8.1 Air Quality

This section describes existing air quality conditions, maximum potential impacts from construction and operation of the new South Bay Replacement Project (SBRP), demolition of the existing South Bay Power Plant (SBPP), construction of the relocated South Bay Substation, and design features that keep these impacts below thresholds of significance. The Project will use combined-cycle combustion gas turbine technology to generate electricity efficiently and cleanly.

Other beneficial environmental aspects of the 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 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 ground-level concentrations of exhaust constituents with an appropriately-sized exhaust stack
- Limited emissions potential of the supplemental duct firing capacity of the facility

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 new SBRP and demolition of the existing SBPP. Potential public health risks posed by emissions of non-criteria pollutants are also addressed in Section 8.6 (Public Health).

The SBRP Project consists of three phases:

- **The Construction Phase**—The first phase is the demolition of existing structures and foundations associated with the former Liquefied Natural Gas (LNG) Facility, preparation of construction lay down areas, and the construction of the SBRP on 12.9 acres within the LNG site. Initial operation of SBRP will include an interim interconnection to the SDG&E transmission system through a new 230-kVA substation on approximately 0.6 acre (interconnecting to SDG&E's Otay 230-kV transmission line) and an underground interconnection to the existing SDG&E South Bay 138/69kV substation.
- **The Demolition Phase**—The second phase of Project construction will occur after the SBRP achieves commercial operation. The construction activity during this phase will be the demolition of the existing SBPP facilities, excluding the existing South Bay Substation, which will remain in service until the new substation is constructed.
- **The New Substation Phase**—The final phase of the Project will involve the construction of the SDG&E substation on approximately 6.5 acres south of and adjacent to the SBRP site. This construction will be performed after the start up of the SBRP. After the new

SDG&E substation construction is completed and operational, and the SBRP generator leads are attached to the new facilities, SDG&E could then initiate demolition activities on the South Bay Substation, located north of the SBRP site. These demolition activities, however, are not part of the scope of this Application for Certification (AFC). They are part of a separate project of unknown timing and scope.

The reason there are two interconnect steps is to assure that interconnection can be secured by the proposed SBRP on-line date of 2010. Also, SDG&E holds certain obligations associated with a new substation as part of its Memorandum of Understanding with the City of Chula Vista, but these obligations occur after the demolition of the SBPP.

Section 8.1.1 presents the air quality setting, including geography, topography, climate, and meteorology. Section 8.1.2 provides an overview of air quality standards and health effects. Section 8.1.3 discusses the criteria pollutants and existing air quality in the vicinity of the proposed Project. The affected environment is analyzed in Section 8.1.4, 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 8.1.5 discusses the environmental analysis 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 8.1.6 discusses compliance with LORS applicable to the Project. A discussion of cumulative impacts is presented in Section 8.1.7. Mitigation for Project air quality impacts is discussed in Section 8.1.8. A list of references used in preparing the section is provided in Section 8.1.9.

8.1.1 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 Project air emissions. The effects of the land and atmospheric variables are discussed separately.

8.1.1.1 Geography and Topography

The SBRP will be constructed on a 12.9-acre site adjacent to, and south of, the existing SBPP on Bay Boulevard, between L Street and Palomar Street, in Chula Vista, California. The Project site is relatively flat at an elevation of approximately 24 feet above mean sea level, with its western edge approximately 100 feet from the south end of San Diego Bay.

8.1.1.2 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 predominately westerly. At San Diego International Airport (Lindbergh Field), which is located approximately 12.5 miles northwest 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). At the SDAPCD monitoring station in Chula Vista, the most frequent wind direction is from the west-southwest and the second most frequent direction is from the west. Appendix 8.1A contains the 25 quarterly plus annual wind roses and 25 quarterly plus annual wind frequency tables for the five years, 1990 through 1994, used in the air dispersion modeling. Because of their similarity, the annual wind rose for 1990 is also shown here in Figure 8.1-1 as an example. Based on twice-daily soundings for the same three years of data, the site experiences good vertical mixing potential.

Temperatures in the Project area range from an average of 57 degrees in December and January to 72 degrees in August. Relative humidity at Lindbergh Field averages 58 percent during daytime and 74 percent during the nighttime. Precipitation in the vicinity of Lindbergh Field 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 pollutants to accumulate in the air basin.

The predominant winds over all of California are shown in Figures 8.1-2 through 8.1-5 for January, April, July, and October, respectively. As indicated in the figures, winds in California generally are light and easterly in the winter, but strong and westerly in the spring, summer, and fall.

8.1.2 Overview of Air Quality Standards

The U.S. Environmental Protection Agency (EPA) has established national ambient air quality standards (NAAQS) for ozone, nitrogen dioxide (NO_2), CO, sulfur dioxide (SO_2), particulate matter with aerodynamic diameter less than or equal to 10 microns (PM_{10}), particulate matter with aerodynamic diameter less than or equal to 2.5 microns ($PM_{2.5}$), and airborne lead. Areas with ambient levels above these standards are designated by EPA as "nonattainment areas" subject to planning and pollution control requirements that are more stringent than standard requirements.

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

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 8.1-1 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.

EPA'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 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 65 $\mu g/m^3$, 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.

TABLE 8.1-1
Ambient Air Quality Standards

Pollutant	Averaging Time	California	National
Ozone	1 hour	0.09 ppm	0.12 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	-	0.053 ppm
	1 hour	0.25 ppm	-
Sulfur Dioxide	Annual Average	-	80 $\mu g/m^3$ (0.03 ppm)
	24 hours	0.04 ppm (105 $\mu g/m^3$)	365 $\mu g/m^3$ (0.14 ppm)

TABLE 8.1-1
Ambient Air Quality Standards

Pollutant	Averaging Time	California	National
	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 EPA, 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	-	65 µg/m^3[c] 35 µg/m^3 (proposed by EPA, Dec 20, 05)
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)	Note d	-

[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 percent.

8.1.3 Existing Air Quality

In coordination with the APCD, data from several representative ambient air monitoring stations were used to characterize air quality at the SBRP site. All ambient air quality data presented in this section were taken from CARB publications and data sources or EPA air quality data tables. Ambient concentrations of ozone, CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and lead are recorded at the SDAPCD monitoring station located on East J Street next to the Hilltop Junior High School in Chula Vista, about 2.6 miles from the Project site. The nearest sulfate monitor is located in Riverside, Riverside County. 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 µg/m^3 on a 24-hour average basis.

8.1.3.1 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.

TABLE 8.1-2
Ozone Levels in San Diego County, Chula Vista Monitoring Station, 1996-2005 (ppm)

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Highest 1-Hour Average	0.098	0.117	0.099	0.105	0.091	0.102	0.115	0.075	0.097	0.093
Highest 8-Hour Average	0.08	0.099	0.079	0.08	0.077	0.079	0.073	0.056	0.087	0.081
Number of Days Exceeding:										
State Standard* (0.09 ppm, 1-hour)	1	10	2	4	0	2	1	0	1	0
Federal Standard (0.12 ppm, 1-hour)	0	0	0	0	0	0	0	0	0	0
Federal Standard (0.08 ppm, 8-hour)	0	3	0	0	0	0	0	0	1	0

Source: California Air Quality Data, California Air Resources Board website (http://www.arb.ca.gov/adam/welcome.html).

Note:

* Measured values are rounded to the same number of significant figures before comparison with this standard; consequently, a value of 0.093 is rounded to 0.09, which does not exceed the standard. Trends related to the new state 8-hour average ozone standard of 0.070 ppm are not yet available.

Maximum ozone concentrations at the Chula Vista station usually are recorded during the spring and fall months. Table 8.1-2 shows the annual maximum hourly ozone levels recorded at Chula Vista during the period 1996-2005, as well as the number of days in which the state and federal standards were exceeded.

The long-term trends of maximum one-hour ozone readings and violations of the state and federal standard are shown in Figure 8.1-6 for the Chula Vista monitoring station. The data show that, on average, the previous state ozone standard has been exceeded in 7 of the past 10 years; during the last four years, there has been not more than one violation per year of that standard. The federal 8-hour ozone standard has been exceeded in 2 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 8.1-7.

[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.

8.1.3.2 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 8.1-3 shows the long-term trend of maximum one-hour NO_2 levels recorded at the Chula Vista monitoring station, 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.

TABLE 8.1-3
Nitrogen Dioxide Levels in San Diego County, Chula Vista Monitoring Station, 1996-2005 (PPM)

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Highest 1-Hour Average	0.079	0.109	0.104	0.100	0.072	0.071	0.093	0.102	0.072	0.071
Annual Average (NAAQS = 0.053 ppm)	0.019	0.019	0.018	0.019	0.017	0.017	0.018	0.018	0.016	0.016
Number of Days Exceeding:										
State Standard (0.25 ppm, 1-hour)	0	0	0	0	0	0	0	0	0	0
Federal Standard (0.053 ppm, annual arithmetic mean)	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).

Figure 8.1-8 shows the historical trend of maximum one-hour NO_2 levels at Chula Vista. Annual average concentrations and trends are shown in Figure 8.1-9.

8.1.3.3 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 8.1-4 shows the California and National Ambient Air Quality Standards for CO, and the maximum one- and eight-hour average levels recorded at the Chula Vista monitoring station during the period 1996-2005.

TABLE 8.1-4
Carbon Monoxide Levels in San Diego County, Chula Vista Monitoring Station, 1996-2005 (PPM)

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Highest 1-hour average	5.7	5.4	4.1	5.4	5.8	5.6	4.3	6.9	3.9	2.8
Highest 8-hour average	3.4	3.8	2.7	2.8	3.1	4.7	2.6	3.4	2.5	2.1
Number of days exceeding:										
State Standard (20 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	0	0	0	0
Federal Standard (9.3 ppm, 8-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).

Trends of maximum one- and eight-hour average CO concentrations are shown in Figures 8.1-10 and 8.1-11, which show that maximum ambient CO levels in Chula Vista have been well below the state standards for the last 10 years.

8.1.3.4 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 8.1-5 presents the state air quality standard for SO_2 and the maximum levels recorded from 1996 through 2005 at the Chula Vista monitoring station. The federal 24-hour average standard is 0.14 ppm; during the period shown, the average SO_2 levels measured at stations in the Project area have been approximately less than 20 percent of the federal standard. Figure 8.1-11 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 8.1-5
Sulfur Dioxide Levels in San Diego County, Chula Vista Monitoring Station, 1996-2005 (PPM)

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Highest 1-Hour Average	0.087	0.081	0.149	0.084	0.045	0.049	0.044	0.03	0.042	0.016
Highest 3-Hour Average	0.066	0.064	0.065	0.047	0.03	0.036	0.028	0.021	0.021	0.009
Highest 24-Hour Average	0.024	0.021	0.02	0.017	0.012	0.015	0.012	0.011	0.016	0.005
Annual Average	0.004	0.003	0.003	0.002	0.003	0.003	0.004	0.004	0.003	0.003
Number of days exceeding:										

TABLE 8.1-5
Sulfur Dioxide Levels in San Diego County, Chula Vista Monitoring Station, 1996-2005 (PPM)

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
State Standard (0.04 ppm, 24-hr)	0	0	0	0	0	0	0	0	0	0
Federal Standard (0.14 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).

8.1.3.5 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, EPA 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 8.1-6 shows the federal and state air quality standards for PM_{10}, maximum levels recorded at the Chula Vista monitoring station during 1996-2005, and geometric 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 8.1-13, and the trend of expected violations of the state 24-hour standard (50 $\mu g/m^3$) is plotted in Figure 8.1-14. 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 and federal standards are shown in Figure 8.1-15. Annual average PM_{10} concentrations are below the federal standard, but above the state standard of 20 $\mu g/m^3$.

TABLE 8.1-6
PM_{10} Levels in San Diego County, Chula Vista Monitoring Station, 1996-2005 ($\mu g/m^3$)

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Highest 24-Hour Average	62	58	40	61	54	66	52	78	45	52
Annual Arithmetic Mean										
(State Standard = 20 $\mu g/m^3$)	27.3	28.3	22.8	—	—	28.6	27.1	27.6	26.5	—
(Federal Standard = 50 $\mu g/m^3$)	27.5	28.4	22.3	—	—	27.8	26.5	27	25.8	27

TABLE 8.1-6
PM_{10} Levels in San Diego County, Chula Vista Monitoring Station, 1996-2005 (µg/m³)

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Number of Days Exceeding:										
State Standard (50 µg/m³, 24-hour)	12.1	11.8	0	—	—	12.1	6.1	12.3	0	—
Federal Standard (150 µg/m³, 24-hour)	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).

Annual average data for 1999 and 2000 not provided because of insufficient data.

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

As discussed previously, the NAAQS for particulates were further revised by EPA 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 Chula Vista monitoring station since 1999, and are presented below.

Table 8.1-7 shows the state and federal air quality standards for $PM_{2.5}$, maximum levels recorded at the Chula Vista monitoring station 1999-2005, and 3-year averages for the same period. The 24-hour average concentrations have exceeded the federal standard only once throughout the monitoring period; however, there are not enough data available to draw conclusions regarding trends in the 3-year average of 98th percentile values. Annual average $PM_{2.5}$ levels have generally been below the federal standard, but above the state standard. 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 8.1-16 and 8.1-17, respectively.

TABLE 8.1-7
$PM_{2.5}$ Levels in San Diego County, Chula Vista Monitoring Station, 1996-2005 (µg/m³)

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Highest 24-Hour Average	—	—	—	47.1	40.5	41	41	41*	32.7	34
Number of Days Exceeding:										
Federal Standard (65 µg/m³, 24-hour)	—	—	—	0	0	0	0	0[a]	0	0
98th Percentile	—	—	—	29.8	32.5	31	36	39.2	30.7	30.2
3-yr Average, 98th Percentile	—	—	—	—	—	31	33	35	35	—
Annual Arithmetic Mean	—	—	—	14.5	13.1	15.5	13.9	14.4	12.2	11.8
3-yr Annual Average (Federal Std = 15 µg/m³) (State Std = 12 µg/m³)	—	—	—	—	—	14	14	14	13	14

TABLE 8.1-7
$PM_{2.5}$ Levels in San Diego County, Chula Vista Monitoring Station, 1996-2005 (µg/m^3)

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005

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).

Note:

* SDAPCD reports that in October 2003, firestorms caused unusually high levels of particulate matter in the San Diego area. A concentration of 239 µg/m^3 was recorded at the Chula Vista monitoring station during the firestorms. This value is considered anomalous, and hence, the District's reported value of 39.2 µg/m^3 is used to represent the background 24-hour concentration of $PM_{2.5}$.Reference: SDCAPCD website, http://www.sdapcd.org/air/reports/smog.pdf, accessed 5/30/06.

8.1.3.7 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 are also monitored in Chula Vista. Table 8.1-8 lists the federal air quality standard for airborne lead and the levels reported in Chula Vista between 1996 and 2005. Maximum quarterly levels are well below the federal standard.[3]

TABLE 8.1-8
Airborne Lead Levels in San Diego County, Chula Vista Monitoring Station, 1996-2005 (µg/m^3)

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Highest Quarterly Average	0.03	0.02	0.02	0.02	0.06	0.07	0.02	0.03	—	—
Number of Days Exceeding										
Federal Standard (1.5 µg/m^3, quarterly)	0	0	0	0	0	0	0	0	—	—

Source: EPA AirData website (http://www.epa.gov/air/data/index.html).

Note: Lead is no longer monitored at the Chula Vista site.

8.1.4 Affected Environment

The EPA 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 EPA Region 9, which has its offices in San Francisco. Region 9 is responsible for the local administration of EPA programs for California, Arizona, Nevada, Hawaii, and certain Pacific trust territories. EPA's activities relative to the California air pollution control program focus principally on reviewing California's submittals for the State Implementation

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

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
- 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 Project. The air agencies having permitting authority for this Project are shown in Table 8.1-9. 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 AFC as an application for a Determination of Compliance.

TABLE 8.1-9
Air Quality Agencies

Agency	Authority	Contact
EPA Region 9	Permit issuance and oversight, enforcement	Gerardo Rios, Chief Permits Office EPA Region 9 75 Hawthorne Street San Francisco, CA 94105 (415) 744-1259

TABLE 8.1-9
Air Quality Agencies

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

8.1.4.1 Laws, Ordinances, Regulations, and Standards (LORS)

Requirements of federal, state, and local jurisdictions are discussed in the following Sections 8.1.4.1.1, 8.1.4.1.2, and 8.1.4.1.3, respectively. Compliance with each of these requirements is addressed in Section 8.1.6.

8.1.4.1.1 Federal

The EPA implements and enforces the requirements of many of the federal environmental laws. EPA 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 EPA with the legal authority to regulate air pollution from stationary sources such as SBRP. EPA 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)
- National Emission Standards for Hazardous Air Pollutants (NESHAPs)

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 EPA Region 9.

As discussed in more detail below, the SBRP is a replacement power plant for the existing SBPP, and emissions increases will be below PSD significance thresholds. Hence, the SBRP is not subject to the PSD program.

Administering Agency: EPA Region 9.

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 EPA Region 9 oversight.

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 EPA Region 9 oversight.

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 EPA as requiring a Title V permit. SDAPCD has received delegation authority for this program.

Administering Agency: SDAPCD, with EPA Region 9 oversight.

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 EPA has established 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 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 SO_2) emissions from turbines, and Subpart Da, Standards of Performance for Electric Utility Steam Generating Units for which Construction

Commenced after September 18, 1978, which limits NO_2, SO_2, particulate matter and mercury emissions from the heat recovery steam generators (HRSGs).

Administering Agency: SDAPCD, with EPA Region 9 oversight.

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 EPA 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 combustion turbines, which limit formaldehyde emissions from turbines, are potentially applicable to a new power plant Project. However, as discussed further below, the combustion 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 EPA Region 9 oversight.

8.1.4.1.2 State

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 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 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

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

[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.

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 8.1.4.1.3.

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

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.

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

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

Nuisance Regulation
Authority: CA Health & Safety Code §41700

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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 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

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

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)

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

8.1.4.1.3 Local
As discussed in the Section 8.4 Land Use, property owned by the San Diego Unified Port District (Port) may not be governed by local LORS that would be applicable to the site absent Port ownership. However, the Port seeks to apply local standards to its property except where to do so would violate a specific Port policy. Accordingly, this section reviews compliance with all relevant local LORS without regard to their applicability as a matter of law.

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 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 to do the following:

- Develop plans for meeting the NAAQS and California ambient air quality standards

- Develop control measures for non-vehicular sources of air pollution necessary to achieve and maintain both state and federal air quality standards
- Implement permit programs established for the construction, modification, and operation of sources of air pollution
- Enforce air pollution statutes and regulations governing non-vehicular sources
- Develop programs to reduce emissions from indirect sources

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 EPA Region 9 and CARB oversight.

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 EPA Region 9 and CARB oversight.

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 Project by the CEC.

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)

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 8.1-10.

TABLE 8.1-10
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
PM10	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 EPA 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 8.1-10. 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 EPA for such emission unit class or category unless demonstrated to not be achievable; or
- BACT

Emission Offsets

A new or modified source resulting in emission increases above the major source or major modification emission thresholds, as defined by the emission thresholds shown in

Table 8.1-11, must offset emission increases of 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, and as a state nonattainment area for both the ozone 1-hour standard and PM_{10} 24-hour standard. Therefore, emissions of NO_x and VOCs, as precursors to ozone, direct emissions of PM_{10}, and emissions of SO_x as precursors to PM_{10} 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 8.1-11
SDAPCD Offset Emission Thresholds

Pollutant	Major Source Threshold [a], tpy	Major Modification Threshold [b], tpy
NO_x	50	25
SO_x	100	40
CO	N/A[c]	N/A[c]
VOC	50	25
PM_{10}	100	15

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 is an attainment pollutant, and hence, is not subject to offset requirements. Although the District is an attainment area for SO_2, SO_x emissions are subject to offset requirements because they are precursors to the nonattainment pollutant, PM_{10},.

Air Quality Impact Analysis

An AQIA must be conducted to evaluate impacts on ambient air quality of emission increases from new or modified facilities exceeding any AQIA threshold shown in Table 8.1-12. Project emissions must not cause a new exceedance or contribute significantly to an existing exceedance of any ambient air quality standard.

TABLE 8.1-12
SDAPCD AQIA Emission Thresholds *

	Emission Thresholds		
Pollutant	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

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

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 8.1-13. 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 SBRP will use T-BACT.

TABLE 8.1-13
SDAPCD Health Risk Thresholds

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

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 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.

Prevention of Significant Deterioration

Rule 20.3 (New Source Review – Major Stationary Sources and PSD Sources) implements the federal NSR and PSD programs.[6] The PSD requirements apply, on a pollutant-specific basis, to any project that is a new major stationary source or a major modification to an existing major stationary source. A major source is a listed facility (one of 28 PSD source categories listed in Rule 20.1, NSR General Provisions) that emits at least 100 tpy, or any other facility that emits at least 250 tpy. The PSD requirements also apply to any project expected to have a significant impact upon Class I or Class II areas or significant emissions of non-criteria pollutants. The rule contains the following PSD elements:

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

The Project is not expected to result in emissions exceeding the applicable PSD thresholds, and, therefore, PSD will not apply to this Project. If PSD were applicable to the Project, then the elements would be applied as follows:

Air Quality Monitoring - At its discretion, SDAPCD 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

[6] Currently, the PSD program in San Diego County is implemented by EPA Region 9.

air quality monitoring data must be collected as deemed necessary by SDAPCD to characterize the impacts of project emissions on ambient air quality.

Best Available Control Technology - BACT must be applied to any modified major source to minimize the emissions increase of those pollutants exceeding the PSD emission thresholds. BACT was previously defined in Section 8.1.4.1.3.

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 8.1-14.

TABLE 8.1-14
PSD Class II Increments *

Pollutant	Averaging Period	Allowable Increment (µg/m3)
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

* SDAPCD Regulation II, Rule 20.1, Table 20.1-2.

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 must be characterized if there is a significant emission increase associated with the new or modified PSD source.

Growth, Visibility, Soils, and Vegetation Impacts - Air quality impacts associated with growth induced by a new power plant project must be analyzed. Impairment to visibility, soils, and vegetation resulting from PSD source emissions as well as associated commercial, residential, industrial, and other growth must be analyzed. Cumulative impacts to local ambient air quality must also be analyzed.

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. Because the proposed SBRP is scheduled to commence operation approximately during the third quarter of 2009, the application for the acid rain permit will be submitted to the SDAPCD by the third quarter of 2007.

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.

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.

Subpart KKKK (Standards of Performance for Stationary Combustion Turbines) 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 SBRP. Subpart KKKK limits NO_x and SO_2 emissions from new gas turbines based on power output. The limits for turbines greater than 30 MW are 0.39lb NO_x per MW-hr and 0.58lb SO_2 per MW-hr.

SDAPCD Prohibitory Rules

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

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.

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.

Rule 52 – Particulate Matter Emission Standards. Prohibits PM emissions in excess of 0.10 grains per dry standard cubic foot (gr/dscf).

- **Rule 53 – Combustion Contaminants.** Prohibits sulfur emissions, calculated as SO_2, in excess of 0.05 percent 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.
- **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.
- **Rule 69 – Electrical Generating Steam Boilers.** Limits NO_x and NH_3 emissions from electrical generating steam boilers rated greater than or equal to 100 MMBtu/hr to BACT levels.
- **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).

TABLE 8.1-15
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 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.	EPA	PSD Permit for a New Major Source or major modification.	Permit to be obtained before start of construction.	8.1.6.1
CAA §171-193, 42 USC §7501 et seq. (New Source Review)	Requires NSR facility permitting for construction or modification of specified stationary sources. NSR applies to pollutants for which ambient concentration levels are higher than NAAQS.	SDAPCD with EPA oversight	Determination of Compliance (DOC) with conditions limiting emissions.	Agency approval to be obtained before start of construction.	8.1.6.1
CAA §401 (Title IV), 42 USC §7651 (Acid Rain Program)	Requires reductions in NO_x and SO_2 emissions.	SDAPCD with EPA oversight	Acid Rain program requirements included in Determination of Compliance, Permit to Operate, and Title V permit.	Meet compliance deadlines listed in regulations.	8.1.6.1
CAA §501 (Title V), 42 USC §7661 (Federal Operating Permits Program)	Establishes comprehensive permit program for major stationary sources.	SDAPCD with EPA oversight	Title V permit after review of application.	Permit application to be submitted within 12 months after commencement of operation.	8.1.6.1
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 EPA oversight	DOC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	8.1.6.1

TABLE 8.1-15
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.	8.1.6.2
California Public Resources Code §25523(a); 20 CCR §§1752, 2300-2309 (CEC & CARB Memorandum of Understanding)	Requires that CEC's decision on AFC include requirements to assure protection of environmental quality; AFC required to address air quality protection.	CEC	Final Certification with conditions limiting emissions.	SDAPCD issuance of DOC precedes CEC approval of AFC.	8.1.6.2
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.	8.1.6.2
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.	8.1.6.3
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 EPA oversight	DOC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	8.1.6.3
SDAPCD Rule 1414 (Title V Applications)	Implements operating permits requirements of CAA Title V.	SDAPCD with EPA oversight	Issues Title V permit after review of application.	Agency approval to be obtained before start of construction.	8.1.6.3

TABLE 8.1-15
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 EPA 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.	8.1.6.3
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.	8.1.6. 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.	8.1.6.3.3
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.	8.1.6.3.3
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.	8.1.6.3.3
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.	8.1.6.3.3
SDAPCD Rule 69 (Electrical Generating Steam Boilers)	Limits NO_x and NH_3 emissions from electrical generating steam boilers.	SDAPCD with CARB oversight	DOC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	8.1.6.3.3
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.	8.1.6.3.3

TABLE 8.1-15
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 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.	Agency approval to be obtained before start of construction.	8.1.6.3.3
SDAPCD Regulation X (New Source Performance Standards: 40 CFR 60, Subpart Da, Boilers; Subpart KKKK, Stationary Gas Turbines)	Requires monitoring of fuel, other operating parameters; limits NO_x and 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.	8.1.6.3.3

- **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 8.1-15 along with identification of the section that discusses compliance with each requirement.

8.1.4.1.3 Attainment Status

Based on the measured existing air quality described in Section 8.1.3, the ambient air quality standards presented in Table 8.1-1, and the responsibilities of the EPA and the CARB discussed in Sections 8.1.4.1.1 and 8.1.4.1.2, respectively, the resulting attainment status of the San Diego Air Basin is shown in Table 8.1-16.

TABLE 8.1-16
Ambient Air Quality Standard Attainment Status in San Diego Air Basin

Pollutant	Averaging Time	California	National
Ozone	1 hour	Nonattainment	Attainment
	8 hours	Designation pending	Nonattainment
Carbon Monoxide	8 hours	Attainment	Attainment
	1 hour	Attainment	Attainment
Nitrogen Dioxide	Annual Average	No CAAQS	Attainment
	1 hour	Attainment	No NAAQS
Sulfur Dioxide	Annual Average	No CAAQS	Attainment
	24 hours	Attainment	Attainment
	3 hours	No CAAQS	Attainment
	1 hour	Attainment	No NAAQS
Respirable Particulate Matter (10 Micron)	Annual Arithmetic Mean	Nonattainment	Unclassifiable
	24 hours	Nonattainment	Unclassifiable
Fine Particulate Matter (2.5 Micron)	Annual Arithmetic Mean	Nonattainment	Attainment
	24 hours	No CAAQS	Attainment
Sulfates	24 hours	Attainment	No NAAQS
Lead	30 days	Attainment	No NAAQS
	Calendar Quarter	No CAAQS	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

8.1.5 Environmental Analysis

Ambient air quality impact analyses for the SBRP have been conducted to satisfy the SDAPCD, EPA, and CEC requirements for analysis of impacts from criteria pollutants (NO_2, CO, PM_{10}, and SO_2) and noncriteria pollutants during Project construction, operation, and demolition. The analyses cover each phase of the Project. Section 8.1.5.1 gives an overview of the analytical approach. Section 8.1.5.2 presents the emissions for operation of the SBRP, and Section 8.1.5.3 gives the ambient air quality impacts of operation. Section 8.1.5.4 gives the analysis for construction of the SBRP, construction of the relocated South Bay Substation, and demolition of the existing SBPP.

8.1.5.1 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 SBRP 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 procedure: 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.

8.1.5.1.1 Emitting Units

The new SBRP combined-cycle combustion gas turbine plant will be made up of two GE 7FA combustion turbine generators (CTGs) arranged as two CTGs-on-one steam turbine. Each gas turbine will be followed by a HRSG equipped for duct firing. The resulting combined-cycle unit will have a nominal maximum rating of 500 MW without duct firing at an ambient temperature of 62°F. Duct firing will be used infrequently (typically less than a 10 percent capacity factor on an annual basis) to generate peaking power at SBRP; the plant's peak capacity with duct firing is a nominal 620 MW.

Each gas turbine will be equipped with dry low- NO_x combustors and a 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 combustion turbines are summarized in Table 8.1-17.

TABLE 8.1-17
New GE 7FA Combined-Cycle Combustion Turbine Design Specifications

Manufacturer	General Electric
Model	7FA
Fuel	Natural gas
Design Ambient Temperature [a]	27 °F
Maximum Turbine Heat Input Rate	1,878.6 MMBtu/hr @ HHV (each turbine)
Maximum Turbine Power Generation Rate	184 MW (each turbine)
Stack Exhaust Temperature [a]	188 °F (after HRSG)
Exhaust Flow Rate [a]	1,083,216 acfm (without duct firing)

TABLE 8.1-17
New GE 7FA Combined-Cycle Combustion Turbine Design Specifications

Exhaust O_2 Concentration, dry volume [a]	13.92%
Exhaust CO_2 Concentration, dry volume [a]	4.02%
Exhaust Moisture Content, wet volume [a]	7.43%
Emission Controls	Dry Low- NO_x Combustor and SCR (2.0 ppmvd NO_x @ 15% O_2); oxidation catalyst (4.0 ppmv CO); combustion controls (2.0 ppmv VOC @ 15% O_2)

[a] Low-temperature scenario corresponds to maximum heat input rate.

A natural gas-fueled auxiliary boiler will be used to facilitate startup of the steam turbine. The maximum heat input capacity of the boiler is 38 MMBtu/hr, and emissions will be limit to 9 ppmc for NO_x and 50 ppmc for CO. The use of natural gas as the sole fuel will minimize emissions of VOC, SO_x and PM-10. As discussed in Section 8.1.6.3.1, the boiler emissions are not subject to BACT. A typical analysis for the natural gas fuel to be used by both the turbines and the auxiliary boiler is summarized in Table 8.1-18.

TABLE 8.1-18
Nominal Fuel Properties – Natural Gas

Component Analysis		Chemical Analysis	
Component	**Average Concentration, Volume**	**Constituent**	**Percent by Weight**
Methane (CH_4)	95.85 %	Carbon (C)	72.80 %
Ethane (C_2H_6)	1.81 %	Hydrogen (H)	23.79 %
Propane (C_3H_8)	0.32 %	Nitrogen (N)	1.08 %
Butane C_4H_{10})	0.09 %	Oxygen (O)	2.33 %
Pentane (C_5H_{12})	0.03 %	Sulfur (S)	0.25 gr/100 scf (annual average)
Hexane (C_6H_{14})	0.02 %	Higher Heating Value	1,018 Btu/scf
Nitrogen (N_2)	0.65 %		22,783 Btu/lb
Carbon Dioxide (CO_2)	1.23 %		
Sulfur (S)	<0.00 %		

The SBRP will have a Diesel-fueled emergency fire water pump engine rated at 240 horsepower with a maximum fuel consumption rate of 10.3 gallons per hour.

8.1.5.1.2 Facility Operations

Combustion turbine performance specifications were developed for three temperature scenarios: extreme hot temperature (108°F), annual average temperature (62°F), and extreme low temperature (27°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 full-load (with duct firing) operation of both CTGs and the auxiliary boiler for

24 hours. For the purpose of estimating maximum annual emissions from the CTGs/HRSGs, auxiliary boiler and Diesel-fueled emergency fire water pump engine, a number of possible operating scenarios were evaluated. For each pollutant and averaging period, the emissions from the scenario that generated the highest emission rate was used to characterize Project emissions.

It is anticipated that the auxiliary boiler would be operated a maximum of 2 hours for each turbine hot start and 24 hours for each turbine cold start. It is anticipated that the Diesel fire pump engine will operate no more than 50 hours per year, and no more than one hour per day, for testing and maintenance.

Heat input limits, as summarized in Table 8.1-19, correspond to the proposed unit and facility emission limits.

Emissions and operating parameters for the turbine under various loads and ambient conditions are shown in Appendix 8.1B, Table 8.1B-1. Emissions and operating parameters for the auxiliary boiler are shown in Appendix 8.1B, Table 8.1B-2.

TABLE 8.1-19
Maximum Facility Fuel Use (MMBtu)*

Period	Auxiliary Boiler	Gas Turbines and Duct Burners (each)	Total Fuel Use (all units)
Per Hour	38.0	2,453	4,943
Per Day	912.5	58,872	118,656
Per Year	63,265	16,915,580	33,894,426

Notes:

* MMBtu: million Btu

8.1.5.2 Emissions Calculations

This section presents calculations of emissions increases from the proposed new SBRP generating and auxiliary equipment and of the emissions reductions from the shutdown of the existing SBPP for the purpose of demonstrating rule compliance. Tables containing the detailed calculations are included in Appendix 8.1B.

8.1.5.2.1 Criteria Pollutant Emissions: SBRP

The gas turbine, duct burner, auxiliary boiler and Diesel fire pump engine emission rates have been calculated from vendor data, Project design criteria, and established emission calculation procedures. The emission rates for the CTGs and the auxiliary boiler are shown in the following tables. The emission rates for the Diesel fire pump engine are shown in Tables 8.1B-3 of Appendix 8.1B.

CTG Emissions during Normal Operations. Emissions of NO_x, CO, and VOC were calculated from emission limits (in ppmv @ 15 percent 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.

Maximum emissions are based on the highest heat input rate shown in Table 8.1-19.

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 results of source tests of similar turbines. $PM_{2.5}$ 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 8.1-20. The BACT analysis upon which the emission factors are based is presented in Appendix 8.1C and summarized in Section 8.1.6.3.

TABLE 8.1-20
Maximum hourly Emission Rates: CTGs AND HRSGS

Pollutant	ppmvd @ 15% O_2	lb/MMBtu	lb/hr
Each Gas Turbine, without Duct Firing[a]			
NO_x	2.0[b]	0.0073	13.6
SO_2[c]	0.139	0.0021	4.0
CO	4.0	0.0088	16.6
VOC	2.0	0.0025	4.75
PM_{10}[d]	n/a	0.0042	7.75
Each Gas Turbine, with Duct Firing[e]			
NO_x	2.0[b]	0.0073	17.8
SO_2[c]	0.139	0.0021	5.2
CO	4.0	0.0088	21.6
VOC	2.0	0.0025	6.2
PM_{10}[d]	n/a	0.0042	10.3

a Emission rates shown reflect the highest value with no duct firing 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 Based on maximum natural gas sulfur content of 0.75 grains/100 scf.

d 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.

e Emission rates shown reflect the highest value with duct firing at any operating load. For NO_x, CO and VOC, emission levels exclude startups and shutdowns.

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 conditions of certification:

> Compliance with the NO_x emission limitations shall not be required during short-term excursions limited to a cumulative total of 10 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 2.5 ppmvd @ 15 percent O_2. The maximum 3-hour average NO_x concentration for periods that include short-term excursions shall not exceed 30 ppmvd @ 15 percent O_2. Examples of transient load conditions include but are not limited to the following: (1) rapid combustion turbine load changes; and (2) initiation/ shutdown of HRSG duct burners. 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 startup or shutdown are shown in Table 8.1-21. 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 turbine operation. The maximum hourly startup emission rates for the turbines are used in developing the maximum hour facility inventory, which is subjected to the air dispersion modeling for each hour in the 5-year meteorological dataset. The average hourly startup emission rates for the turbines represent the full 6-hour long cold start[7], while the maximum emission rate represents the worst hour. The emission rate during a 1-hour hot start is enveloped by the maximum hourly rate.

TABLE 8.1-21
CTG Startup and Shutdown Emission Rates

	NO_x	CO	VOC
Startup and Shutdown, maximum, lb/hr, per turbine	320*	2000[a]	32
Startup and Shutdown, average, lb/hr, per turbine	80	900	16

Notes:

* Maximum hourly emissions during a startup will be managed to assure that the above limits are not exceeded regardless of whether one or two turbines are in startup mode.

Criteria Pollutant Emissions: Auxiliary Boiler. Emissions from the small auxiliary steam boiler are shown in Table 8.1-22. The auxiliary boiler will be used only to facilitate CTG startups and therefore is expected to have very limited operation.

[7] A startup is considered cold if the turbine is offline at least 72 hours before the start.

TABLE 8.1-22
Maximum Hourly Emission Rates: Auxiliary Boiler

Pollutant	ppmvd @ 15% O_2	lb/MMBtu	lb/hr
NO_x	9.0	0.011	0.41
SO_2[a]	0.139	0.0021	0.08
CO	50	0.037	1.39
VOC	9.53	0.0040	0.15
PM_{10}[b]	n/a	0.005	0.19

[a] Based on maximum natural gas sulfur content of 0.75 gr/100 scf.

[b] 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.

SBRP Criteria Pollutant Emissions Summary. The calculation of maximum facility emissions shown in Table 8.1-23 is based on the CTG and auxiliary boiler emission rates shown in Tables 8.1-20, 8.1-21 and 8.1-22, the fuel energy use limitations in Table 8.1-19, and the following assumptions:

1. Each CTG may operate up to 24 hours per day.
2. Each CTG may have up to one 6-hour cold start per day, yielding a total of 12 hours of startup activity per day for two CTGs.
3. Worst-case annual emissions, depending on the pollutant and operating schedule.

The assumptions used in calculating maximum hourly, daily and annual emissions from the new facility are shown in Appendix 8.1B, Tables 8.1B-4 and 8.1B-5.

TABLE 8.1-23
maximum Emissions from new equipment

	Pollutant				
Emissions/Equipment	**NO_x**	**SO_2**	**CO**	**VOC**	**PM_{10}**
Maximum Hourly Emissions[a]					
Turbines and Duct Burners[a]	320[a]	10.34	2,000[a]	32[a]	20.6
Auxiliary Boiler	0.41	0.08	1.4	0.15	0.19
Diesel Fire Pump Engine[b]	n/a	0.003	n/a	n/a	0.074
Total, pounds per hour	**320.4**	**10.4**	**2,001**	**32.2**	**20.9**
Maximum Daily Emissions[a]					
Turbines and Duct Burners	2,559.8	248.1	11,579	415.1	493.5
Auxiliary Boiler	9.9	n/a[c]	33.4	3.6	n/a[c]
Diesel Fire Pump Engine	2.3	0.003	0.31	0.26	0.074
Total, pounds per day	**2,569.7**	**248.1**	**11,612.5**	**418.8**	**493.6**

TABLE 8.1-23
maximum Emissions from new equipment

	Pollutant				
Emissions/Equipment	**NO_x**	**SO_2**	**CO**	**VOC**	**PM_{10}**
Maximum Annual Emissions[d]					
Turbines and Duct Burners	103.8	11.01	543.5	39.6	69.2
Auxiliary Boiler	0.16	n/a[c]	1.16	n/a[c]	n/a[c]
Diesel Fire Pump Engine	0.06	<0.01	0.01	0.01	<0.01
Total, tons per year	**104.0**	**11.0**	**544.6**	**39.6**	**69.2**

[a] Maximum hourly, daily and annual NO_x, VOC and CO emission rates include emissions during startup. Maximum hourly emissions for both NO_x and CO will be managed to assure that these limits are met whether one or two turbines are in startup mode.

[b] The Diesel-fueled fire water pump engine will not be operated during a turbine startup, but may be operated during an hour of supplemental duct firing at the extreme cold ambient temperature (27°F) when maximum SO_2 and PM_{10} emissions may occur.

[c] Maximum daily and annual SO_2 and PM_{10}, and maximum annual VOC, emissions occur under an operating scenario that does not include startups, and the auxiliary boiler will not operate in a scenario in which there are no startups.

[d] Maximum annual NO_x and CO emission rates include emissions during startup

The maximum hourly, daily and annual emissions in Table 8.1-23 are used in the air dispersion modeling to calculate the maximum potential ground-level concentrations contributed by the Project to the ambient air.

8.1.5.2.2 Emissions Reductions from the Shutdown of SBPP

The existing South Bay Power Plant Units 1 through 4 and the combustion turbine will be retired following the successful commissioning of SBRP. The emissions reductions from the shutdown of the existing units are based on historical baseline operations and emissions during the two years immediately preceding the filing of the AFC: 2004 and 2005. Calculation of the historical baseline emissions for SBPP is shown in Appendix 8.1B, Tables 8.1B-6 and 8.1B-7.

8.1.5.2.3 Evaluation of Potential PSD Applicability

For the purposes of determining applicability of the PSD program requirements, the following regulatory procedure is used. Proposed SBRP emissions are compared with regulatory significance thresholds to determine whether the facility is major and thus may be subject to PSD. If the facility emissions exceed these thresholds, it is a major facility. Then the emissions increases due to the proposed modification are compared with the significance thresholds to determine whether the modification is major. The comparison in Table 8.1-24 indicates that the new SBRP, like the existing SBPP, would be a major source because its emissions of NO_x and CO exceed the 100 ton per year major source threshold. However, as shown in Table 8.1-25, because the SBRP replaces the SBPP, and the net emission increases do not exceed the thresholds, the SBRP is not a major modification. Hence, the SBRP is not subject to the PSD regulatory program.

TABLE 8.1-24
Comparison of SBPP and SBRP emissions with PSD major source thresholds

Pollutant	Existing SBPP Baseline Emissions (tpy)	Maximum Annual SBRP Emissions (tpy)	PSD Major Source Threshold (tpy)	Is Facility a Major Source?
NO_2	106.5	104.0	100	Yes
SO_2	6.9	11.0	100	No
CO	763.5	544.6	100	Yes
PM_{10}	69.3	69.2	100	No

TABLE 8.1-25
Comparison of SBRP emissions increases with PSD Significant Emission Levels

Pollutant	Existing SBPP Baseline Emissions (tpy)	Maximum Annual SBRP Emissions (tpy)	Net Increase (Decrease) in Emissions (tpy)	PSD Emission Increase Significance Threshold (tpy)	Are Emission Changes Significant?
NO_2	106.5	104.0	(2.5)	40	No
SO_2	6.9	11.0	4.1	40	No
CO	763.5	544.6	(218.9)	100	No
PM_{10}	69.3	69.2	(0.1)	15	No

8.1.5.2.4 Non-Criteria Pollutant Emissions

Maximum hourly and annual noncriteria pollutant (toxic air contaminant [TAC]) emissions were estimated for the proposed CTGs and HRSGs, auxiliary boiler, and emergency fire pump. Maximum proposed TAC emissions for the CTGs, HRSGs and auxiliary boiler are shown in Table 8.1-26, and were calculated from the heat input rate (in MMBtu/hr and MMBtu/yr), emission factors (in lb/MMscf), and the nominal higher heating value for the natural gas of 1018 Btu/scf. Hourly and annual emissions were based on the heat input rates shown in Table 8.1-19. The ammonia emission factor was derived from an ammonia slip limit of 10 ppmv @ 15 percent O_2. Although the turbines/HRSGs will be equipped with oxidation catalyst systems, only the acrolein and benzene emission factors reflect any control effectiveness. These factors are based on test data rather than any assumption regarding catalyst control efficiency.

Other emission factors were obtained from AP-42 (Table 3.1-3, 4/00, and Table 3.4-1 of the Background Document for Section 3.1), from the ARB's CATEF database for combustion turbines, and from Ventura County APCD for natural gas-fired boilers. As Diesel particulate matter is considered to be a HAP, all of the PM_{10} emissions from the Diesel fire pump engine are also included. (These are shown in Table 8.1-23, with supporting calculations shown in Appendix 8.1B, Tables 8.1B-3, 8.1B-4 and 8.1B-5.) The relative importance of these non-criteria pollutant emissions is determined by the potential health risks calculated in the screening health risk assessment (see Section 8.1.5.4).

Detailed calculations of the TAC emissions from the facility are shown in Appendix 8.1B, Table 8.1B-8.

As emissions of each individual HAP are below 10 tons per year and total HAP emissions are below 25 tons per year, the turbines are not subject to the Maximum Achievable Control Technology (MACT) requirements of 40 CFR Part 63, Subpart YYYY.

TABLE 8.1-26
Non-criteria Pollutant Emissions for the Project

Compound	Emission Factor (lb/mmcf)	Maximum Proposed Emissions	
		lb/hr	tpy
Gas Turbines and HRSGs (two units)[a]			
Ammonia[b,c]	10 ppm	65.8	226.9
Propylene[c]	0.771	3.72	12.8
Acetaldehyde	0.0408	0.197	0.68
Acrolein	0.00369	1.78×10^{-2}	0.061
Benzene	0.00333	1.60×10^{-2}	0.055
1,3-Butadiene	0.000439	2.12×10^{-3}	7.3×10^{-3}
Ethylbenzene	0.0326	0.157	0.54
Formaldehyde	0.0635	1.77	6.10
Hexane	0.259	1.25	4.30
Naphthalene	0.00133	8.00×10^{-3}	0.028
PAHs[d]	0.000165	6.31×10^{-4}	2.18×10^{-3}
Propylene Oxide	0.0296	0.143	0.49
Toluene	0.133	0.64	2.21
Xylene	0.0653	0.32	1.09
Total HAPs			15.6
Auxiliary Boiler[e]			
Propylene[c]	0.0155	5.79×10^{-4}	4.82×10^{-4}
Acetaldehyde	0.0009	3.36×10^{-5}	2.80×10^{-5}
Acrolein	0.0008	2.99×10^{-5}	2.49×10^{-5}
Benzene	0.0017	6.35×10^{-5}	5.28×10^{-5}
Ethylbenzene	0.0020	7.47×10^{-5}	6.21×10^{-5}
Formaldehyde	0.0036	1.34×10^{-4}	1.12×10^{-4}
Hexane	0.0013	4.86×10^{-5}	4.04×10^{-5}
Naphthalene	0.00030	1.12×10^{-5}	9.32×10^{-6}
Polycyclic Aromatics	0.00010	3.73×10^{-6}	3.11×10^{-6}
Toluene	0.0078	2.91×10^{-4}	2.42×10^{-4}
Xylene	0.0058	1.80×10^{-4}	1.80×10^{-4}
Total HAPs			1.31×10^{-3}

[a] Emission factors obtained from AP-42 and the CATEF database. See text.

[b] Based on an exhaust NH_3 limit of 10 ppmv @ 15% O_2.

[c] Ammonia and propylene are not HAPs.

[d] Carcinogenic PAHs only; naphthalene considered separately.

[e] Emission factors obtained from Ventura County APCD.

8.1.5.3 Air Quality Impact Analysis

The air quality impact analysis for the SBRP subjects the emissions presented above to ambient air dispersion modeling and health risk assessment. In addition, the CEC requires various ambient air quality impact analyses for CEQA review, and those analyses are presented in this section.

8.1.5.3.1 Air Quality Modeling Methodology

An assessment of impacts from the SBRP on ambient air quality has been conducted using the EPA-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 SBRP. 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 EPA[8] and CARB[9], 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.

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

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

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 (assumed to be 85.2 meters for SBRP - the closest distance between the beach along San Diego Bay and the westernmost turbine stack).

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

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

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 EPA 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 EPA 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:

- Screening modeling procedures
- Refined air quality impact analysis
- Existing ambient pollutant concentrations and preconstruction monitoring

- Results of the ambient air quality modeling analyses
- PSD increment consumption

Modeling for this Project was performed in accordance with the modeling protocol submitted to and approved by the District and the CEC staff. The modeling procedures used for each type of modeling analysis are described in more detail in the following sections.

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

The EPA-approved AERMOD[10] 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, 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 five years of actual meteorological data recorded at San Diego International Airport (Lindbergh Field). AERMOD replaces the previously EPA-recommended model, Industrial Source Complex, Version 3 (ISC3), which has been used for many years for air quality impact analyses in CEC AFCs.

The SCREEN3 model was used to evaluate 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 auxiliary boiler and emergency fire water pump engine are so small compared to the turbine emissions, they are excluded from this single-source model used for the fumigation analysis. The fumigation analysis is discussed in more detail below.

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 screening conditions that produce the highest ambient levels, and applies the analysis to all the sources (i.e., turbines, auxiliary boiler and emergency fire water pump engine).

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

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

Briggs (1972) for cases where the stack exit velocity is less than 1.5 times the wind speed at stack top, were selected per EPA guidance.

AERMOD uses hourly meteorological data to characterize plume dispersion. At this time, Lindbergh Field meteorological data has been found by the SDAPCD to be representative, based on the proximity of the meteorological monitoring site to the Project area, the complexity of the terrain, the exposure of the meteorological monitoring site, and the period of time during which the data are collected. It is anticipated that the SDAPCD will be developing an AERMOD-compatible meteorological dataset from its Chula Vista monitoring station, which is closer to the proposed Project site; however, the Chula Vista data set was not available from the SCAPCD in time to be used to prepare this ambient air quality impact analysis. 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 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 95086) 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 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. EPA guidance[11] 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)

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

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 turbine stack, the nearby (influencing) structure is the existing HRSG structure, which is 94 feet (28.65 m) high, 132 feet (40.3 m) long and 38.8 feet (11.8 m) wide. Thus H = L = 94 feet, and Hg = 2.5 * 94 = 235 feet (71.6 m). The proposed stack height of 125 feet (38.1 m) does not exceed GEP stack height of 235 feet (71.6 m), and consequently satisfies the EPA 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 8.1D, Table 8.1D-1 and Figure 8.1D-1.

Screening Procedures and Unit Impact Modeling

Screening modeling was performed to select the worst-case turbine operating mode for each pollutant and averaging period. The modeling used emissions data based on an average temperature (62°F), maximum temperature (108°F) and minimum temperature (27°F), and at nominal minimum and maximum turbine operating load points of 50 and 100 percent. The determination of the worst-case 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 turbine screening modeling, each turbine was modeled with a unit emission rate of 1 gram per second to obtain maximum 1-hour, 8-hour and annual average concentration to emission rate (X/Q in units of μg/m3 per g/s) values. These X/Q values were multiplied by the actual emission rate in grams per second from the turbine to calculate concentrations of CO and NO2 in μg/m3. Stack characteristics used in the screening modeling analysis are shown in Table 8.1D-2 of Appendix 8.1D.

The results of the screening analysis are shown in the Appendix 8.1D, Table D-3. The stack parameters and emission rates corresponding to the operating case that produced the maximum impacts in the turbine screening analysis for each pollutant and averaging period were used in the refined modeling analysis to evaluate the impacts of the new turbines. For the unit impacts analysis, the CEC staff's recommendation regarding receptor grid spacing has been followed.[12]

[12] 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 km from the site.

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 equipment at the new facility are shown in Appendix 8.1D, Table D-4. 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 for each site plan would be located. A map showing the layout of the receptor grid around the site plan is presented in Appendix 8.1D, Figure D-2.

Terrain features were taken from USGS DEM data and 7.5-minute quadrangle maps of the area including Point Loma, Point Loma OEW, National City, Jamul Mountains, Imperial Beach, Imperial Beach OEW, and Otay Mesa. Receptors were placed in a mixed 250-meter resolution coarse grid and a semi-coarse near-facility grid at 100-meter resolution. The number of mixed receptors is 9,208. In addition, adjacent to the fenceline, one tier of 244 receptors was established at 25-meter resolution. The fine receptor grids contain 24,763 receptors at 50-meter resolution.

8.1.5.3.2 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 EPA guidance.

The SCREEN3 model was used to evaluate maximum ground-level concentrations for short-term averaging periods (24 hours or less). Guidance from the EPA[13] was followed in evaluating fumigation impacts. The maximum fumigation impact from the turbine occurred approximately 11.4 to 15.6 km from the facility. This analysis, which is shown in more detail in Appendix 8.1D, Table D-5, 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

[13] EPA, October 1992.

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 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 8.1D, Table 8.1D-6.

Turbine Startup

Facility impacts were also evaluated during simultaneous startup of the two new turbines with concurrent operation of the auxiliary boiler to evaluate short-term impacts under worst-case startup emissions. Turbine and auxiliary boiler exhaust parameters used to characterize turbine exhaust during startup and the CO and NO_x emission rates are shown in Appendix 8.1D, Table 8.1D-7.

Ozone Limiting

In accordance with the procedure followed for similar projects, one-hour NO_2 impacts during Project construction and Project operation were modeled using the ozone-limiting method (OLM).

The OLM uses hourly ozone data to perform ozone-limiting calculations on individual plumes on an hour-by-hour basis. In accordance with the procedures followed for similar projects, the most complete available year of meteorological data and ozone data collected at the nearest monitoring station (Lindbergh Field for meteorological data, Chula Vista for ozone data) were used for this analysis. Annual NO_x impacts were converted to NO_2 using the EPA-guidance Ambient Ratio Method and the nationwide default conversion rate of 0.75.

Turbine Commissioning

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 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 78 days, but simultaneous testing of the two turbines for some loads may reduce the overall length of the commissioning period. There are several high emissions scenarios possible during commissioning. The first is the period prior to SCR system installation, when the combustor is being tuned. Under this scenario, NO_x emissions would be high because the NO_x emissions control system would not be functioning and because the combustor would not be tuned for optimum performance. CO emissions would also be high because combustor performance would not be optimized. The

second high emissions scenario may occur when the combustor has been tuned but the SCR installation is not complete, and other parts of the 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 high. Commissioning activities and expected emissions are discussed in more detail below.

8.1.5.3.2 Results of the Ambient Air Quality Modeling Analyses

The maximum impacts from the SBRP, calculated from the refined, startup and fumigation modeling analyses described above are summarized in Table 8.1-27. Although the one-hour NO_x startup emission rate from the turbines is much higher than the normal operation NO_x emission rate, the smaller NO_x emission rate from the Diesel-fueled emergency fire water pump engine creates the peak facility 1-hour NO_x concentration.

TABLE 8.1-27
Air Quality Modeling Results

		Modeled Maximum Concentrations (µg/m^3)			
Pollutant	**Averaging Time**	**Normal Operations AERMOD**	**Startup AERMOD**	**Fumigation SCREEN3**	**Shoreline Fumigation SCREEN3**
NO_2	1-hour	171.7	109.2	6.8	44.7
	Annual	0.3	[a]	[c]	[c]
SO_2	1-hour	6.6	[b]	2.0	13.2
	3-hour	4.4	[b]	1.6	11.9
	24-hour	1.0	[b]	0.7	1.2
	Annual	0.038	[b]	[c]	[c]
CO	1-hour	28.4	1,886.5	8.2	54.4
	8-hour	11.8	598.2	4.9	17.2
$PM_{2.5}/PM_{10}$	24-hour	3.4	[b]	1.4	2.5
	Annual	0.43	[b]	[c]	[c]

[a] Not applicable, because startup emissions are included in the modeling for annual average.

[b] Not applicable, because emissions are not elevated above normal operation levels during startup.

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

8.1.5.3.3 Impacts During Turbine Commissioning

During initial facility operation and equipment commissioning, 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 8.1B, Table B-9.

- **Full Speed No Load Tests (FSNL) –** The tests include a test of the combustion 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. During the tests, the heat input to the CTG will be approximately 20 percent of the maximum heat input rating. Worst-case NO_x emission concentrations are expected to be ~100 ppmv @ 15 percent oxygen, or

~436 lb/hr. Total operating time for these tests is expected to be about 120 hours. CO and VOC emissions during these tests are assumed to be equivalent to emission rates during startup.

- **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. During the tests, the heat input to the combustion turbine will be 50 percent of the maximum heat input rating, with an average NO_x emission concentration for the period assumed be 9 ppm @ 15 percent O_2.
- **Full Speed, No Load Tests (SCR Not Operational) –** These tests will occur over approximately a 4-day period. The SCR catalyst will be installed during this testing period, but no ammonia will be injected. During the tests, the heat input to the CTG will be 50 percent of the maximum heat input rating, with an average NO_x emission concentration of about 5.5 ppmv @ 15 percent O_2.
- **Multiple Load Tests (SCR Fully Operational) –** These tests will occur over approximately a month. By the beginning of this test period the control systems will be completely tuned and achieving NO_x and CO control at design levels. Emissions during these tests are assumed to be equivalent to emissions during turbine startup.

It is assumed that the maximum modeled NO_2 and CO impact during commissioning will occur under the turbine operating conditions that are least favorable for dispersion. As shown in the unit impacts analysis, these conditions are expected to occur under part-load, low-temperature conditions.

Emission rates and stack parameters for the turbines during commissioning are shown in Appendix 8.1D, Table 8.1D-7. Modeled impacts during commissioning are summarized in Table 8.1-28.

TABLE 8.1-28
Modeled Impacts During Commissioning

Pollutant/Averaging Period	Modeled Concentration, µg/m^3
NO_2 - 1-hour	160.1
CO - 1-hour	1,886.5
CO - 8-hour	878.5

8.1.5.3.4 Ambient Air Quality Impacts from the 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 Project was provided above.

Table 8.1-29 presents the maximum concentrations of NO_2, CO, SO_2, PM_{10}, and $PM_{2.5}$ recorded between 2003 and 2005 from nearby monitoring stations, as required by Appendix B(g)(8)(G) of the CEC guidelines.

TABLE 8.1-29
Maximum Background Concentrations, Chula Vista, 2003-2005 (µG/M³)

Pollutant	Averaging Time	2003	2004	2005
NO_2	1-hour	**192.0**[a]	135.5	133.6
	Annual	**33.9**	30.1	30.1
SO_2	1-hour	78.6	**110.0**	41.9
	3-hour	55.0	**55.0**	23.6
	24-hour	28.8	**41.9**	13.1
	Annual	**10.5**	7.9	7.9
CO	1-hour	**8,625**	4,875	3,500
	8-hour	**3,778**	2,778	2,333
PM_{10}	24-hour	**78**	45	52
	Annual	**27.6**	26.5	27
$PM_{2.5}$	24-hour	**39.2**[b,c]	30.7	30.2
	Annual	**14.4**	12.2	11.8

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/m³ except for PM_{10} which were already rounded to the nearest integer.

Notes:

[a] 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.

[c] As discussed in Section 8.1.3.6, Table 8.1-7, a concentration of 239 µg/m³ was recorded at the Chula Vista monitoring station during the firestorms of October 2003. This value is considered anomalous, and the District's reported value of 39.2 µg/m³ is used to represent the background 24-hour concentration of $PM_{2.5}$.

The maximum modeled concentrations in Tables 8.1-27 and 8.1-28 are combined with the maximum background ambient concentrations in Table 8.1-29 and compared with the state and federal ambient air quality standards in Table 8.1-30. Using the conservative assumptions described earlier, the results indicate that the SBRP 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 8.1-30
Modeled Maximum Impacts[A]

Pollutant	Averaging Time	Maximum Facility 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[b]	171.7	192.0	364	470	—
	Annual	0.3	33.9	34	—	100
SO_2	1-hour	13.2	110.0	123	650	—
	3-hour	11.9	55.0	67	—	1300
	24-hour	1.2	41.9	43	109	365
	Annual	0.038	10.5	11	—	80
CO	1-hour	1,886.5	8,625	10,512	23,000	40,000
	8-hour	598.2	3,778	4,376	10,000	10,000
PM_{10}	24-hour	3.4	78	81	50	150
	Annual	0.43	27.6	28	20	50
$PM_{2.5}$	24-hour	3.4	39.2	43	—	65
	Annual	0.43	14.4	14.8	12	15

[a] Maximum facility impacts do not reflect the reduced concentrations associated with the shutdown of the existing SBPP.

[b] Maximum one-hour NO_2 impact shown occurs only during simultaneous operation of two turbines along with the fire pump engine. Maximum impact during routine turbine operation will be approximately 23 µg/m^3.

PSD Increment Consumption

The PSD program was established to allow emission increases (increments of consumption) that do not result in significant deterioration of ambient air quality in areas where criteria pollutants have not exceeded the NAAQS. The comparisons in Tables 8.1-24 and 8.1-25 above indicated that although the SBRP will be a major source, the net increases resulting from the proposed Project will not exceed regulatory significance thresholds and thus the Project is not subject to PSD review. However, an analysis is conducted here to determine whether the ambient impacts of the proposed 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 are compared with the PSD significance thresholds in Table 8.1-31 below.

TABLE 8.1-31
Comparison of Maximum Modeled Impacts and PSD Significant Impact Levels

Pollutant	Averaging Time	Significant Impact Level, µg/m^3	Maximum Modeled Impact for SBRP, µg/m^3	Exceed Significant Impact Level?
NO_2	Annual	1	0.3	No
SO_2	3-hour	25	12	No
	24-Hour	5	1.2	No
	Annual	1	0.0	No
CO	1-Hour	2000	1,887	No
	8-Hour	500	598	Yes
PM_{10}	24-Hour	5	3.4	No
	Annual	1	0.4	No

8.1.5.3.5 Preconstruction Monitoring

Because the SBRP is not subject to PSD review, the EPA will not require preconstruction ambient air quality monitoring data for the purposes of establishing background pollutant concentrations in the impact area.

8.1.5.4 Screening Health Risk Assessment

The 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, auxiliary boiler and emergency fire water pump 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 1.2a) 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 SHRA utilized the following information:

- Inhalation cancer potency factors for the carcinogenic emissions,
- Noncancer Reference Exposure levels (RELs) for determining chronic and acute non-carcinogenic health impacts,
- One-hour and annual average emission rates for each non-criteria pollutant, and
- The modeled maximum offsite concentration of each non-criteria pollutant emitted.

Many of the carcinogenic compounds also have non-carcinogenic health effects and are therefore included in the determination of both potential carcinogenic and noncarcinogenic effects. RELs are used as indicators of potential non-carcinogenic adverse health effects. RELs are generally based on the most sensitive adverse health effect reported and are designed to protect the most sensitive individuals. However, exceeding the REL does not automatically indicate a health impact. The OEHHA RELs were used to determine potential adverse health effects from noncarcinogenic compounds. A potential chronic health hazard index for each relevant non-carcinogenic pollutant is then determined by the ratio of the pollutant maximum annual average concentration to its respective REL. Similarly, a potential acute health hazard index for each relevant non-carcinogenic pollutant is determined by the ratio of the pollutant maximum one-hour average concentration to its respective REL. The individual indices are summed to determine the overall hazard index

for the Project. Because noncarcinogenic compounds target different internal systems or organs (e.g., respiratory system, nervous system, eyes), this sum is considered conservative.

The SHRA results are compared with the established risk management procedures for the determination of acceptability. The established risk management criteria include those listed below.

- If the MICR is less than one in one million, the facility risk is considered not significant.
- If the MICR is greater than one in one million but less than ten in one million and T-BACT has been applied to reduce risks, the facility risk is considered acceptable.
- If the MICR is greater than ten in one million but less than 100 in one million and there are mitigating circumstances that, in the judgment of a regulatory agency, outweigh the risk, the risk is considered acceptable.
- For non-carcinogenic effects, total hazard indices of one or less are considered not significant.
- For a hazard index greater than one, OEHHA, the CEC and the SDAPCD may conduct a more refined review of the analysis and determine whether the impact is acceptable.

The SHRA includes the noncriteria pollutants listed above in Table 8.1-26. The receptor grid described earlier for criteria pollutant modeling was used for the SHRA. The potential health risks are presented in Table 8.1-32, and the detailed calculations are provided in Appendix 8.1E. The locations of the maximum modeled risks are shown in Appendix 8.1E, Figure 8.1E-1.

TABLE 8.1-32
Potential Health Risks from the Operation of SBRP

	Significance Thresholds	SBRP	Significant?
Maximum Incremental Cancer Risk (MICR) at Point of Maximum Impact [a]	10 in one million	**1.0** in one million	No
MICR to Maximally-Exposed Individual (Resident) (MEI)[a]	10 in one million	**0.1** in one million	No
MICR to Maximally-Exposed Worker (Offsite) (MEW) [a,b]	10 in one million	**0.02** in one million	No
Acute Inhalation Health Hazard Index	1.0	**0.09**	No
Chronic Inhalation Health Hazard Index	1.0	**0.02**	No

[a] The Diesel-fueled fire water pump engine is responsible for the majority of the cancer risk; see Appendix 8.1E.

[b] The worker is assumed to be exposed at the work location 8 hours per day, instead of 24, 245 days per year, instead of 365, and for 40 years, instead of 70.

The acute and chronic health hazard indices are well below 1.0, and hence, are not significant. The MICR is 1.1 in one million, well below the ten in one million limit for the

Project proposed with Toxics-BACT. The Project will not pose a significant health risk at any location, under any weather conditions, under any operating conditions.

8.1.5.5 Construction and Demolition Impacts Analysis

The Project will start with 4 months of limited demolition of foundations and berms located in the old LNG facility area. This limited demolition is part of site preparation, and when combined with subsequent construction of the Project will take about 28 months. After construction, a period of commissioning will occur before commercial operation of the SBRP. Upon satisfactory commencement of operation of the SBRP and arrangements for contracting demolition of the existing plant, the existing SBPP will be demolished during a separate period of 25 months.

Emissions due to the construction and demolition phases 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 8.1F. The results of the analysis indicate that the direct maximum construction/demolition impacts of the Project 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 also included in Appendix 8.1E.

8.1.6 Consistency with Laws, Ordinances, Regulations, and Standards

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

8.1.6.1 Consistency with Federal Requirements

The SDAPCD has been delegated authority by the EPA to implement and enforce most federal requirements that may be applicable to the Project, including new source performance standards and new source review for nonattainment pollutants.[14] Compliance with the District regulations assures compliance and consistency with the corresponding federal requirements as well. The Project would 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 SBRP Title V Federal Operating Permit would include the necessary requirements for compliance with the Title IV Acid Rain provisions.

8.1.6.2 Consistency with State Requirements

As discussed in Section 8.1.4.1.2, 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 SBRP is under the local jurisdiction of the SDAPCD, and hence,

[14] As discussed in Section 8.1.4.1.1, EPA retains the authority to implement the PSD program in the San Diego Air Basin.

compliance with District regulations will assure compliance with state air quality requirements.

8.1.6.3 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 facility compliance with applicable District 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 the new combustion turbine will use BACT and will provide any necessary emission offsets.

8.1.6.3.1 Best Available Control Technology

BACT would be applied to the emitting sources resulting in an emissions increase exceeding any SDAPCD BACT threshold. Applicable BACT levels are shown in Table 8.1-33. SDAPCD Rule 20.3 requires any new or modified emission unit that has any increase in its potential to emit NO_x, VOC, SO_x, and PM_{10} and that has a post-project potential to emit 10 pounds per day or more of any of these pollutants to apply BACT for that pollutant. The maximum daily emissions from each turbine and the auxiliary boiler are compared with the BACT thresholds to determine BACT applicability. The comparison indicates that the CTGs/HRSGs are subject to BACT for NO_x, VOC, SO_x, and PM_{10}, as the maximum daily emissions of these pollutants exceed the 10 lb/day BACT threshold. However, emissions from the auxiliary boiler are below 10 lb/day, so the auxiliary boiler is not required to use BACT.

TABLE 8.1-33
SDAPCD BACT Emission Thresholds

Pollutant*	Threshold (lbs/day)	SBRP Emission Rates (lbs/day)	
		Each CTG/HRSG	Aux. Boiler
PM_{10}	10	247	4.6
NO_x	10	1,280	9.9
SO_x	10	124	1.9
VOC	10	208	3.6

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

BACT for the applicable pollutants was determined (see Appendix 8.1C) by reviewing SDAPCD BACT Guidance,[15] the South Coast Air Quality Management District BACT

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

Guidelines Manual,[16] the most recent Compilation of California BACT Determinations,[17] CAPCOA (2nd Ed., November 1993), and EPA's RACT/BACT/LAER Clearinghouse.[18] For the combustion turbines, the SDAPCD considers BACT to be the most stringent level of demonstrated emission control that is feasible. The SBRP turbines will use the BACT measures discussed below.

As a BACT measure, the Project will limit the fuels burned in the new turbine to natural gas, a clean burning fuel.

BACT for NO_x emissions from the combustion 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), on a three-hour average basis.[19] The District BACT Guideline determination for NO_x from combustion turbines is shown in Appendix 8.1C.

BACT for CO emissions will be achieved by using good combustion practices and an oxidation catalyst to achieve CO emissions of 4.0 ppmc on a 3-hour average basis. A review of recent BACT determinations for CO from combustion turbines is provided in Appendix 8.1C.

BACT for VOC emissions will be achieved by use of good combustion practices in the combustion turbines. BACT for VOC emissions from combustion devices has historically been the use of best combustion practices. VOC emissions leaving the stacks will not exceed 2.0 ppmc. This level of emissions is consistent with recent BACT determinations for similar projects.

For the turbine, BACT for PM_{10} is best combustion practices and the use of gaseous fuels. BACT for SO_2 is the exclusive use of clean-burning regulated natural gas with a sulfur content of less than 0.75 grains per 100 scf. The proposed turbine will burn exclusively PUC-regulated natural gas with maximum sulfur content of 0.75 grains per 100 scf (gr/100 scf), and an annual average level of 0.25 gr/100 scf, which will result in minimal SO_2 emissions.

8.1.6.3.2 Emission Offsets

A new or modified facility with a stationary source NSR balance for nonattainment pollutants and precursors exceeding the SDAPCD offset thresholds shown in Table 8.1-34 requires offsets. Table 8.1-34 shows that the net increases that will result from the replacement of the existing SBPP with the proposed SBRP will be below the major modification threshold. Therefore, no additional offsets are required for the SBRP. Table 8.1-35 shows that ozone and PM_{10} precursor emission increases from SBRP will be lower than the ozone and PM_{10} precursor emission decreases obtained from the shutdown

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

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.

19 The Applicant anticipates that there are some transient turbine operating conditions under which NO_x emissions may exceed 2.0 ppmc and is proposing a limited allowance for excursions during these conditions. The proposed excursions and the conditions under which they may occur are discussed further in Section 8.1.5.2.1.

of the existing SBPP, so that the proposed Project will result in a net reduction in emissions of ozone and PM_{10} precursor emissions in the District.

TABLE 8.1-34
SDAPCD Nonattainment Pollutant Offset Emission Thresholds (tpy)

Pollutant	Major Modification Threshold	SBPP Actual Baseline Emissions	Maximum SBRP Emissions	Net Increase/ Decrease
NO_x	25	106.55	104.01	(2.54)
VOC	25	50.00	39.63	(10.37)
PM_{10}	15	69.26	69.16	(0.1)
SO_x	40	6.86	11.01	4.15

TABLE 8.1-35
Comparison of Ozone and PM_{10} Precursor Emissions from SBPP and SBRP (tpy)

Pollutant Precursor	SBPP Actual Precursor Emissions	Maximum SBRP Precursor Emissions	Net Change in Precursor Emissions
Ozone precursors[a]	156.55	143.64	(12.91)
PM_{10} precursors[b]	232.68	223.81	(8.87)

Notes:

[a] Ozone precursors include NO_x and VOC.

[b] PM_{10} precursors include NO_x, VOC, SO_x and PM_{10}.

For the new SBRP, both individual criteria pollutant and precursor emissions are based on the proposed maximum allowable yearly emissions, while the emissions for the existing SBPP are based on actual historical operations.

The District's new source review rule requires project denial if SO_2, NO_2, PM_{10}, or CO air quality modeling results indicate emissions will interfere with the attainment or maintenance of the applicable ambient air quality standards or will exceed PSD increments. The modeling analyses presented in Section 8.1.5.3 of the application show that facility emissions will not interfere with the attainment or maintenance of the applicable air quality standards.

The federal PSD rules also require applicants to demonstrate that emissions from a project located within 10 km (6.2 miles) of a Class I area will not cause or contribute to the exceedance of any national ambient air quality standard or any applicable Class I PSD increment. The nearest Class I area, Agua Tibia Wilderness Area, is more than 10 km from the proposed SBRP. In addition, this requirement is not applicable because the Project is not subject to PSD review.

8.1.6.3.3 SDAPCD Prohibitory Rules

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

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 SBRP use of natural gas would eliminate the possibility of a dark visible emission.

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 SBRP would not emit odorous pollutants, and the screening health risk assessment demonstrated that the potential health risks from the emissions are less than significant.

Rule 52 – Particulate Matter Emission Standards

Prohibits PM emissions in excess of 0.10 gr/dscf. The proposed PM_{10} emission rate for the CTGs will limit PM emissions to less than 0.002 gr/dscf.

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 limit of 0.75 gr/100 scf. Compliance with Rule 52 will assure compliance with the grain loading limit of Rule 53.

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 SBRP will have a sulfur content that will be less than 0.75 gr S/100 scf., The Diesel fuel used in the Diesel fire pump engine will comply with current CARB fuel sulfur limit of 15 ppm, or 0.0015 percent, well below the limit of this rule.

Rule 69 – Electrical Generating Steam Boilers

Limits NO_x and NH_3 emissions from electrical generating steam boilers rated greater than or equal to 100 MMBtu/hr to BACT levels. BACT would be implemented on the gas turbines as described in Appendix 8.1C. As the auxiliary boiler has a heat input rating of 38.02 MMbtu/hr, it is not subject to the requirements of this rule.

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 SBRP turbines will be limited to 2 ppmc.

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, the emergency fire water pump engine is exempt from these emission limits.

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 SBRP CTGs. Subpart KKKK limits NO_x and SO_2 emissions from new gas turbines based on power output. The limits for 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 are proposed for the SBRP are well below the Subpart KKKK limits, as shown in Table 8.1-36.

TABLE 8.1-36
Compliance with 40 CFR 60 Subpart KKKK

	Proposed Permit Limits			
Pollutant	**ppmc**	**lb/hr**	**lb/MW-hr (Max)**	**Subpart KKKK Limit, lb/MW-hr**
NO_x	2.0	17.77	0.085	**0.39**
SO_2	0.4	5.26	0.0047	**0.59**

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

8.1.7 Cumulative Air Quality Impacts Analysis

An analysis of potential cumulative air quality impacts that may result from the proposed SBRP and other reasonably foreseeable projects is required by the SDAPCD. A protocol for performing the cumulative impacts analysis is presented in Appendix 8.1H; the analysis will be submitted upon receipt of the necessary data from the SDAPCD. The cumulative impact analysis determines if the total set of proposed SBRP and foreseeable projects will cause an exceedance of an ambient air quality standard or impede progress of the San Diego Air Basin towards attainment of those standards.

8.1.8 Mitigation

Mitigation will be provided for all emissions increases from the Project in the form of offsets and the installation of BACT, as required under District regulations. The demonstration of compliance with the BACT requirement is provided in Appendix 8.1C.

As discussed in Section 8.1.6.3.2 above, the emissions increases from the proposed SBRP will be offset through the reductions achieved by shutting down the existing SBPP. Table 8.1-34 demonstrated that the proposed Project will result in a net reduction in emissions of NO_x, VOC and PM_{10} and that the increase in SO_2 will be below regulatory offset thresholds. Table 8.1-35 demonstrated that the proposed Project will result in a net reduction in emissions of ozone and PM_{10} precursors. Therefore, no further mitigation will be needed.

8.1.9 References

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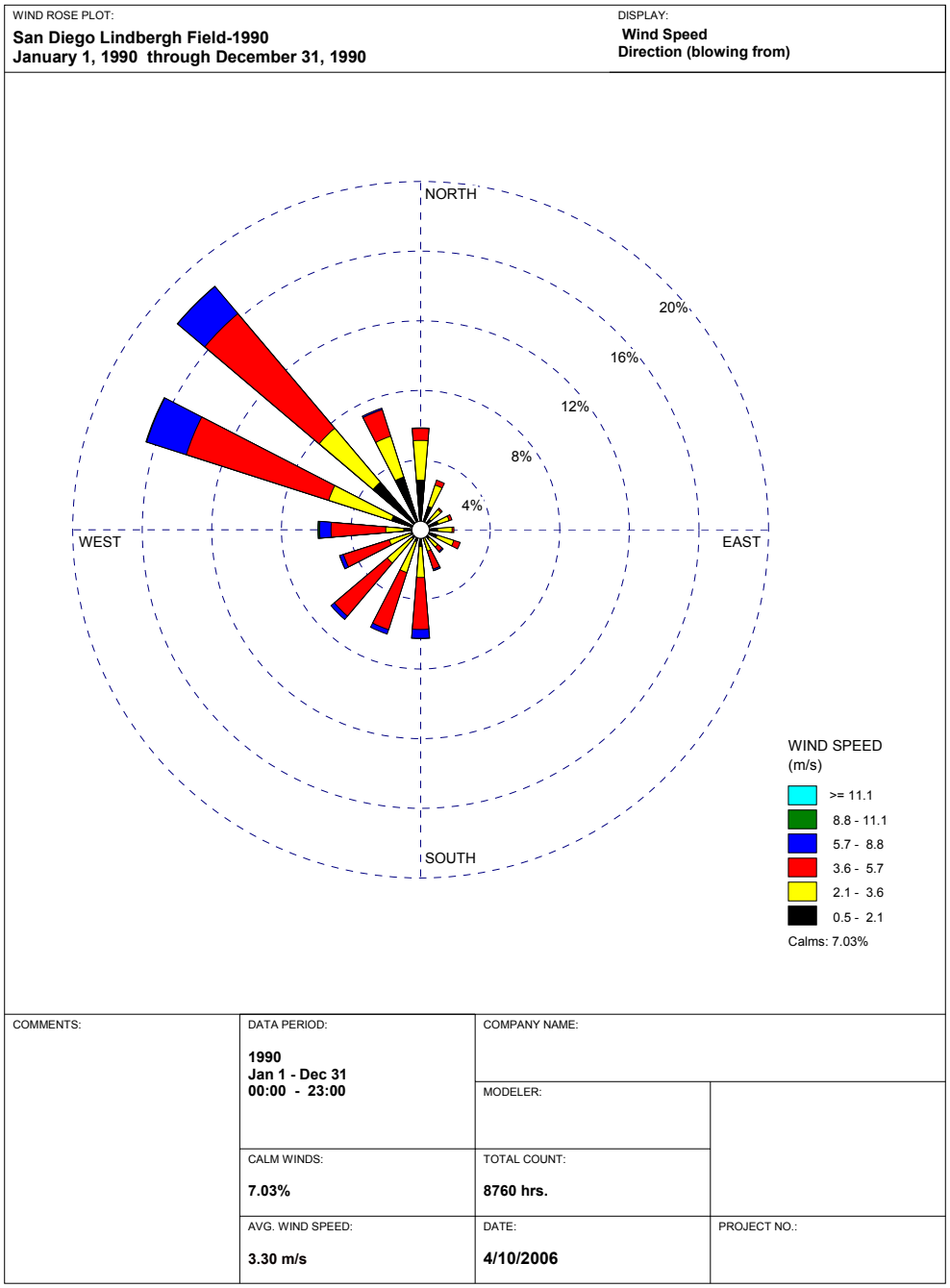

FIGURE 8.1-1
1990 Annual Wind Rose, Lindbergh Field, San Diego, CA

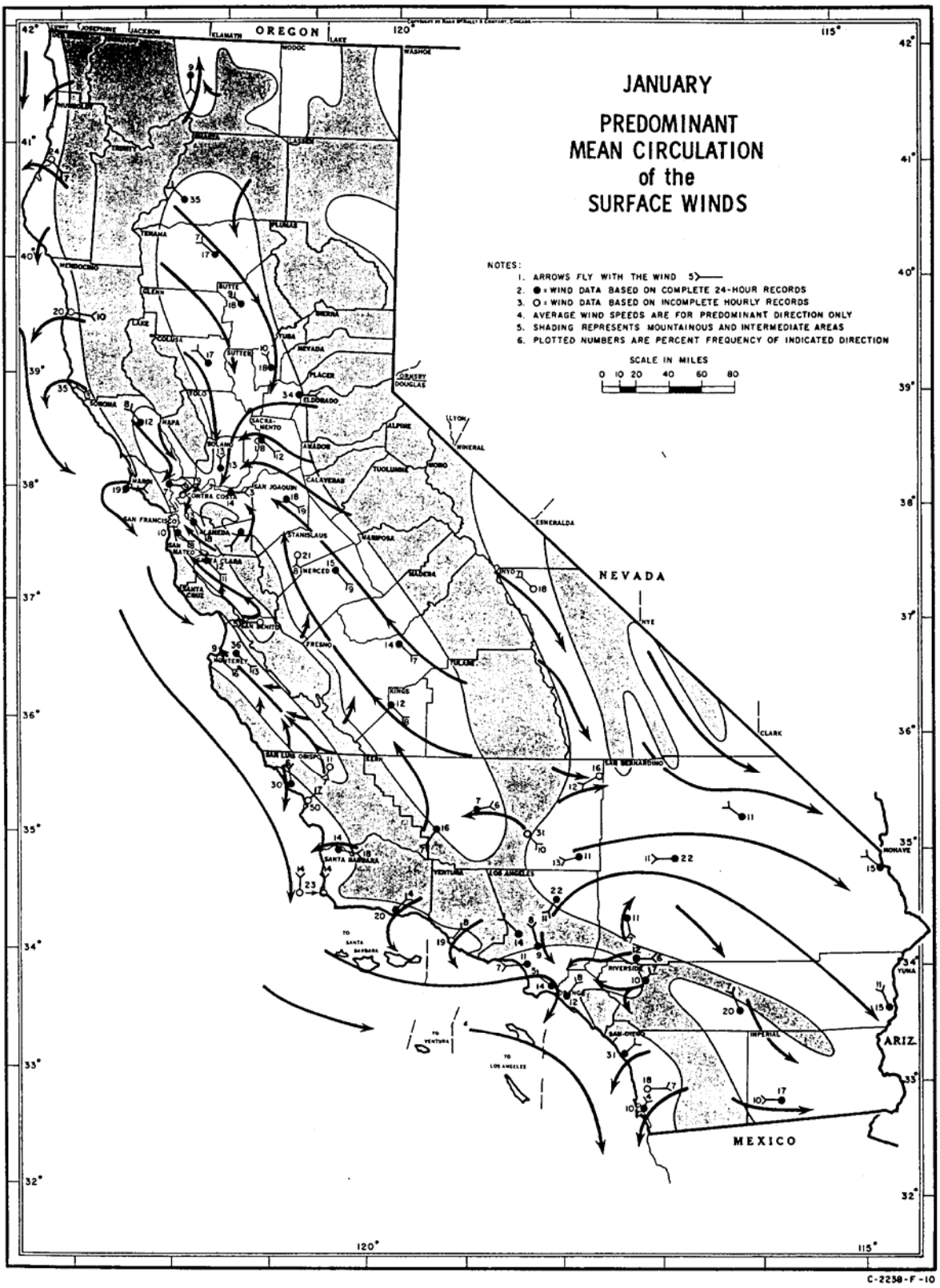

FIGURE 8.1-2
January Predominant Mean Circulation of the Surface Winds

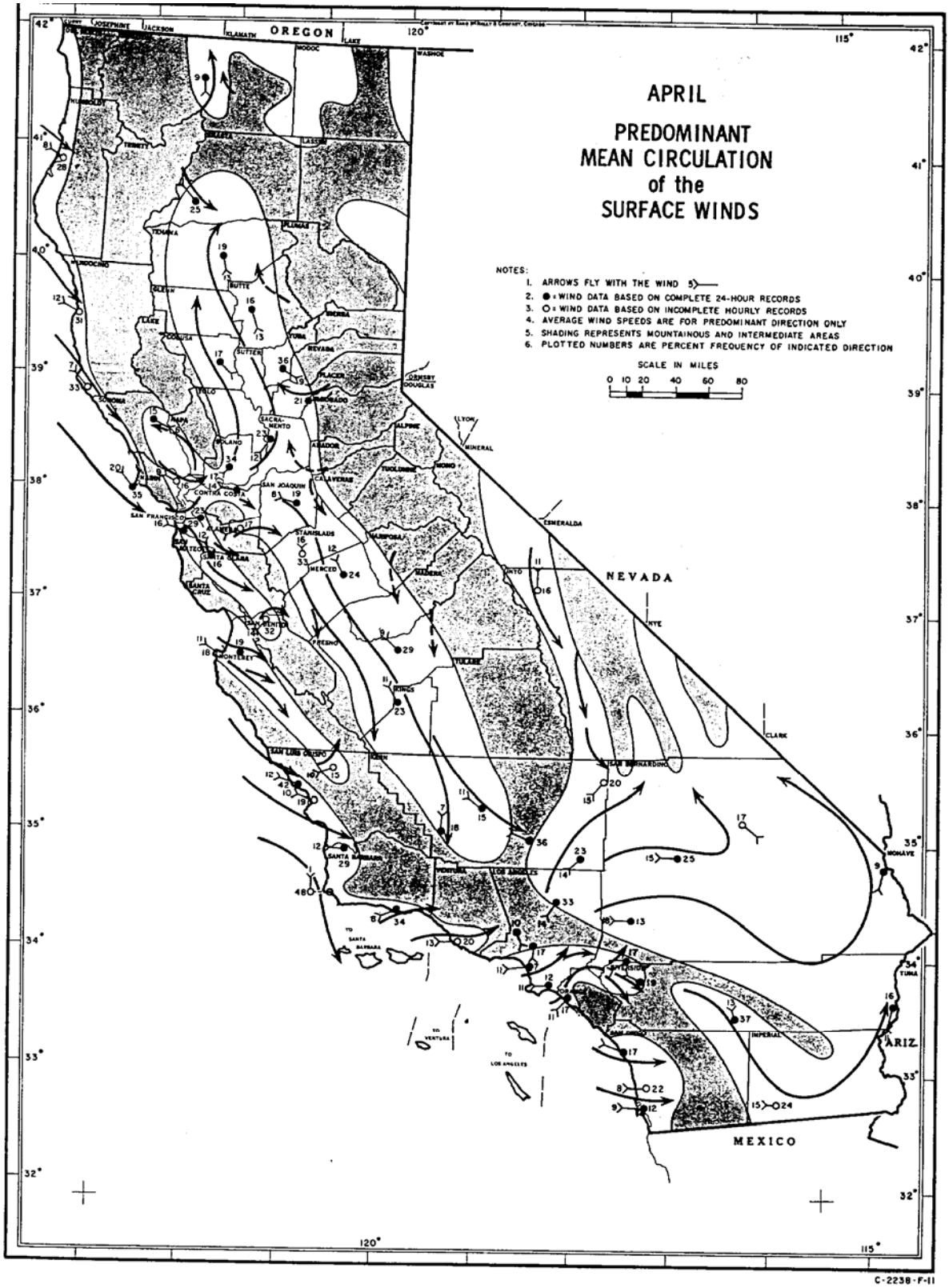

FIGURE 8.1-3
April Predominant Mean Circulation of the Surface Winds

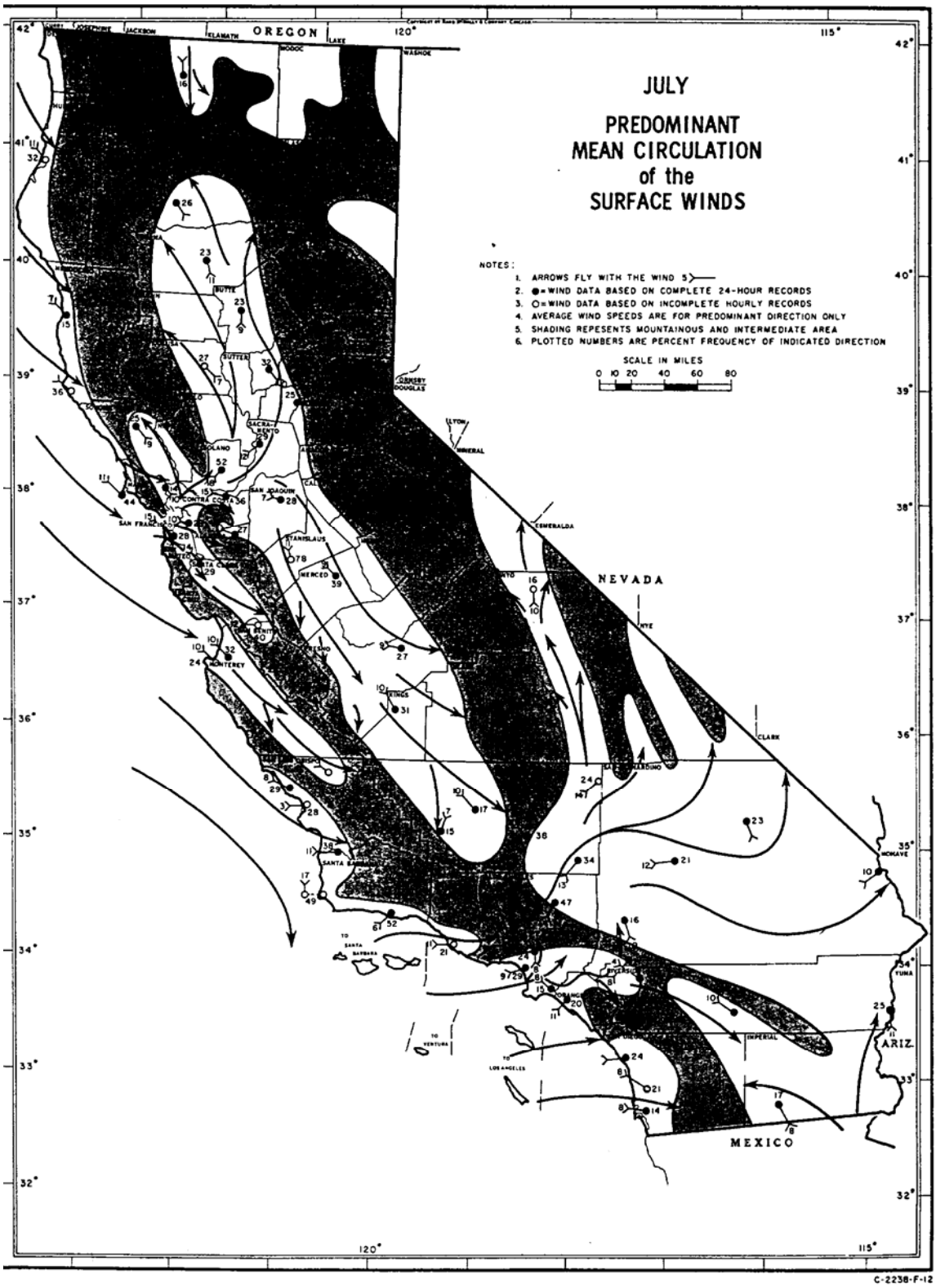

FIGURE 8.1-4
July Predominant Circulation of the Surface Winds

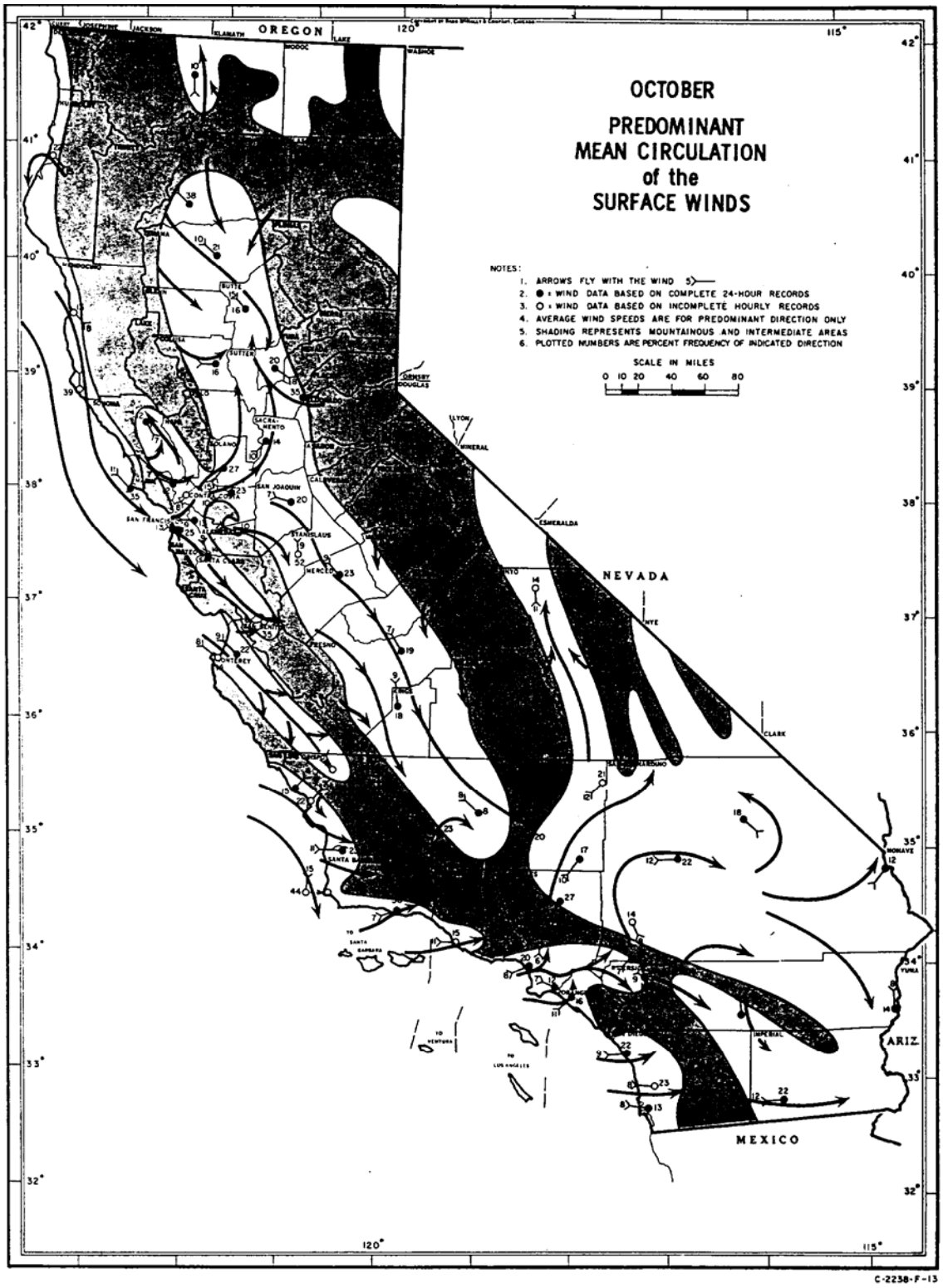

FIGURE 8.1-5
October Predominant Mean Circulation of the Surface Winds

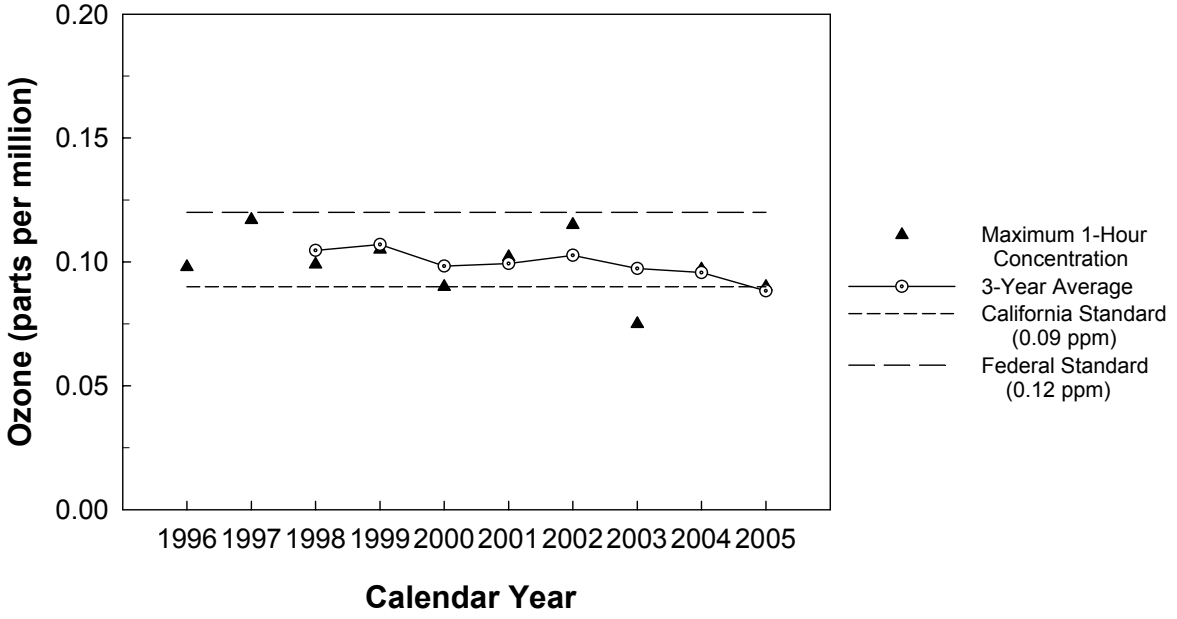

FIGURE 8.1-6
Maximum 1-Hour Average ozone Levels
Chula Vista, 1996-2005

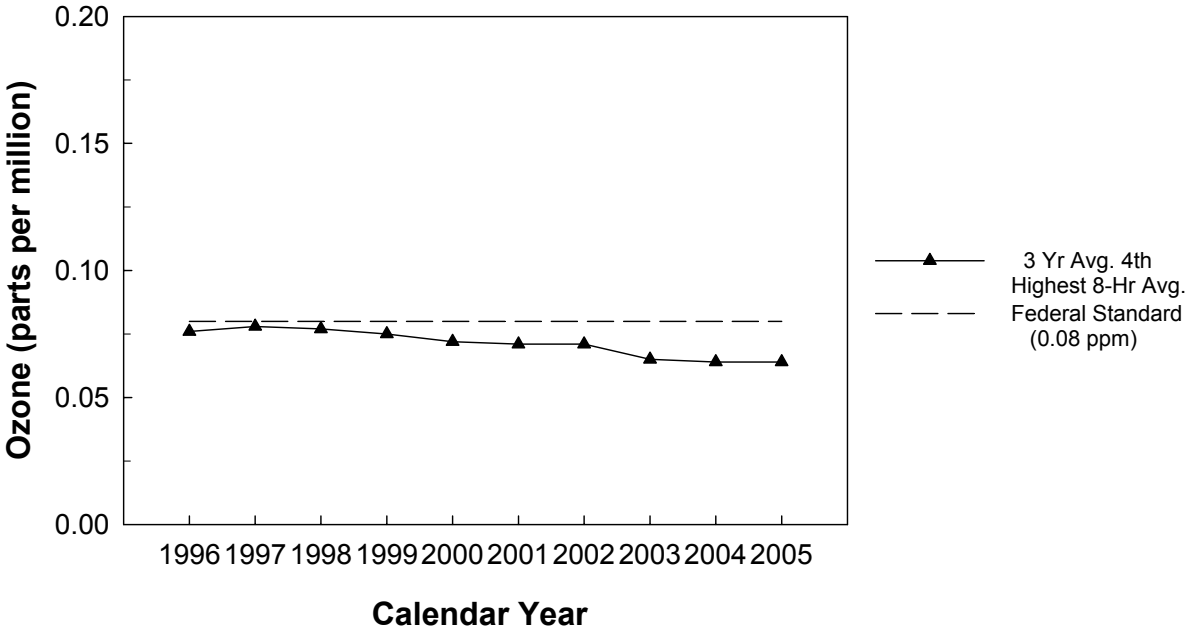

FIGURE 8.1-7
3-Year Average 4th Highest 8-Hour Average Ozone Levels
Chula Vista, 1996-2005

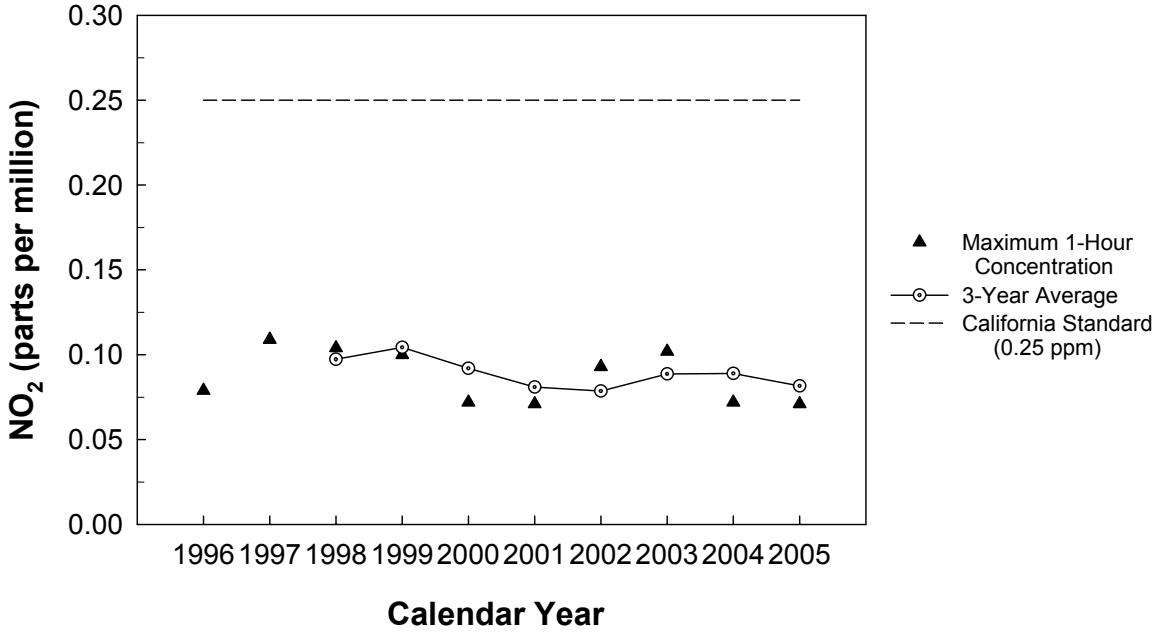

FIGURE 8.1-8
Maximum 1-Hour Average NO_2 Levels
Chula Vista, 1996-2005

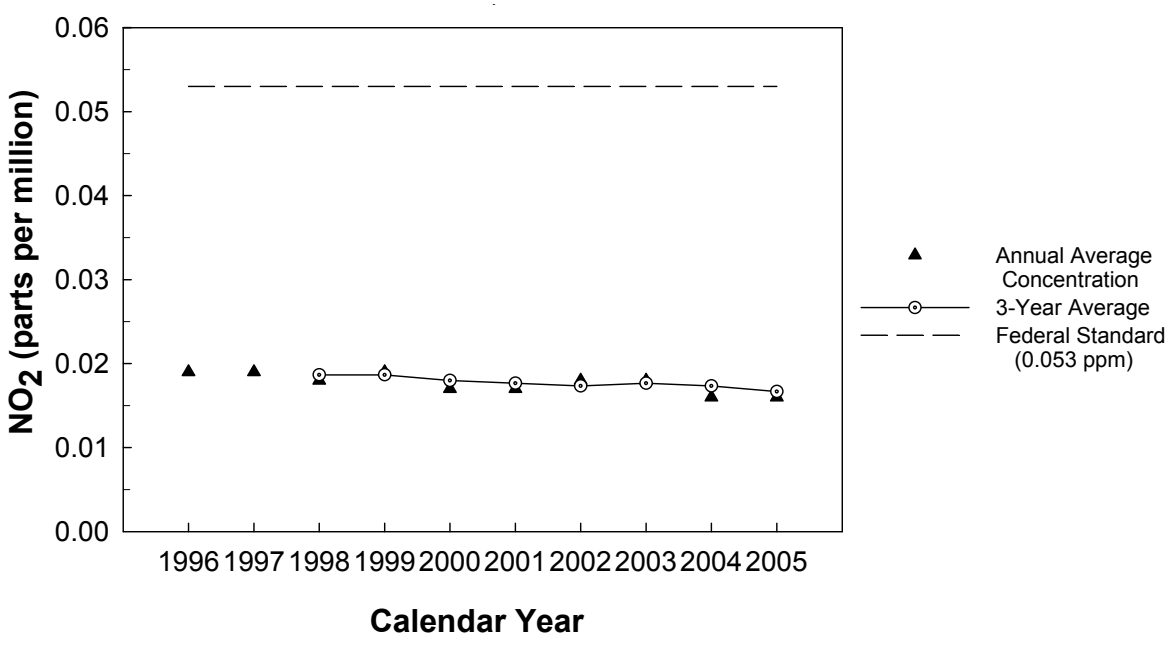

FIGURE 8.1-9
Annual Average NO_2 Levels
Chula Vista, 1996-2005

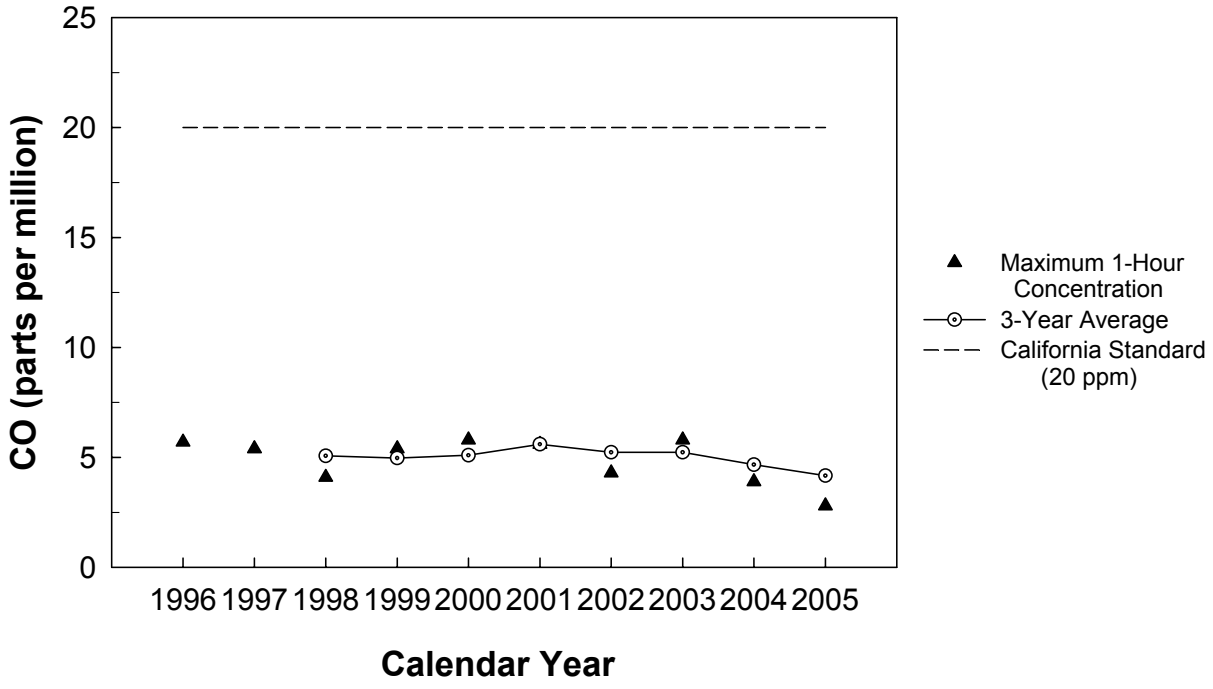

FIGURE 8.1-10
Maximum 1-Hour Average CO Levels
Chula Vista, 1996-2005

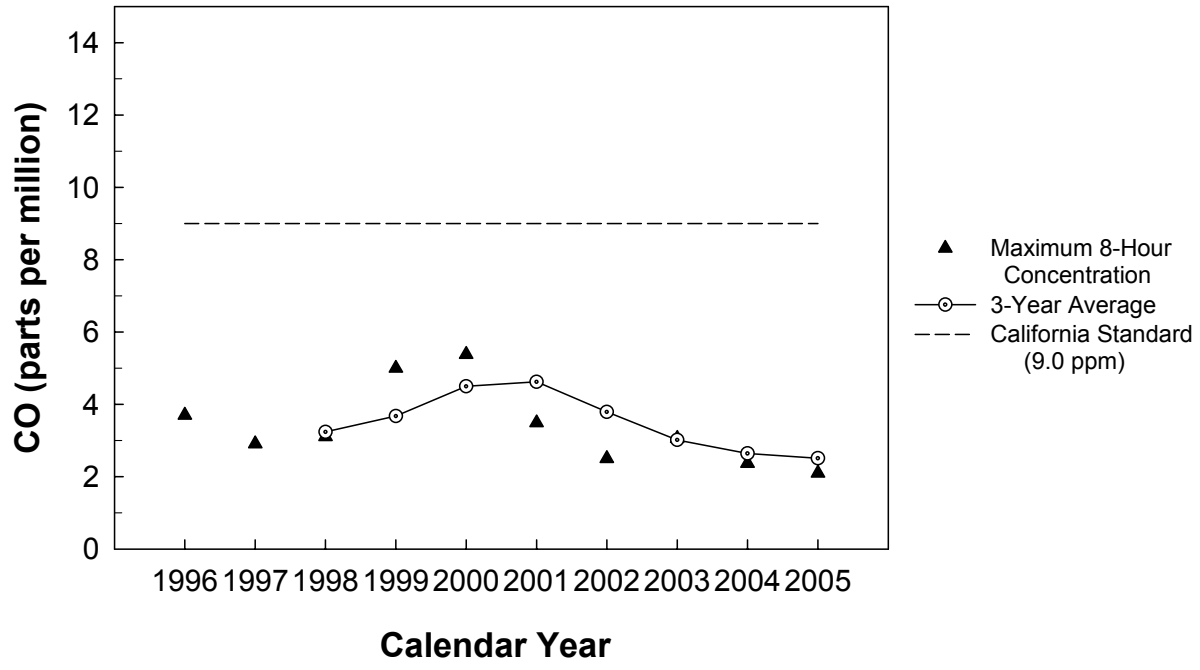

FIGURE 8.1-11
Maximum 8-Hour Average CO Levels
Chula Vista, 1996-2005

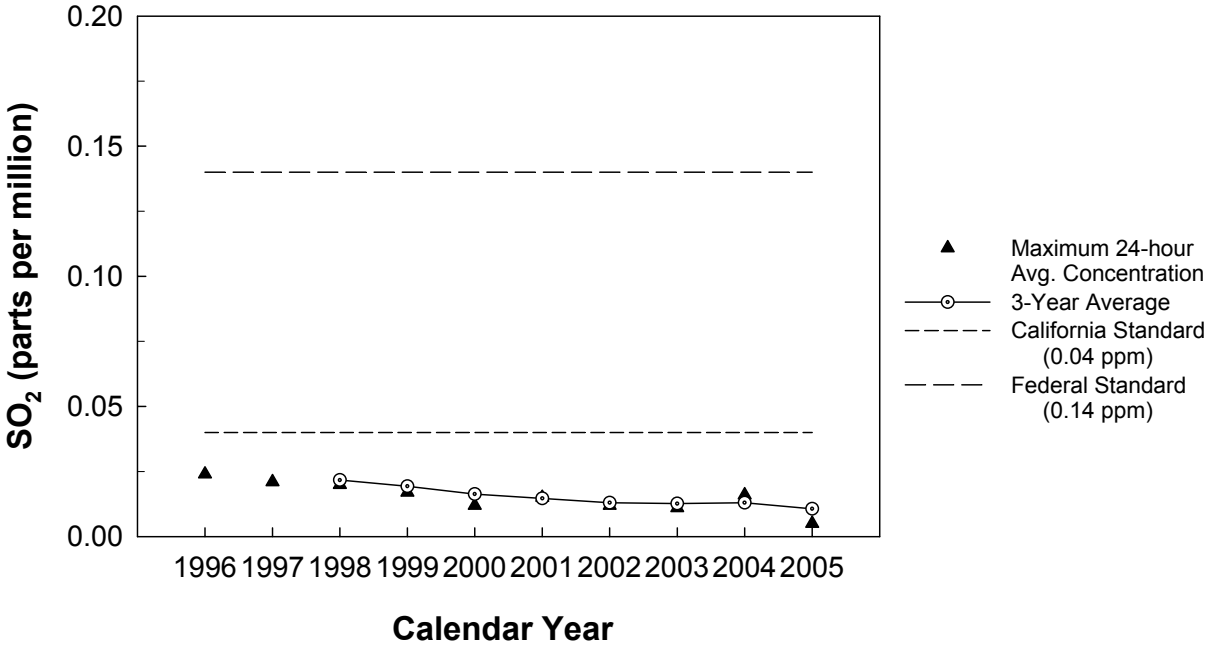

Figure 8.1-12
Maximum 24-Hour Average SO_2 Levels
Chula Vista, 1996-2005

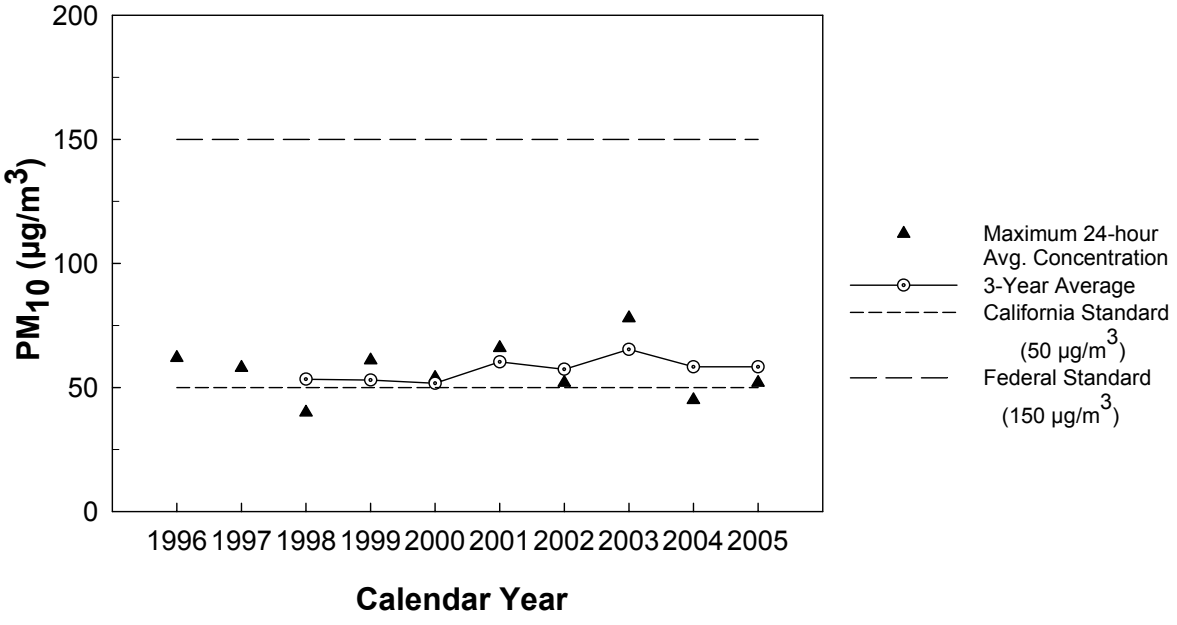

FIGURE 8.1-13
Maximum 24-Hour Average PM_{10} Levels
Chula Vista, 1996-2005

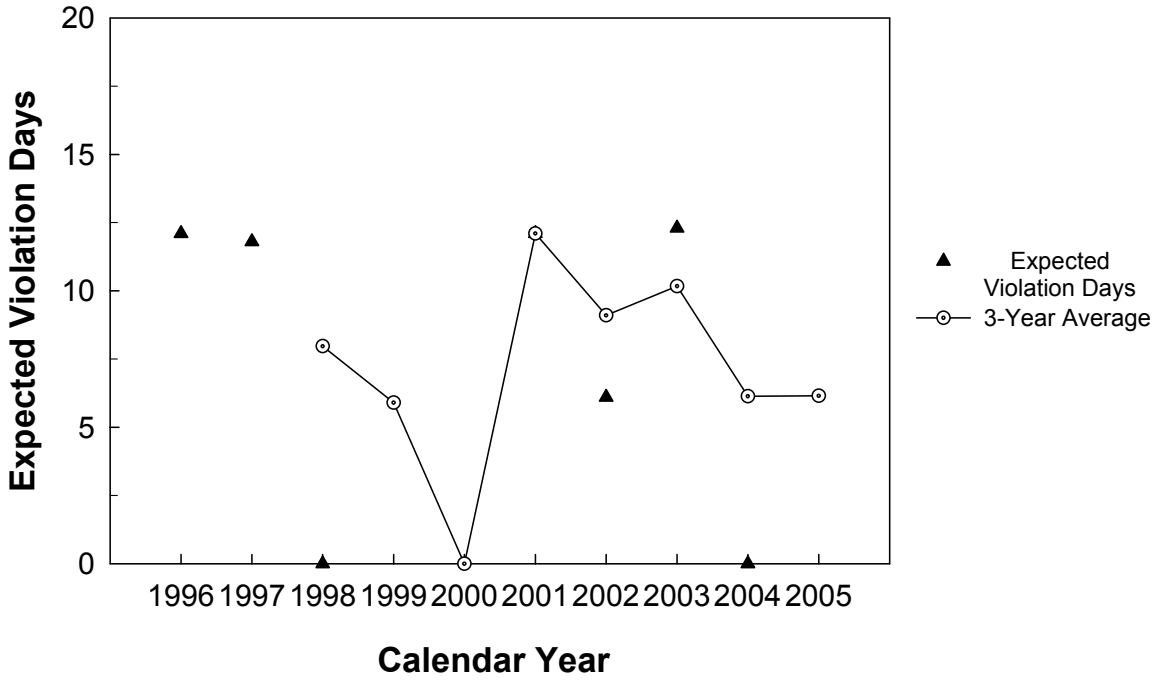

FIGURE 8.1-14
Expected Violations of the California 24-Hour PM_{10} Standard (50 µg/m^3)
Chula Vista, 1996-2005

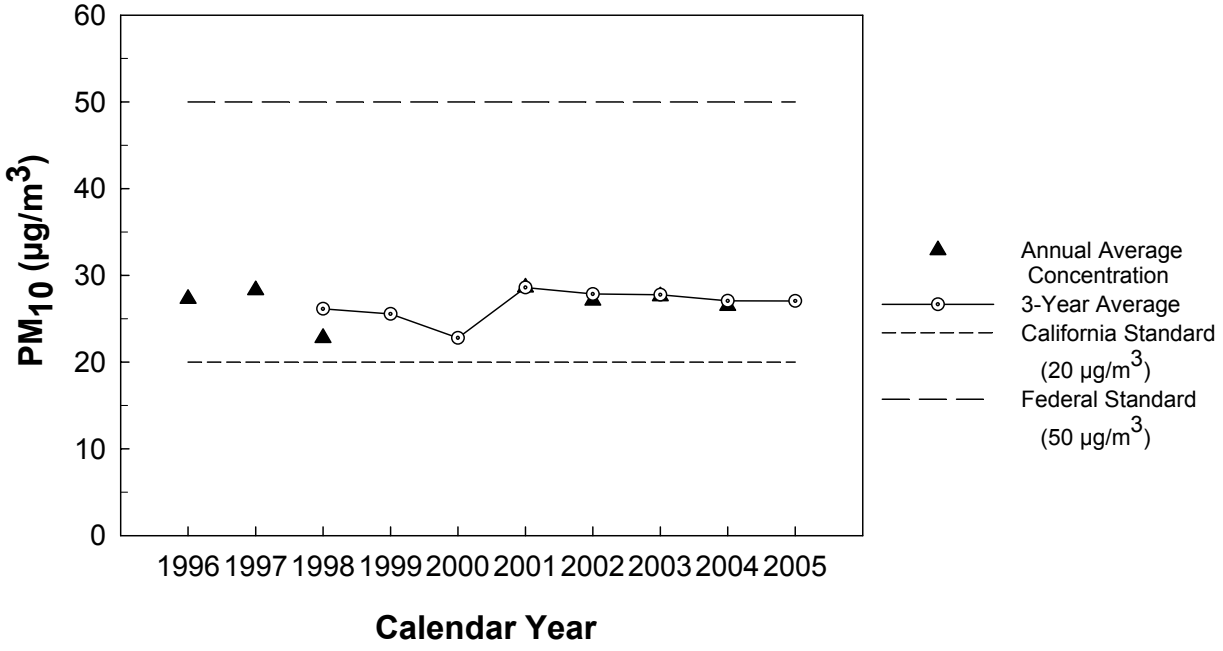

FIGURE 8.1-15
Annual Average PM_{10} Levels
Chula Vista, 1996-2005

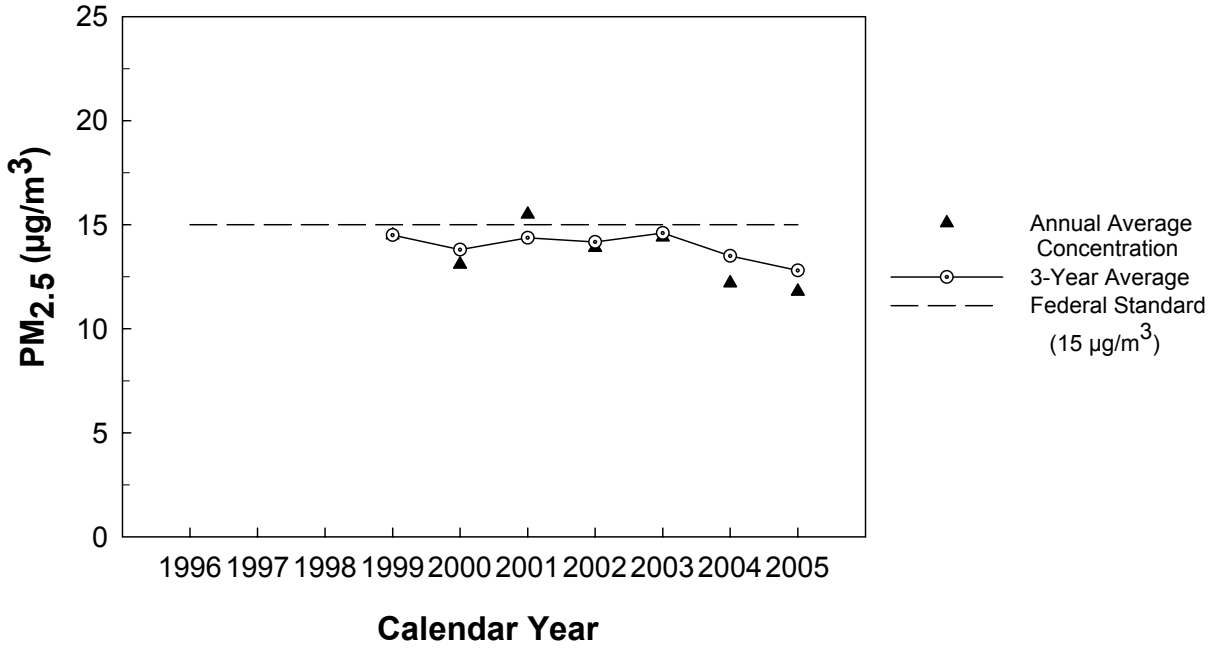

FIGURE 8.1-16
Annual Average $PM_{2.5}$ Levels
Chula Vista, 1996-2006

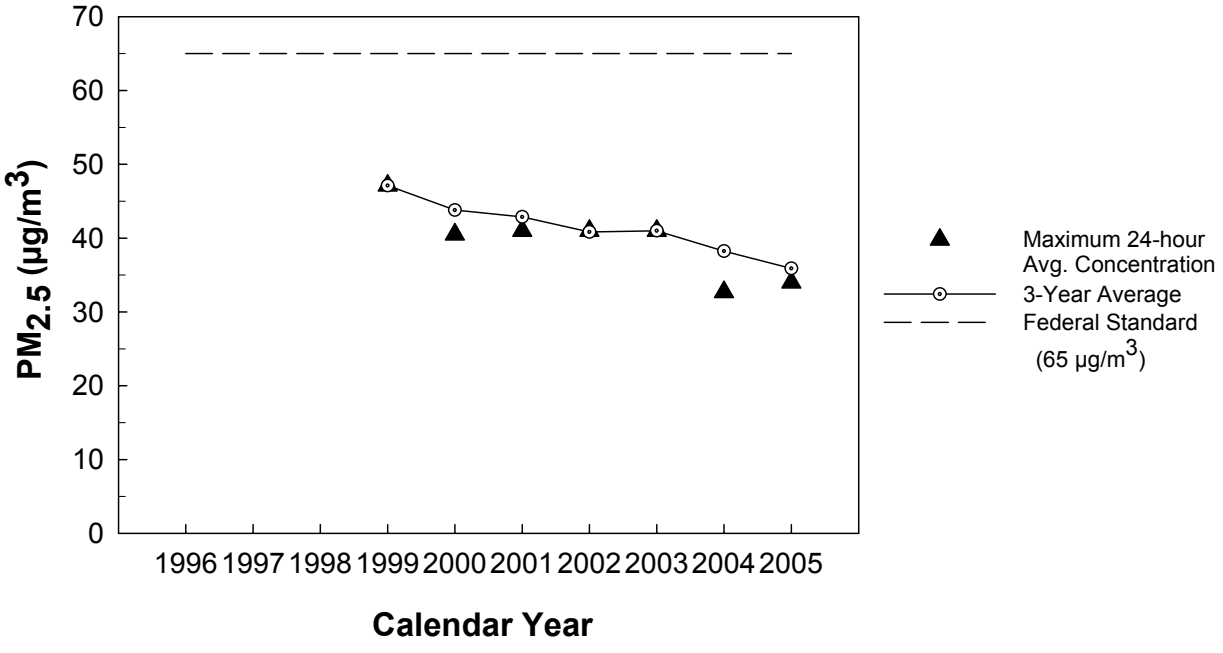

FIGURE 8.1-17
Maximum 24-Hour Average $PM_{2.5}$ Levels
Chula Vista, 1996-2005