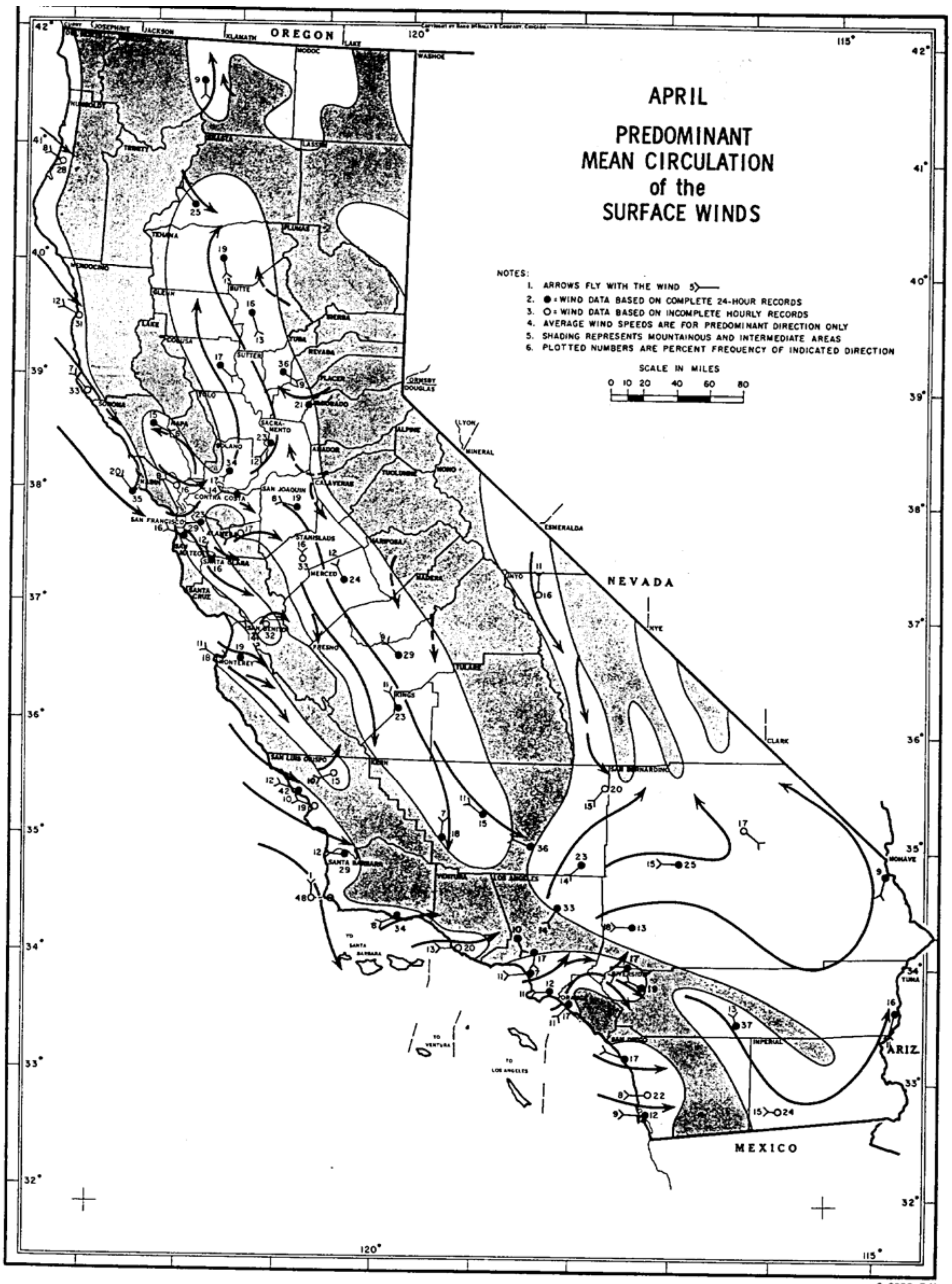

FIGURE 5.1-2
April Predominant Mean Circulation of the Surface Winds

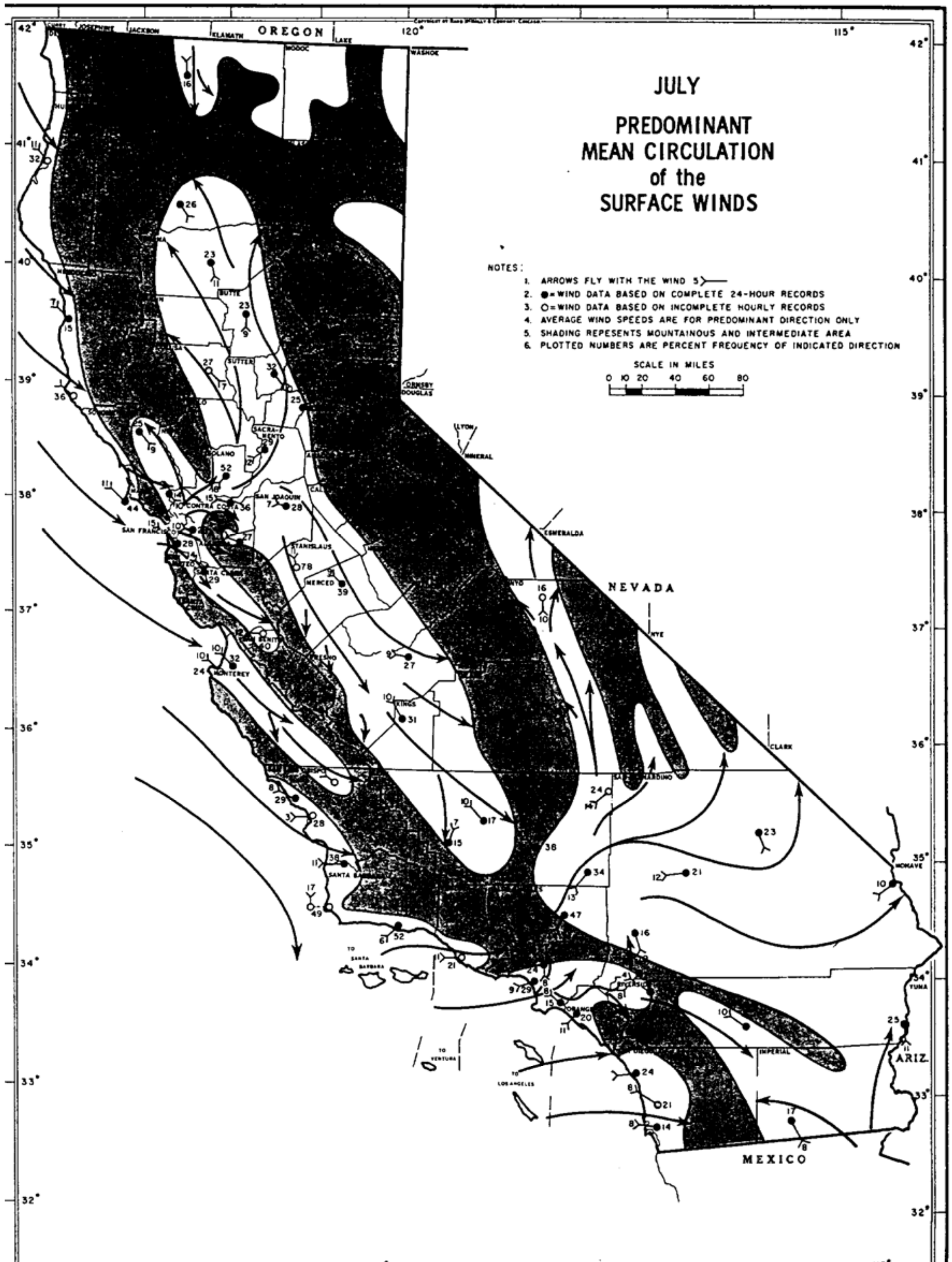

FIGURE 5.1-3
July Predominant Circulation of the Surface Winds

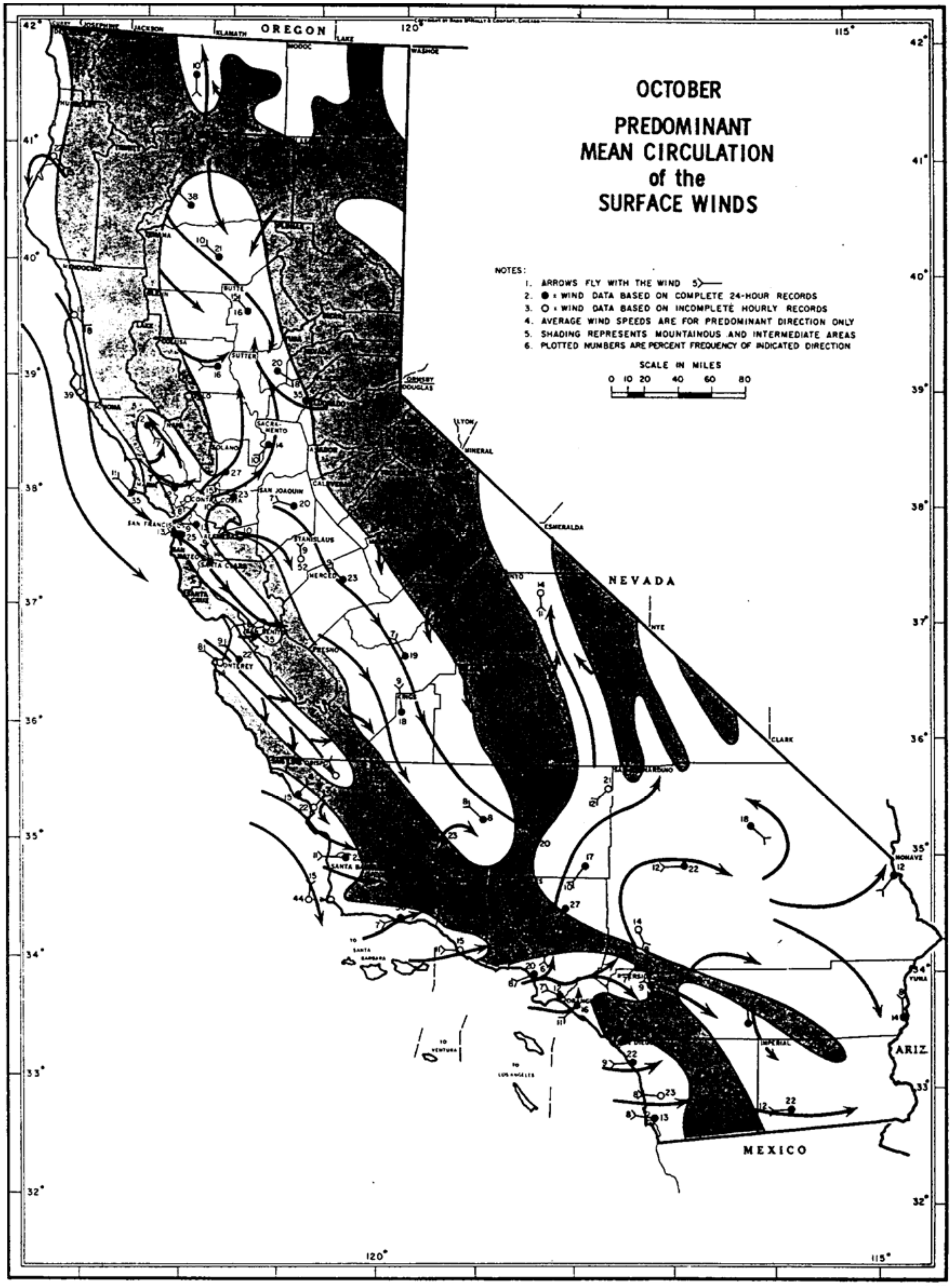

FIGURE 5.1-4
October Predominant Mean Circulation of the Surface Winds

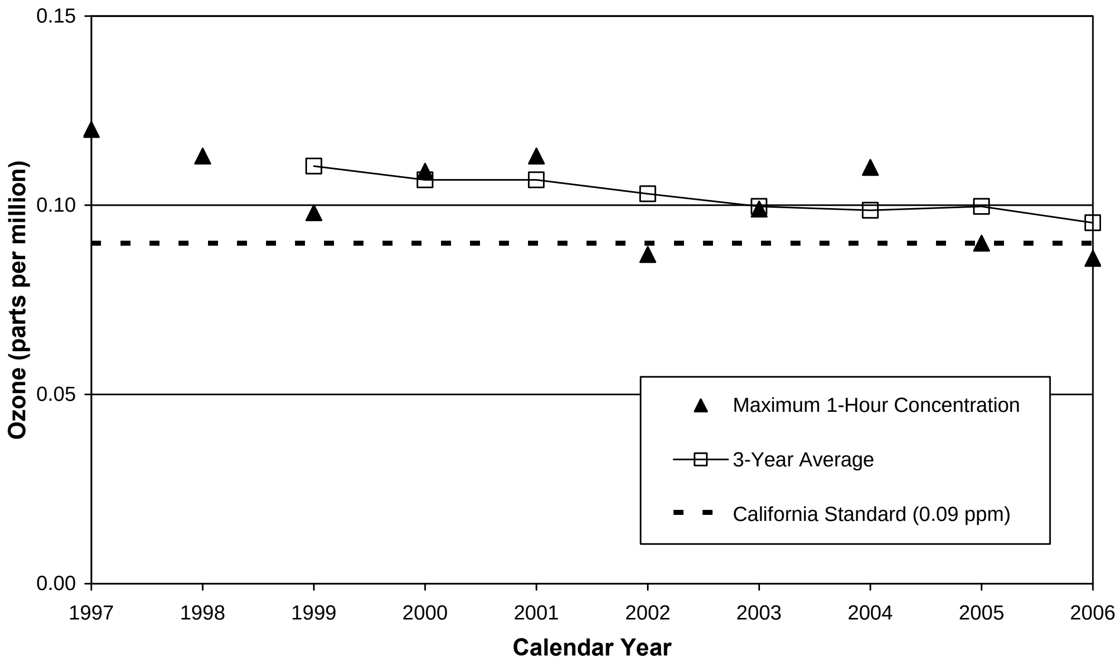

FIGURE 5.1-5
Maximum 1-hour Average Ozone Levels Camp Pendleton 1997-2006

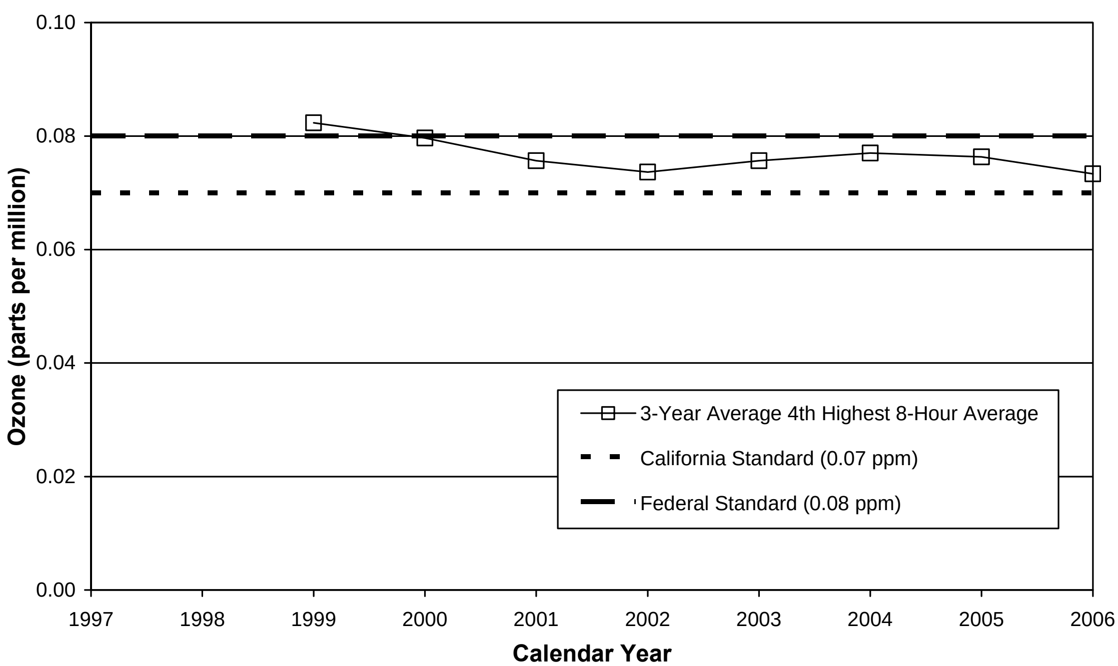

FIGURE 5.1-6
3-year Average 4th Highest 8-hour Average Ozone Levels Camp Pendleton, 1997-2006

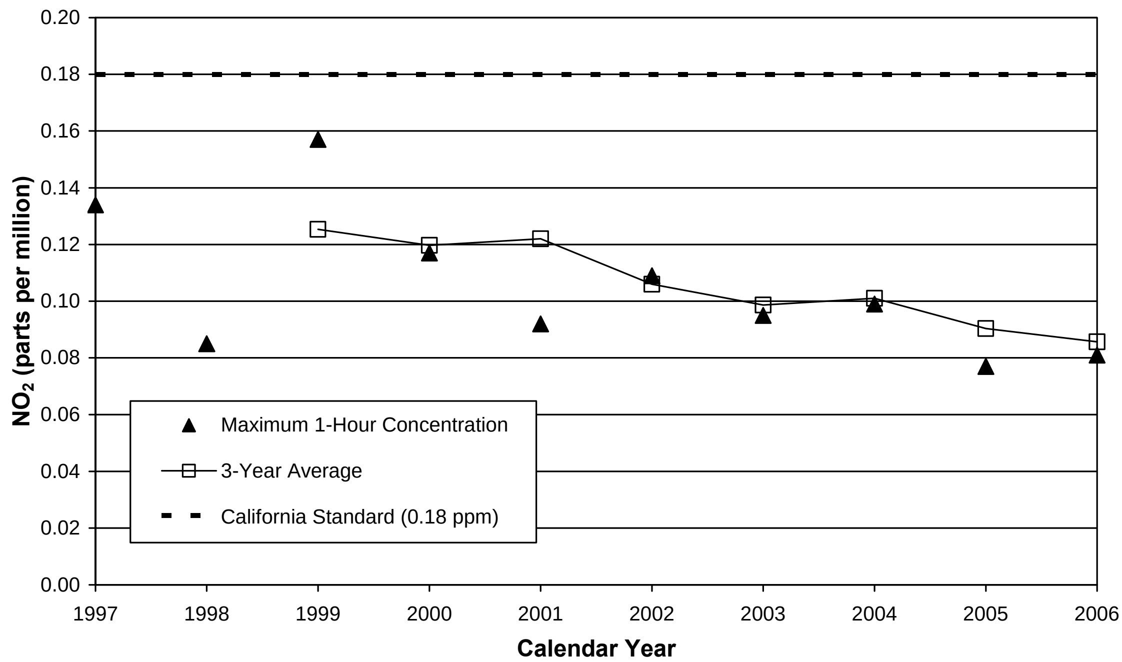

FIGURE 5.1-7
Maximum 1-hour Average NO_2 Levels Camp Pendleton, 1997-2006

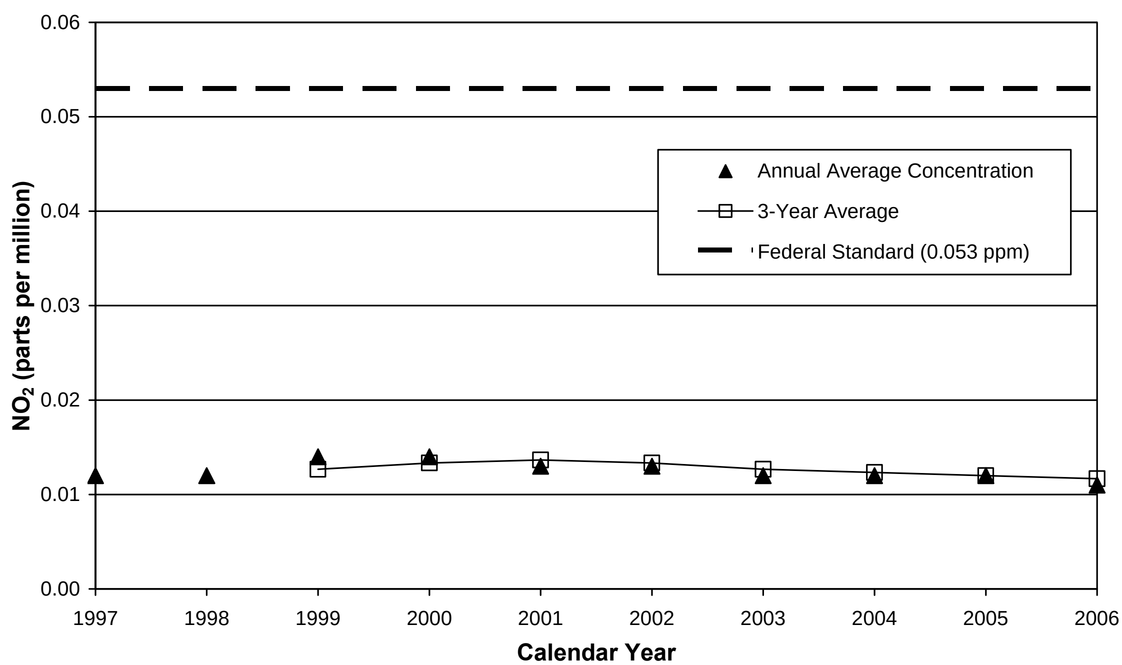

FIGURE 5.1-8
Annual Average NO_2 Levels Camp Pendleton, 1997-2006

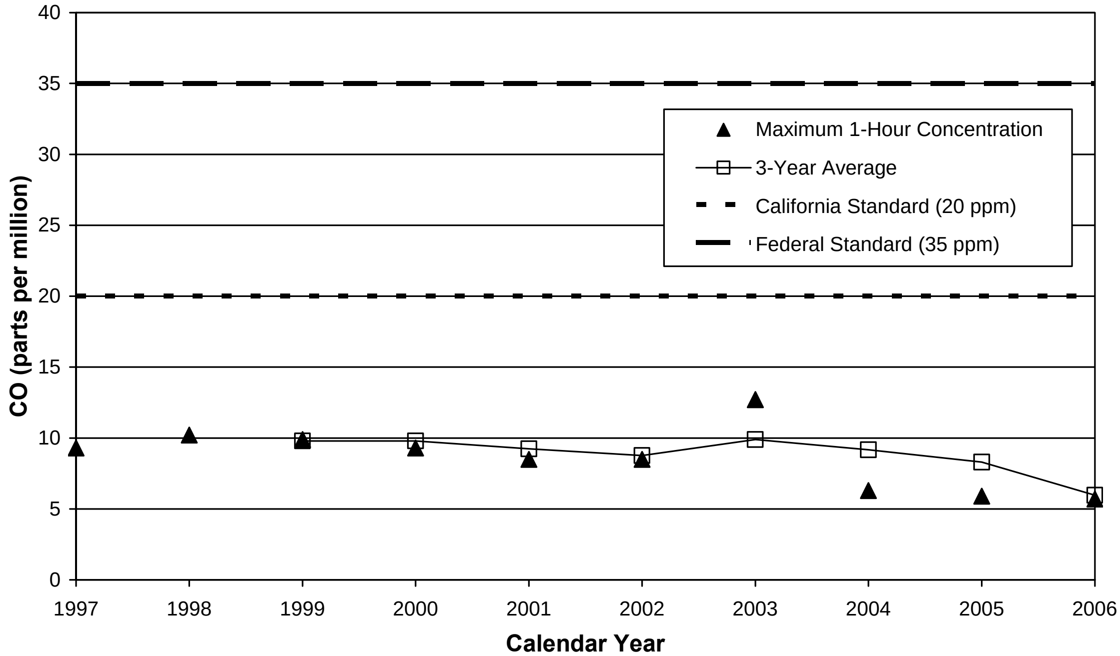

FIGURE 5.1-9
Maximum 1-Hour Average CO Levels Escondido, 1997-2006

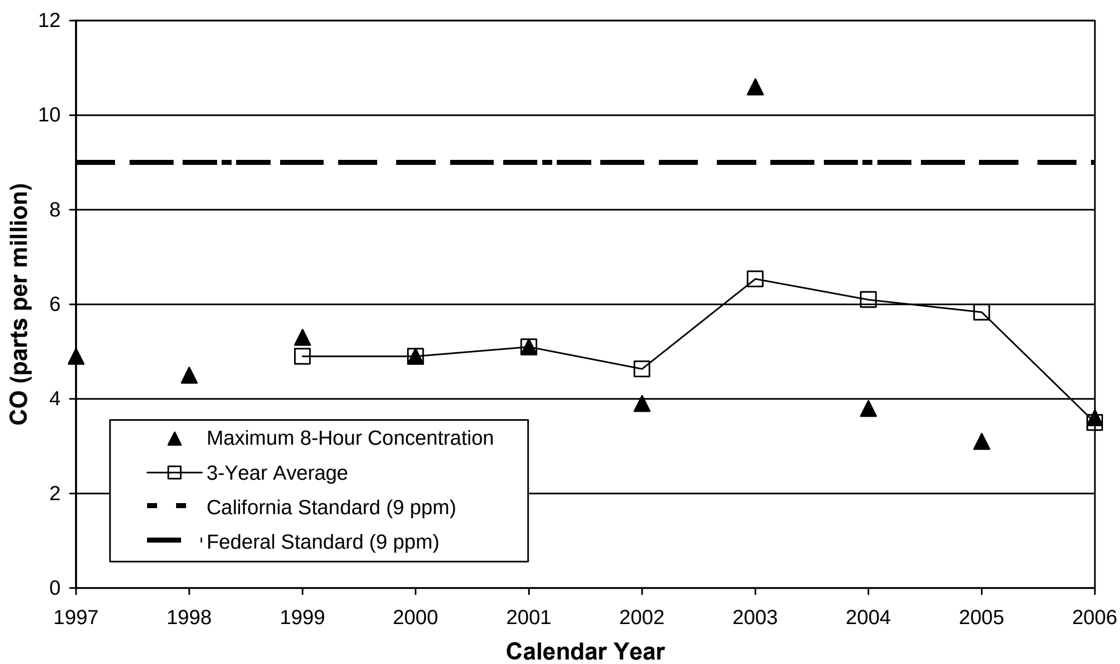

FIGURE 5.1-10
Maximum 8-hour Average CO Levels Escondido, 1997-2006

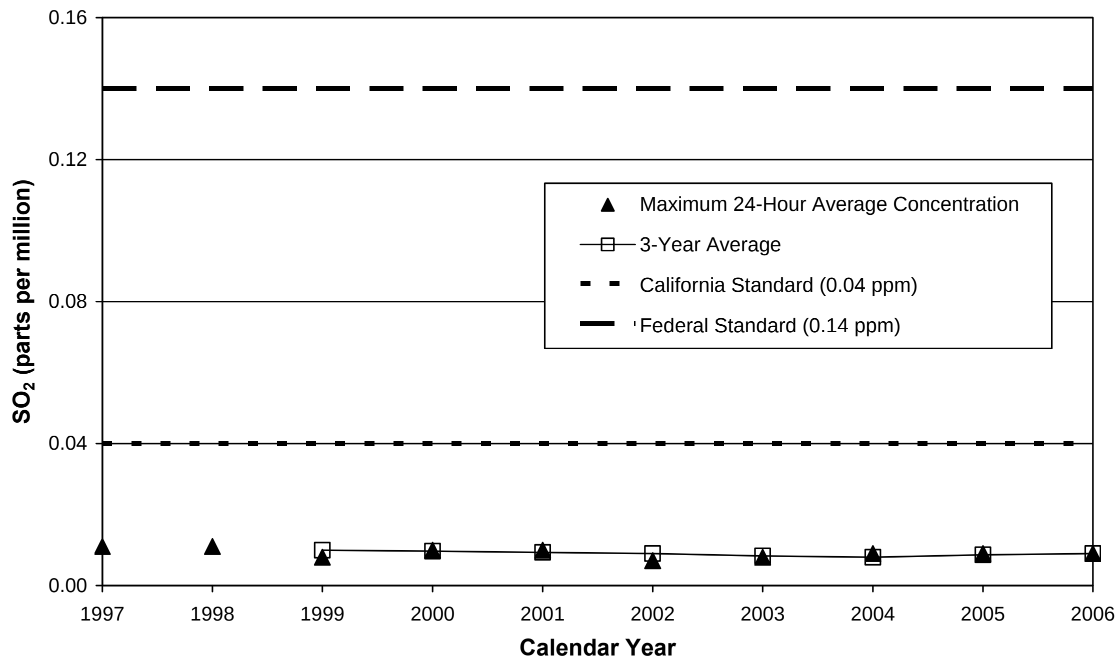

FIGURE 5.1-11
Maximum 24-hour Average SO_2 Levels San Diego (12th Avenue), 1997-2006

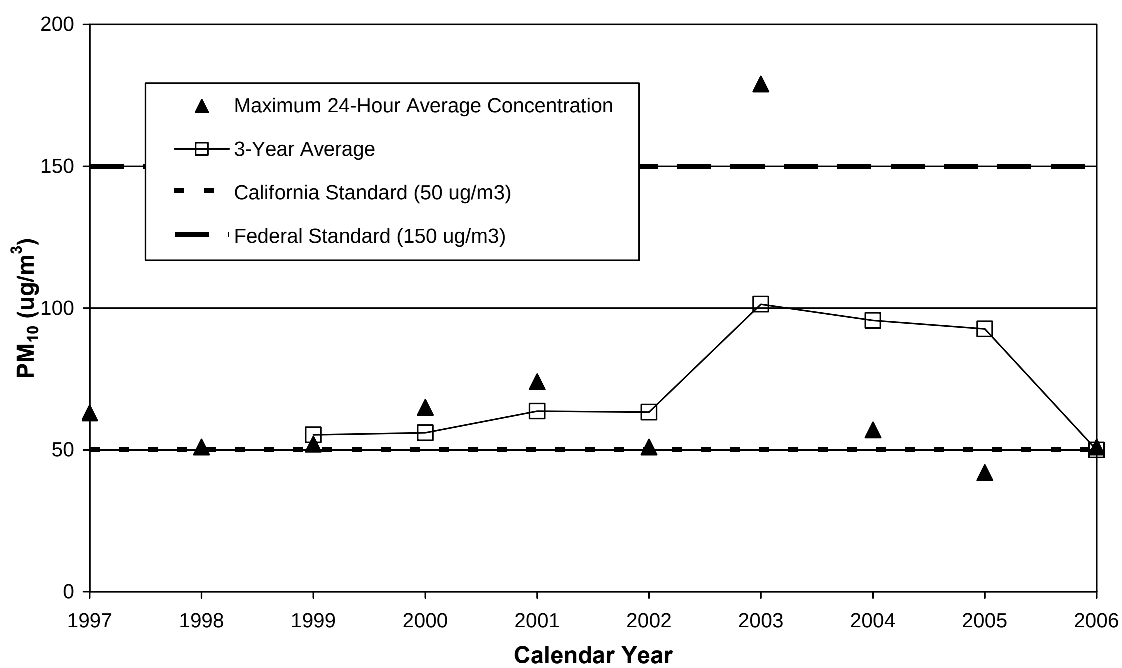

FIGURE 5.1-12
Maximum 24-hour Average PM_{10} Levels Escondido, 1997-2006

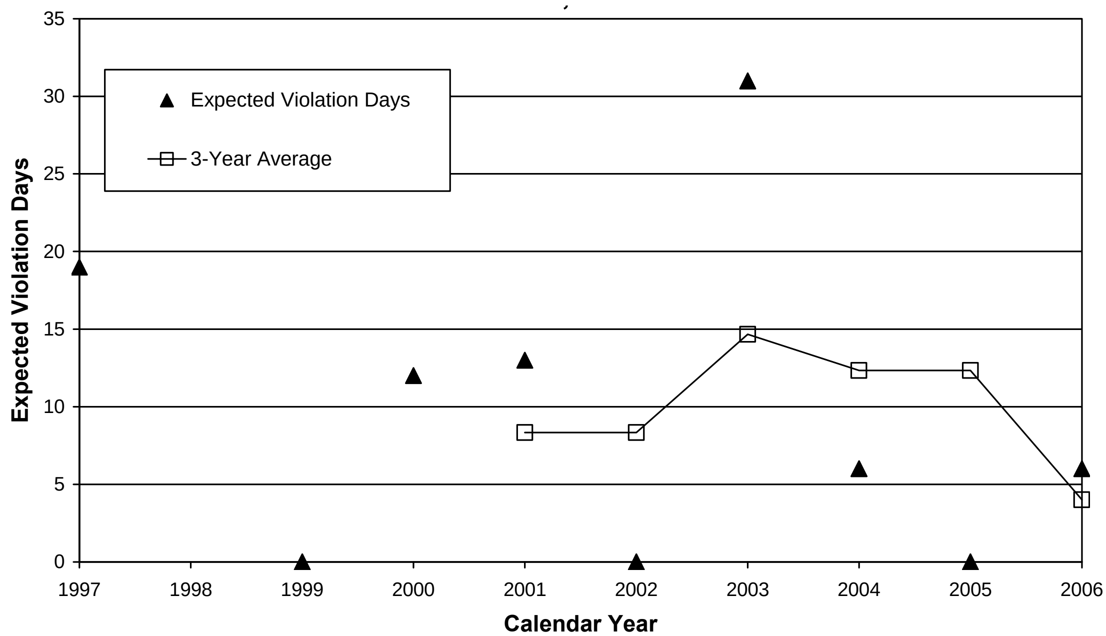

FIGURE 5.1-13
Expected Violations of the California 24-hour PM10 Standard (50 µg/m3) Escondido, 1997-2006

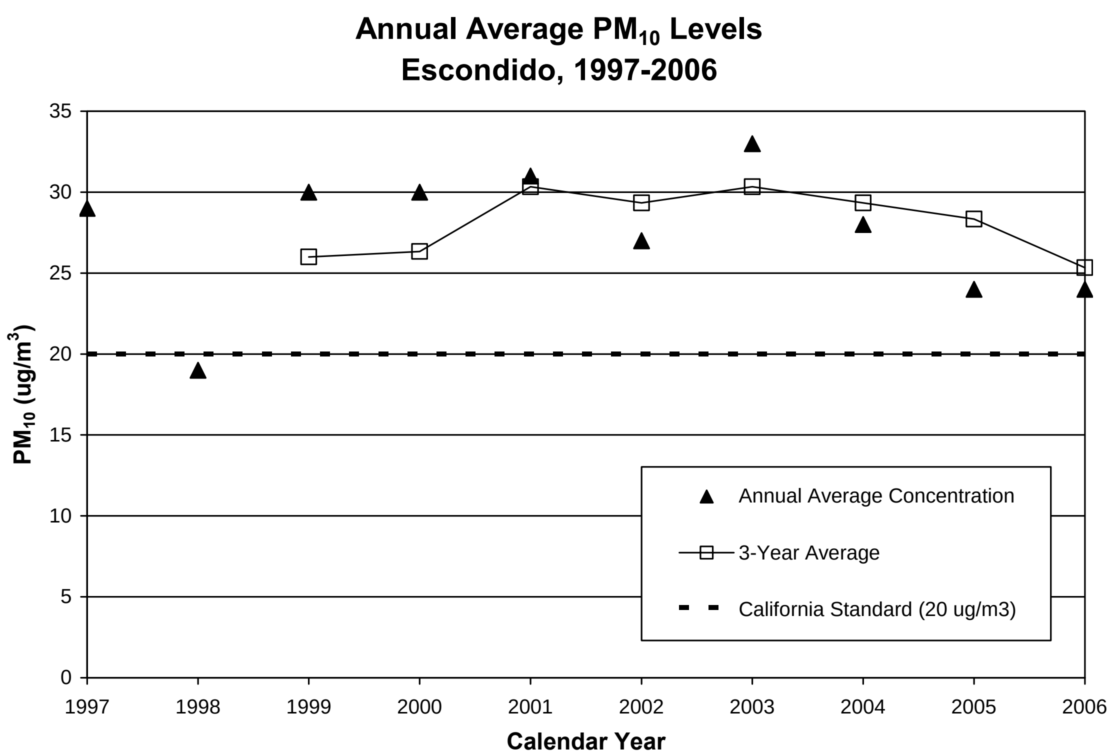

FIGURE 5.1-14
Annual Average PM_{10} Levels Escondido, 1997-2006

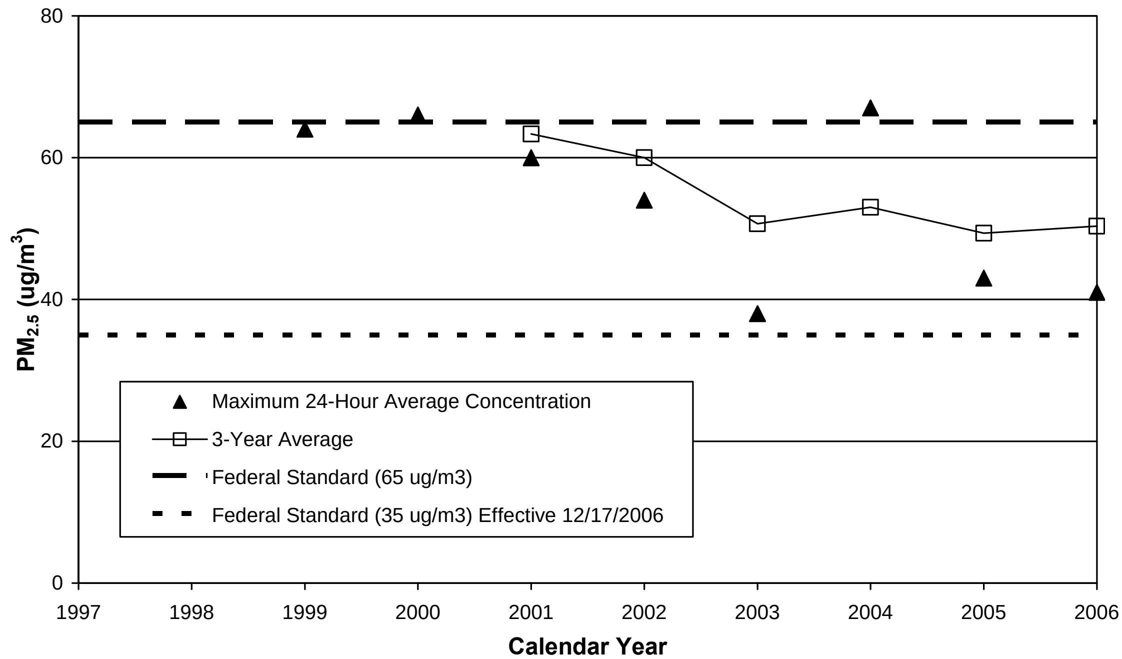

FIGURE 5.1-15
Maximum 24-hour Average PM2.5 Levels Escondido, 1997-2006

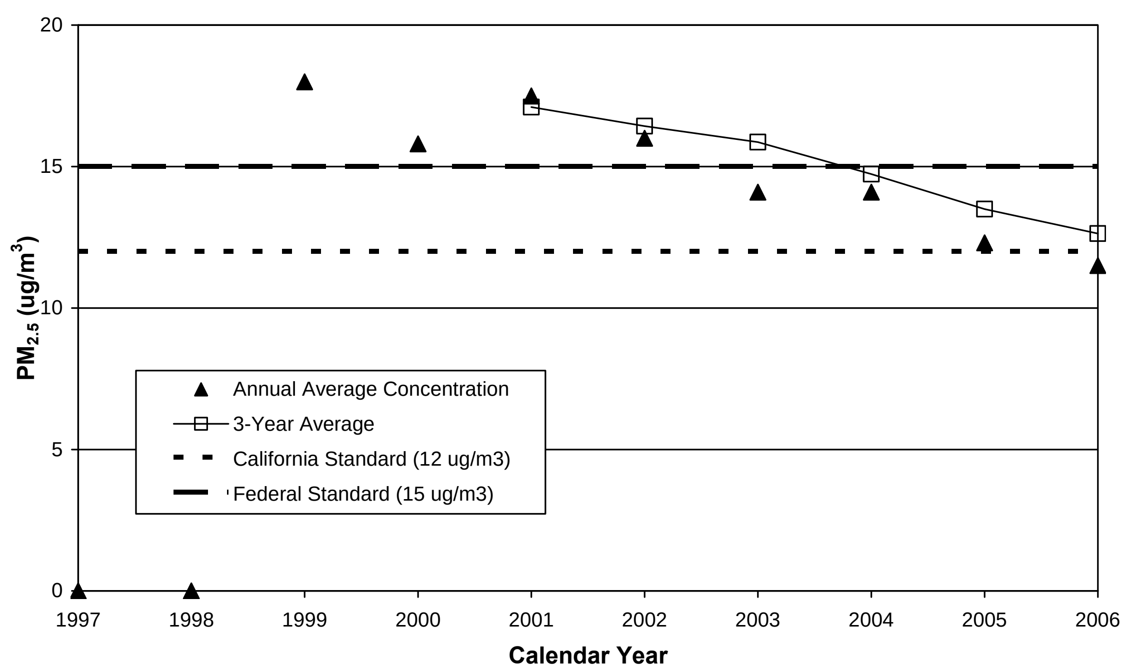

FIGURE 5.1-16
Annual Average PM2.5 Levels Escondido, 1997-2005