7.1 AIR QUALITY

7.1 AIR QUALITY

This analysis of the potential air quality impacts of the San Gabriel Generating Station (SGGS) has been conducted according to California Energy Commission (CEC) power plant siting requirements. It also addresses U.S. Environmental Protection Agency (U.S. EPA) Prevention of Significant Deterioration (PSD) requirements and South Coast Air Quality Management District (SCAQMD) permitting requirements for Determination of Compliance/Permit to Construct (DOC/PTC).

Air quality data are presented in this section as well as in other sections of this AFC, including an evaluation of toxic air pollutants (see Section 7.6, Public Health) and information related to the fuel characteristics, heat rate, and expected capacity factor of the proposed facility (see Chapter 2, Facility Description and Location).

7.1.1 Affected Environment

This section describes the regional climate and meteorological conditions that influence transport and dispersion of air pollutants and the existing air quality within the proposed project region. The data presented in this section are representative of the SGGS site.

The proposed SGGS site is located at 8996 Etiwanda Avenue in Rancho Cucamonga, approximately 1.5 miles northeast of the intersection of Interstate 15 (I-15) and Interstate 10 (I-10) in San Bernardino County, California. When completed, the power plant will occupy approximately 16.2 acres in the northwest portion of the 60 fenced acres that comprise the existing Etiwanda Generating Station (EGS), generally within the footprint of the area formerly occupied by the Unit 1 and 2 cooling towers, and west of Units 3 and 4, which will remain unchanged. The SGGS will also occupy approximately 0.8 acre of land currently owned by IEUA. Figure 2.2-1 in Chapter 2 shows the general arrangement of the proposed project components.

The overall site topography is generally flat, although there is a very slight rise towards the north, with elevations increasing from 1,090 to 1,130 feet above mean sea level. The portion of the site used for the proposed combined cycle units and auxiliary systems will be uniformly graded to an elevation of approximately 1,120 feet. Figure 7.1-1 shows the topography within a 10-mile radius of the proposed project site.

7.1.1.1 Climate and Meteorology

Meteorological (short-term) and climatological (long-term) conditions influence ambient air quality. The southwestern portion of San Bernardino County is in the northeastern part of the South Coast Air Basin (the Basin). The project area has a Mediterranean climate characterized by warm, dry summers and mild winters, and is dominated by a semi-permanent high-pressure cell located over the Pacific Ocean. This high-pressure cell maintains clear skies for much of the year by steering wet weather systems north of Southern California. As winter approaches in the Northern Hemisphere, the semi-permanent Pacific High off the coast of California tends to weaken and move southward, which allows wet weather systems coming from the northern Pacific Ocean to enter Southern California. This is the mechanism that brings most of the precipitation in the winter (November through April). During the summer, the San Bernardino area is under the influence of the stronger Pacific High, which tends to keep wet weather systems to the north, and bring in warmer, dryer air from the desert southwest. The Pacific High drives the dominant onshore circulation and also helps create two types of temperature inversions—subsidence and radiation—that contribute to local air quality degradation.

Subsidence inversions occur during warmer months, as descending air associated with the Pacific High-pressure cell comes into contact with cool marine air. During the summer, a warm air mass frequently descends over the cool, moist marine layer produced by the interaction between the ocean's surface and the lowest layer of the atmosphere. The warm upper layer forms a cap over the cool marine layer and inhibits the upwards dispersion of pollutants in the marine layer from dispersing upward. In addition, light winds during the summer further limit ventilation. Furthermore, sunlight triggers the photochemical reactions that produce ozone. Radiation inversions typically develop on winter nights with low wind speeds, when air near the ground cools by radiation and the air aloft remains relatively warm. These cool air pockets act as lids to trap ground-level pollutants that are emitted into them, thus creating shallow inversion layers containing elevated pollutant concentrations, until later in the day when surface heating breaks up the inversions.

During the dry season (from April to October), and to a lesser degree during winter, a daytime sea breeze blowing onshore and a nighttime land breeze moving offshore typify the daily circulation pattern in the Basin. Generally, the onshore sea breeze is approximately twice as strong as the offshore land breeze, and summer wind speeds average slightly higher than winter wind speeds. Throughout the year during the night, a drainage flow exists as cool air from the nearby mountain slopes drains down and back toward the ocean.

On occasion during the fall and winter, a high-pressure system develops over Nevada and Utah and pushes air southward over the San Gabriel and San Bernardino Mountains. The resulting wind is known as a Santa Ana wind. Santa Ana winds can be very strong, with speeds through mountain passes sometimes exceeding 60 miles per hour (mph), and are usually warm and dry. They tend to clear the Basin of accumulated air pollutants but can also cause dust storms and high particulate levels.

Air in the Basin is generally moist, due to presence of a marine air layer. Relative humidity during summer usually ranges from 70 percent to 80 percent during the night and from 50 percent to 60 percent in the daytime. During the winter, daytime relative humidity is usually 50 percent to 60 percent, while nighttime relative humidity is typically 75 percent.

Atmospheric stability and mixing heights are also important parameters in the determination of pollutant dispersion. Atmospheric stability reflects the degree of atmospheric turbulence and mixing. In general, the less stable an atmosphere, the greater the turbulence, resulting in more mixing and better dispersion. Atmospheric pressure decreases with height above the earth's surface; as a result, air temperature also generally decreases with height. In the absence of other influences, air that is warmer than ambient air (that is, warmer than the air around it), such as heated exhaust from an industrial stack or vehicle tailpipe, would tend to rise indefinitely. However, the vertical dispersion of air pollutants in the Basin is limited by the presence of a persistent temperature inversion (a temperature increase with altitude) in the lower atmosphere. Warm air released at ground level will tend to rise as long as the surrounding air is cooler, but when the rising air encounters a temperature inversion, it can no longer rise and becomes trapped below the layer of warmer air. The altitude at which air temperature begins to increase with altitude is the base of the inversion and defines the mixing height. The mixing height limits the volume of air that is available for mixing and dilution of pollutants emitted near the ground. The lower the base of the inversion and the mixing height, the smaller the volume of air available for dilution of air pollutants; low mixing heights, therefore, lead to higher ambient concentrations of air pollutants.

Usually, inversions are lower before sunrise than during daylight hours. The mixing height normally increases during the day as the base of the inversion erodes because of surface heating. Along the coast of southern California, relatively cool surface air temperatures, coupled with warm, dry, subsiding air from aloft, produce inversions approximately 87 percent of the time in the early morning. The average occurrence of ground-based inversions (in which the base of the inversion is at ground level and pollutants emitted at ground level are trapped closed to ground level) is 11 days per month, ranging from 2 days in June to 22 days in December and January. Elevated inversions, in which the base of the inversion may be up to 2,500 feet above mean sea level (MSL), occur approximately 20 days each month. Mixing heights of 3,500 feet above MSL or less occur approximately 191 days each year.

Air pollutants from the South Coast Air Basin are transported in both directions between the SCAQMD and the coastal portions of Ventura and Santa Barbara counties in the South Central Coast Air Basin. The Basin also receives air pollutants from oil and gas development operations on the outer continental shelf. Both the Antelope Valley and the Coachella Valley Planning Area are impacted by pollutant transport from the South Coast Air Basin. In addition, pollutant transport occurs to the Mojave Desert, Ventura County, and San Diego County.

Although marine air generally flows into the Rancho Cucamonga area from the Pacific Ocean, the topographic features in the region around the SGGS site restrict air movement through and out of the valley. The San Gabriel and Santa Ana mountains hinder wind access into the valley from the northwest, north, and southwest, and the San Bernardino and San Jacinto mountains are significant barriers to the northeast, east, and southeast. These topographic features create a weak air flow through the valley, which is frequently blocked vertically by temperature inversions. This weak air flow contributes to stagnant conditions, which can lead to high pollutant concentrations.

Long-term average temperature and precipitation data have been collected at the Fontana Kaiser station, the nearest surface meteorological station to the proposed project site, and are presented in Table 7.1-1. The data indicate that August is usually the warmest month of the year. In the fall and spring, the afternoon temperatures are mild (in the 60s and 70s), while nights are cooler (in the 50s and 60s). In the winter, temperatures are cool in the afternoon and crisp at night. The coldest months are usually January and December. The annual average rainfall is approximately 14.8 inches, with 13 inches falling between November and March.

Table 7.1-1
Climatological Normals – Historical Average Temperature and Precipitation Data (1971-2000) for Fontana Kaiser, California

Month	Highest Mean Temperature (°F)	Lowest Mean Temperature (°F)	Mean Temperature (°F)	Mean Precipitation (in.)
January	62.2	50.4	56.6	3.5
February	64.4	54.1	58.5	3.4
March	65.9	53.4	59.0	3.5
April	67.5	55.1	62.5	0.6
May	73.3	60.4	66.7	0.2
June	77.4	65.2	72.9	0.0
July	83.6	73.7	78.3	0.0
August	85.5	74.3	79.0	0.1
September	82.0	70.6	76.2	0.3
October	73.7	64.3	69.5	0.3
November	65.8	55.7	61.3	1.3
December	60.5	52.4	56.4	1.6
Annual	85.5	50.4	66.4	14.8
Source: Western Regional Climate Center, Desert Research Institute, Las Vegas, NV http://www.wrcc.dri.edu				

Appendix K-1 contains seasonal windroses, which present the predominant wind patterns as documented by 5 years of hourly observations at the Ontario International Airport (about 3.7 miles southeast the EGS site). The annual windrose at the Ontario Airport for the years 1994, 1995, 1997, 1998, and 1999 is provided on Figure 7.1-2. These figures show that the dominant wind direction annually and in each season is west-southwest, but the frequency of winds in the sector between southwest and west varies considerably over the year. Winds are least variable during the summer, when the combined frequency of flow from this sector is above 60 percent, and most variable during winter, when the wind is from this sector less than 30 percent of the time. Particularly in the winter, the frequencies of northerly and northwesterly winds increase to 6 and 8 percent, respectively. Winds from the sector between east and south are almost completely absent during all seasons.

7.1.1.2 Existing Air Quality

Ambient air quality standards have been set by both the federal government and the State of California to protect public health and welfare with an adequate margin of safety. Pollutants for which National Ambient Air Quality Standards (NAAQS) or California Ambient Air Quality Standards (CAAQS) have been set are often referred to as "criteria" air pollutants. The term is derived from the comprehensive health and damage effects review that culminates in pollutant-specific air quality criteria documents, which precede the establishment of NAAQS and CAAQS. These standards are reviewed on a legally prescribed frequency and revised as new health and welfare effects data warrant. Each NAAQS or CAAQS is based on a specific averaging time over which the concentration is measured. Different averaging times are based upon protection against short-term, high dosage effects or longer-term, low dosage effects. NAAQS may be exceeded no more than once per year. CAAQS are not to be exceeded.

The ambient air quality in San Bernardino County is monitored at seven permanent air quality monitoring stations operated by SCAQMD. The monitoring stations within the County that are closest to the proposed project site are the Fontana-Arrow Highway (Fontana) station, the Upland station, each within 5 miles from the project site (northeast and northwest, respectively), the San Bernardino 4th Street station, and the Riverside Rubidoux station, located to the east approximately 7 miles and southeast approximately 9 miles, respectively. These stations measure all criteria pollutant concentrations, with the exceptions that the Upland station does not monitor particulate matter (PM_{10} and $PM_{2.5}$ represent particulate matter 10 microns in diameter and 2.5 microns in diameter, respectively) and sulfur dioxide (SO_2), the Fontana station does not monitor CO or lead (Pb), and the San Bernardino 4th Street station does not monitor SO_2.

The criteria pollutants monitored at these stations include ozone (O_3), PM_{10}, $PM_{2.5}$, carbon monoxide (CO), nitrogen dioxide (NO_2), SO_2, and Pb. Air quality measurements taken at these stations are presented in Tables 7.1-2 through 7.1-8. For the air quality impact analysis described in Section 7.1.2.3, the maximum recorded concentration from the most recent 5 years (2002-2006) at any of these monitoring stations were used to represent background air quality levels.

Ozone

Tables 7.1-2a through 7.1-2c show that the federal one-hour O_3 NAAQS of 0.12 parts per million (ppm) has been exceeded in each of the last 5 years at the Fontana, Upland, and Rubidoux stations (26 times in 2003 at the Fontana station with a maximum concentration of 0.176 ppm in 2003). The more stringent state O_3 CAAQS of 0.09 ppm was also exceeded each year for the past 5 years at each station (80 times in 2003 at the Rubidoux station). The federal 8-hour O_3 NAAQS of 0.08 ppm has also been exceeded frequently. The federal standard requires maintaining 0.08 ppm as a 3-year average of the fourth-highest daily maximum values. Therefore, the number of days that the maximum concentration exceeds the standard concentration is not the number of violations of the standard for the year.

The proposed project site is located in an area that is in extreme nonattainment of the state 1-hour O_3 standard.

Table 7.1-2a
Concentration Data Summary for Ozone at Fontana-Arrow Highway

Year	Highest Concentration for O_3 (ppm)		Estimated Number of Days Exceeding Standards		
	1-hour	8-hour	Federal 1-hr	Federal 8-hr	State 1-hr
2006	0.112	0.123	13	29	48
2005	0.150	0.128	9	23	49
2004	0.149	0.123	7	29	48
2003	0.176	0.148	26	43	65
2002	0.159	0.123	8	21	37

The federal 8-hour average O_3 standard is 0.08 ppm. On June 15, 2005, the 1-hour ozone standard (0.12 ppm) was revoked for all areas except the 8-hour ozone nonattainment Early Action Compact Areas (EAC). The project site is not located within one of the EAC areas that are still subject to the 1-hour ozone standard.

The state O_3 standards are 1-hour average (0.09 ppm) and 8-hour average (0.07 ppm).

Monitoring site: Fontana-Arrow Highway, 14360 Arrow Blvd, Fontana, San Bernardino County

Source: CARB-California Air Quality Data website (http://www.arb.ca.gov/aqd/aqdpage.htm)

Table 7.1-2b
Concentration Data Summary for Ozone at Upland

Year	Highest Concentration for O_3 (ppm)		Estimated Number of Days Exceeding Standards		
	1-hour	8-hour	Federal 1-hr	Federal 8-hr	State 1-hr
2006	0.166	0.131	14	25	52
2005	0.149	0.121	8	15	34
2004	0.138	0.104	3	18	31
2003	0.155	0.134	15	34	48
2002	0.139	0.116	5	19	36

The federal 8-hour average O_3 standard is 0.08 ppm. On June 15, 2005, the 1-hour ozone standard (0.12 ppm) was revoked for all areas except the 8-hour ozone nonattainment Early Action Compact Areas (EAC). The project site is not located within one of the EAC areas that are still subject to the 1-hour ozone standard.

The state O_3 standards are 1-hour average (0.09 ppm) and 8-hour average (0.07 ppm).

Monitoring site: Upland, 1350 San Bernardino Road, San Bernardino County

Source: California Air Resources Board – California Air Quality Data website (http://www.arb.ca.gov/aqd/aqdpage.htm)

Table 7.1-2c
Concentration Data Summary for Ozone at Riverside-Rubidoux

Year	Highest Concentration for O_3 (ppm)		Estimated Number of Days Exceeding Standards		
	1-hour	8-hour	Federal 1-hr	Federal 8-hr	State 1-hr
2006	0.151	0.117	8	30	45
2005	0.144	0.129	3	32	46
2004	0.141	0.114	8	35	59
2003	0.169	0.140	18	62	80
2002	0.155	0.124	12	35	56

The federal 8-hour average O_3 standard is 0.08 ppm. On June 15, 2005, the 1-hour ozone standard (0.12 ppm) was revoked for all areas except the 8-hour ozone nonattainment Early Action Compact Areas (EAC). The project site is not located within one of the EAC areas that are still subject to the 1-hour ozone standard.

The state O_3 standards are 1-hour average (0.09 ppm) and 8-hour average (0.07 ppm).

Monitoring site: Riverside-Rubidoux, 5888 Mission Blvd., Rubidoux, Riverside County

Source: California Air Resources Board – California Air Quality Data website (http://www.arb.ca.gov/aqd/aqdpage.htm)

Particulates

PM_{10}

Particulates in the air are caused by a combination of (1) windblown fugitive dust or road dust; (2) particles emitted from combustion sources (primarily carbon particles); and (3) organic, sulfate, and nitrate aerosols formed in the air from emitted hydrocarbons, sulfur oxides, and nitrogen oxides (NO_X). Respirable particulate matter is referred to as PM_{10}, which has a diameter of equal to or less than 10 microns. It can contribute to increased respiratory disease, lung damage, cancer, premature death, reduced visibility, and surface soiling. In 1987, the EPA adopted standards for PM_{10} and phased out the total suspended particulate (TSP) standards that had been in effect until then.

The South Coast Air Basin is designated as moderate nonattainment for PM_{10}. Concentration data for this pollutant in micrograms per cubic meter ($\mu g/m^3$) that were recorded within the most recent 5 years at the Fontana, San Bernardino, and Riverside-Rubidoux monitoring stations are summarized in Tables 7.1-3a through 7.1-3c, respectively, These tables show that the 24-hour average CAAQS for PM_{10} of 50 $\mu g/m^3$ is frequently exceeded in the Basin. The federal 24-hour average PM_{10} NAAQS of 150 $\mu g/m^3$ was exceeded six times in 2003 at the Rubidoux station, with a maximum recorded 24-hour PM_{10} concentration of 164 $\mu g/m^3$. The annual PM_{10} data are also presented in Tables 7.1-3a through 7.1-3c. As shown by these three tables, the Basin has not been in attainment of the state PM_{10} standards during any of the last 5 years.

Prior to July 2003, the annual geometric mean PM_{10} concentration was referred to as the state annual average. Since then, the state annual average has been changed to match the federal standards (i.e., annual arithmetic mean), which is called the national annual average and calculated as the arithmetic average of the four arithmetic quarterly averages. The federal annual PM_{10} standard was revoked by the U.S. EPA in 2006 due to a lack of evidence linking health problems to long-term exposure to coarse particle pollution. However, the measured annual geometric and arithmetic mean concentrations recorded at the nearest air monitoring stations to the EGS site have been above the California PM_{10} ambient air quality standard of 20 $\mu g/m^3$. The maximum annual arithmetic mean concentration recorded at Rubidoux was 56.2 $\mu g/m^3$ in 2002.

Table 7.1-3a
Concentration Data Summary for Particulate Matter (PM_{10}) at Fontana-Arrow Highway

Year	Highest 24-hour Concentration for PM_{10} ($\mu g/m^3$)		Annual Arithmetic Mean for PM_{10} ($\mu g/m^3$)	Estimated Number of Days Exceeding Standards	
	Federal	State	State	Federal 24-hour	State 24 hour
2006	115	NA	NA	NA	NA
2005	108	104	48.4	0	166
2004	106	101	45.7	0	149
2003	101	97	NA	NA	NA
2002	102	98	47.8	0	176

The federal PM_{10} standard is 24-hour average: 150 $\mu g/m^3$.

The state PM_{10} standards are annual arithmetic mean: 20 $\mu g/m^3$ and 24-hour average: 50 $\mu g/m^3$.

Monitoring site: Fontana-Arrow Highway, 14360 Arrow Blvd, Fontana, San Bernardino County

Source: California Air Resources Board – California Air Quality Data website (http://www.arb.ca.gov/aqd/aqdpage.htm)

NA = There were insufficient (or no) data available to determine the value.

Table 7.1-3b
Concentration Data Summary for Particulate Matter (PM_{10}) at San Bernardino-4th Street

Year	Highest 24-hour Concentration for PM_{10} ($\mu g/m^3$)		Annual Arithmetic Mean for PM_{10} ($\mu g/m^3$)	Estimated Number of Days Exceeding Standards	
	Federal	State	State	Federal 24-hour	State 24 hour
2006	83	NA	NA	NA	NA
2005	72	69	40.7	0	122
2004	118	114	46.9	0	159
2003	98	95	43.2	0	129
2002	94	90	48.2	0	194

The federal PM_{10} standard is 24-hour average: 150 $\mu g/m^3$.

The state PM_{10} standards are annual arithmetic mean: 20 $\mu g/m^3$ and 24-hour average: 50 $\mu g/m^3$.

Monitoring site: San Bernardino 4th Street, 24302 4th St., San Bernardino, San Bernardino County, CA

Source: California Air Resources Board – California Air Quality Data website (http://www.arb.ca.gov/aqd/aqdpage.htm)

NA = There were insufficient (or no) data available to determine the value.

Table 7.1-3c
Concentration Data Summary for Particulate Matter (PM_{10}) at Riverside-Rubidoux

Year	Highest 24-hour Concentration for PM_{10} (µg/m^3)		Annual Arithmetic Mean for PM_{10} (µg/m^3)	Estimated Number of Days Exceeding Standards	
	Federal	State	State	Federal 24-hour	State 24 hour
2006	99	NA	NA	NA	NA
2005	123	119	50.4	0	198
2004	137	133	53.5	0	210
2003	164	159	55.1	6	201
2002	130	126	56.2	0	228

The federal PM_{10} standard is 24-hour average: 150 µg/m^3.

The state PM_{10} standards are annual arithmetic mean: 20 µg/m^3 and 24-hour average: 50 µg/m^3.

Monitoring site: Riverside-Rubidoux, 5888 Mission Blvd., Rubidoux, Riverside County

Source: California Air Resources Board – California Air Quality Data website (http://www.arb.ca.gov/aqd/aqdpage.htm)

NA = There were insufficient (or no) data available to determine the value.

$PM_{2.5}$

Fine particulates result from fuel combustion in motor vehicles and industrial sources, residential and agricultural burning, and from atmospheric reactions involving NO_X, sulfur oxides (SO_X), and organics. Fine particulates are referred to as $PM_{2.5}$ and have a diameter equal to or less than 2.5 microns. The potential health effects of $PM_{2.5}$ are considered more serious than those of PM_{10}. In 1997, U.S. EPA established annual and 24-hour NAAQS for $PM_{2.5}$ for the first time. The standard regulating the 3-year average of the 98th percentile of 24-hour PM_{10} concentrations (35 µg/m^3) became effective on December 17, 2006.

The $PM_{2.5}$ data presented in Tables 7.1-4a through 7.1-4c for the Fontana, San Bernardino, and Riverside-Rubidoux monitoring stations show that the federal 24-hour average NAAQS of 35 µg/m^3 is exceeded in the proposed project vicinity area. The highest 24-hour $PM_{2.5}$ concentration of 106.2 µg/m^3 was measured at the San Bernardino monitoring station during 2005. The annual average $PM_{2.5}$ data for the same monitoring stations are also presented in these tables. The annual arithmetic mean concentrations are above the California $PM_{2.5}$ ambient air quality standard of 12 µg/m^3. The maximum annual arithmetic mean concentration recorded at Rubidoux was 27.4 µg/m^3 in 2002, which is also above the federal annual $PM_{2.5}$ NAAQS of 15 µg/m^3.

Table 7.1-4a
Concentration Data Summary for Particulate Matter ($PM_{2.5}$) at Fontana-Arrow Highway

Year	Highest 24-hour Concentration for $PM_{2.5}$ ($\mu g/m^3$)	Annual Arithmetic Mean for $PM_{2.5}$ ($\mu g/m^3$)	Estimated Number of Days Exceeding Standards
			Federal
2006	52.6	NA	0
2005	96.8	18.9	1
2004	71.4	19.9	1
2003	98.1	22.1	1
2002	66.6	24.3	1

The federal $PM_{2.5}$ standards are 24-hour average (35 µg/m^3) and annual arithmetic mean (15 µg/m^3).

The state $PM_{2.5}$ standard is annual arithmetic mean: 12 µg/m^3.

Monitoring site: Fontana-Arrow Highway, 14360 Arrow Blvd, Fontana, San Bernardino County

Source: California Air Resources Board – California Air Quality Data website (http://www.arb.ca.gov/aqd/aqdpage.htm)

NA = There were insufficient data available to determine the value.

Table 7.1-4b
Concentration Data Summary for Particulate Matter ($PM_{2.5}$) at San Bernardino-4th Street

Year	Highest 24-hour Concentration for $PM_{2.5}$ ($\mu g/m^3$)	Annual Arithmetic Mean for $PM_{2.5}$ ($\mu g/m^3$)	Estimated Number of Days Exceeding Standards
			Federal
2006	38.2	NA	0
2005	106.2	17.4	1
2004	93.4	21.9	4
2003	73.9	22.2	1
2002	82.1	25.8	3

The federal $PM_{2.5}$ standards are 24-hour average (35 µg/m^3) and annual arithmetic mean (15 µg/m^3).

The state $PM_{2.5}$ standard is annual arithmetic mean: 12 µg/m^3.

Monitoring site: San Bernardino 4th Street, 24302 4th St., San Bernardino, San Bernardino County, CA

Source: CARB-California Air Quality Data website (http://www.arb.ca.gov/aqd/aqdpage.htm)

NA = There were insufficient data available to determine the value.

Table 7.1-4c
Concentration Data Summary for Particulate Matter ($PM_{2.5}$) at Riverside-Rubidoux

Year	Highest 24-hour Concentration for $PM_{2.5}$ ($\mu g/m^3$)	Annual Arithmetic Mean for $PM_{2.5}$ ($\mu g/m^3$)	Estimated Number of Days Exceeding Standards
			Federal
2006	62.2	NA	0
2005	98.7	21.0	4
2004	91.7	22.1	5
2003	104.3	24.8	8
2002	77.6	27.4	8

The federal $PM_{2.5}$ standards are 24-hour average (35 $\mu g/m^3$) and annual arithmetic mean (15 $\mu g/m^3$).

The state $PM_{2.5}$ standard is annual arithmetic mean: 12 $\mu g/m^3$.

Monitoring site: Riverside-Rubidoux, 5888 Mission Blvd., Rubidoux, Riverside County

Source: CARB-California Air Quality Data website (http://www.arb.ca.gov/aqd/aqdpage.htm)

NA = There were insufficient (or no) data available to determine the value.

Carbon Monoxide

CO is a product of incomplete combustion, principally from automobiles and other mobile sources of pollution. CO emissions from wood-burning stoves and fireplaces can also be important sources of this pollutant. Health effects resulting from exposure to high CO levels can include chest pain in heart patients, headaches, and reduced mental alertness.

Recorded CO monitoring data for the San Bernardino, Upland, and Rubidoux monitoring stations are provided in Tables 7.1-5a through 7.1-5c. These tables indicate that the San Bernardino County portion of the South Coast Basin is in attainment for CO. However, San Bernardino is still classified as serious nonattainment for CO, although redesignation to attainment for the federal standard is expected to occur during 2007.

The data in Tables 7.1-5a through 7.1-5c indicate that maximum 1-hour average CO levels comply with the NAAQS and CAAQS of 20.0 ppm. This limit has not been exceeded at any station in the last 5 years. The maximum 1-hour concentration was 5.1 ppm at the San Bernardino monitoring site in 2003. The tables also show that maximum recorded 8-hour average CO levels comply with the NAAQS and CAAQS of 9.0 ppm within the last 5 years. The maximum 8-hour concentration was 4.5 ppm at the San Bernardino station in 2003. The South Coast Air Basin is currently designated as serious federal nonattainment for CO. On February 24, 2006, based on no violations in the last 5 years, the California Air Resources Board (CARB) adopted the Maintenance Plan and submitted it to U.S. EPA as a State Implementation Plan (SIP) revision, along with a request to EPA to approve a redesignation to CO attainment area. U.S. EPA has not yet ruled on this redesignation.

Table 7.1-5a
Concentration Data Summary for Carbon Monoxide at San Bernardino-4th Street

Year	Highest Concentration for CO (ppm)		Estimated Number of Days Exceeding Standards (days)			
	1-hour	8-hour	Federal 1-hour	Federal 8-hour	State 1-hour	State 8-hour
2006	2.8	1.9	0	0	0	0
2005	3.8	2.5	0	0	0	0
2004	4.1	3.4	0	0	0	0
2003	5.1	4.5	0	0	0	0
2002	4.5	3.2	0	0	0	0

The federal CO standards are 1-hour average (35 ppm) and 8-hour average (9 ppm).

The state CO standards are 1-hour average (20 ppm) and 8-hour average (9 ppm).

Monitoring site: San Bernardino 4th Street, 24302 4th St., San Bernardino, San Bernardino County, CA

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

Table 7.1-5b
Concentration Data Summary for Carbon Monoxide at Upland

Year	Highest Concentration for CO (ppm)		Estimated Number of Days Exceeding Standards (days)			
	1-hour	8-hour	Federal 1-hour	Federal 8-hour	State 1-hour	State 8-hour
2006	2.7	1.9	0	0	0	0
2005	2.5	1.9	0	0	0	0
2004	3.3	2.2	0	0	0	0
2003	3.7	2.7	0	0	0	0
2002	3.5	1.7	0	0	0	0

The federal CO standards are 1-hour average (35 ppm) and 8-hour average (9 ppm).

The state CO standards are 1-hour average (20 ppm) and 8-hour average (9 ppm).

Monitoring site: Upland, 1350 San Bernardino Road, San Bernardino County

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

Table 7.1-5c
Concentration Data Summary for Carbon Monoxide at Riverside-Rubidoux

Year	Highest Concentration for CO (ppm)		Estimated Number of Days Exceeding Standards (days)			
	1-hour	8-hour	Federal 1-hour	Federal 8-hour	State 1-hour	State 8-hour
2006	2.7	1.9	0	0	0	0
2005	3.4	2.5	0	0	0	0
2004	4.3	3.0	0	0	0	0
2003	4.5	3.7	0	0	0	0
2002	4.1	3.1	0	0	0	0

The federal CO standards are 1-hour average (35 ppm) and 8-hour average (9 ppm).

The state CO standards are 1-hour average (20 ppm) and 8-hour average (9 ppm).

Monitoring site: Riverside-Rubidoux, 5888 Mission Blvd., Rubidoux, Riverside County

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

Nitrogen Dioxide (NO_2)

Nitrogen oxides (NO_X) emissions are primarily generated from the combustion of fuels. Nitrogen oxides include nitric oxide and NO_2. Because nitric oxide converts to NO_2 in the atmosphere over time and NO_2 is the more toxic of the two, NO_2 is the listed criteria pollutant. The control of NO_2 also is important because of this pollutant's role in the atmospheric formation of ozone, the principal component of smog. It also can provoke lung irritation and damage.

Recorded NO_2 concentration data for the Fontana, Upland, and Rubidoux monitoring stations are provided in Tables 7.1-6a through 7.1-6c. As supported by the tables, the Basin has been in attainment of NO_2 for many years.

Maximum annual average (arithmetic mean) NO_2 levels comply with the federal NAAQS of 0.053 ppm. This limit has not been exceeded in the last 5 years. The maximum annual average concentration was 0.036 ppm at the Upland station in 2002. The data in the tables also show that maximum 1-hour average NO_2 levels comply with the CAAQS of 0.25 ppm. This limit also has not been exceeded in the last 5 years. The maximum 1-hour concentration was 0.122 ppm at the Upland station in 2002.

On February 23, 2007, the CARB approved new stricter ambient California standards for NO_2. The new 1-hour standard will be 0.18 ppm not to be exceeded, and the new annual average standard is 0.030 ppm. The Office of Administrative Law must approve the standards before they take effect. A CARB spokesperson stated that the standards are expected to become effective within 6-8 months following CARB's approval.

Table 7.1-6a
Concentration Data Summary for Nitrogen Dioxide at Fontana-Arrow Highway

Year	Highest 1-hour Concentration for NO_2 (ppm)	Annual Average for NO_2 (ppm)	Estimated Number of Days Exceeding Standards (days)	
			Federal	State
2006	0.087	NA	0	0
2005	0.101	0.031	0	0
2004	0.104	0.027	0	0
2003	0.117	0.030	0	0
2002	0.105	0.033	0	0

The federal NO_2 standards is annual average: 0.053 ppm

The state NO_2 standards is 1-hour average: 0.25 ppm

Monitoring site: Fontana-Arrow Highway, 14360 Arrow Blvd, Fontana, San Bernardino County

Source: California Air Resources Board – California Air Quality Data website (http://www.arb.ca.gov/aqd/aqdpage.htm)

NA = There were insufficient (or no) data available to determine the value.

Table 7.1-6b
Concentration Data Summary for Nitrogen Dioxide at Upland

Year	Highest 1-hour Concentration for NO_2 (ppm)	Annual Average for NO_2 (ppm)	Estimated Number of Days Exceeding Standards (days)	
			Federal	State
2006	0.098	NA	0	0
2005	0.102	0.031	0	0
2004	0.106	0.031	0	0
2003	0.115	0.034	0	0
2002	0.122	0.036	0	0

The federal NO_2 standards is annual average: 0.053 ppm

The state NO_2 standards is 1-hour average: 0.25 ppm

Monitoring site: Upland, 1350 San Bernardino Road, San Bernardino County

Source: California Air Resources Board – California Air Quality Data website (http://www.arb.ca.gov/aqd/aqdpage.htm)

NA = There were insufficient (or no) data available to determine the value.

Table 7.1-6c
Concentration Data Summary for Nitrogen Dioxide at Riverside-Rubidoux

Year	Highest 1-hour Concentration for NO_2 (ppm)	Annual Average for NO_2 (ppm)	Estimated Number of Days Exceeding Standards (days)	
			Federal	State
2006	0.076	NA	0	0
2005	0.077	0.022	0	0
2004	0.092	0.017	0	0
2003	0.099	0.021	0	0
2002	0.098	0.023	0	0

The federal NO_2 standards is annual average: 0.053 ppm

The state NO_2 standards is 1-hour average: 0.25 ppm

Monitoring site: Riverside-Rubidoux, 5888 Mission Blvd., Rubidoux, Riverside County

Source: California Air Resources Board – California Air Quality Data website (http://www.arb.ca.gov/aqd/aqdpage.htm)

NA = There were insufficient (or no) data available to determine the value.

Sulfur Dioxide

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 trace amounts of sulfur, while fuel oils contain much larger amounts. SO_2 can increase lung disease and breathing problems for asthmatics. It reacts in the atmosphere to form acid rain, which is destructive to crops and vegetation, as well as to buildings, materials, and works of art.

Summaries of monitored SO_2 concentration data are presented in Tables 7.1-7a and 7.1-7b, respectively, for the Fontana and Rubidoux (in Riverside County) monitoring stations. The San Bernardino and Upland stations did not monitor for SO_2. These tables show that the South Coast Air Basin is in attainment for all applicable state and federal ambient standards for SO_2.

The SO_2 data in Tables 7.1-7a and 7.1-7b demonstrate that the 24-hour average CAAQS of 0.04 ppm is not exceeded in the proposed project vicinity and the federal 24-hour average SO_2 NAAQS of 0.14 ppm has not been exceeded between 2002 and 2006. The maximum 24-hour SO_2 monitored concentration of 0.015 ppm was measured at the Rubidoux monitoring station in 2004. The recorded annual average (arithmetic mean) SO_2 concentrations at the monitoring stations are also presented in the tables and in all cases are well below the federal ambient air quality standard of 0.03 ppm. The maximum 1-hour average SO_2 levels comply with the CAAQS of 0.25 ppm. This limit also has not been exceeded in the last 5 years. The maximum 1-hour concentration was 0.024 ppm at the Rubidoux monitoring station in 2005.

Table 7.1-7a Concentration Data Summary for Sulfur Dioxide at Fontana-Arrow Highway									
Year	Highest Concentration for SO_2 (ppm)			Annual Average for SO_2 (ppm)	Estimated Number of Days Exceeding Standards (days)				
	1-hour	3-hour	24-hour		Federal 3-hour	Federal 24-hour	Federal Annual Mean	State 1-hour	State 24-hour
2006	0.008	0.004	0.003	0.002	0	0	0	0	0
2005	0.009	0.006	0.004	0.002	0	0	0	0	0
2004	0.006	0.005	0.003	0.001	0	0	0	0	0
2003	0.009	0.007	0.003	0.001	0	0	0	0	0
2002	0.015	0.009	0.005	0.002	0	0	0	0	0

The federal SO_2 standards are annual average (0.03 ppm,) 24-hour average (0.14 ppm), and 3-hour average (0.50 ppm).

The state SO_2 standards are 24-hour average (0.04 ppm) and 1-hour average (0.25 ppm).

Monitoring site: Fontana-Arrow Highway, 14360 Arrow Blvd, Fontana, San Bernardino County

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

Table 7.1-7b Concentration Data Summary for Sulfur Dioxide at Riverside-Rubidoux									
Year	Highest Concentration for SO_2 (ppm)			Annual Average for SO_2 (ppm)	Estimated Number of Days Exceeding Standards (days)				
	1-hour	3-hour	24-hour		Federal 3-hour	Federal 24-hour	Federal Annual Mean	State 1-hour	State 24-hour
2006	0.012	0.004	0.002	0.001	0	0	0	0	0
2005	0.024	0.012	0.011	0.004	0	0	0	0	0
2004	0.017	0.016	0.015	0.004	0	0	0	0	0
2003	0.018	0.015	0.012	0.003	0	0	0	0	0
2002	0.016	0.010	0.003	0.001	0	0	0	0	0

The federal SO_2 standards are annual average (0.03 ppm,) 24-hour average (0.14 ppm), and 3-hour average (0.50 ppm).

The state SO_2 standards are 24-hour average (0.04 ppm) and 1-hour average (0.25 ppm).

Monitoring site: Riverside-Rubidoux, 5888 Mission Blvd., Rubidoux, Riverside County

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

Lead

Lead exposure can occur through multiple pathways, including inhalation of air and ingestion of lead in food from water, soil, or dust contamination. Excessive exposure to lead can trigger seizures, mental retardation or behavioral disorders, and other central nervous system damage. Lead gasoline additives, nonferrous smelters, and battery plants were the most significant contributors to atmospheric lead emissions. Legislation in the early 1970s required gradual reduction of the lead content of gasoline over a period of time, which has dramatically reduced lead emissions from mobile and other combustion sources. In addition, unleaded gasoline was introduced in 1975, and together these controls have essentially eliminated violations of the lead standard for ambient air in urban areas. Measured lead concentration levels for Upland, San Bernardino, and Rubidoux are presented in Tables 7.1-8a through 7.1-8c. Complete data for 2006 were not available at the time of this AFC's preparation, thus 2001-2005 data were presented. The data in these tables support the attainment status of the South Coast Basin for lead.

Table 7.1-8a
Concentration Data Summary for Lead at Upland

Year	Highest 24-hour Concentration for Lead (μg/m^3)	Estimated Number of Days Exceeding Federal and State Standards (days)
2005	0.03	0
2004	0.03	0
2003	0.29	0
2002	0.03	0
2001	0.06	0

The federal lead standard is quarterly average: 1.5 μg/m^3.

The state lead standard is 30 days average: 1.5 μg/m^3.

Monitoring site: 1350 San Bernardino Rd, Upland, San Bernardino County

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

Table 7.1-8b
Concentration Air Pollution Data Summary for Lead at San Bernardino

Year	Highest 24-hour Concentration for Lead (μg/m^3)	Estimated Number of Days Exceeding Federal and State Standards (days)
2005	0.03	0
2004	0.03	0
2003	0.35	0
2002	0.04	0
2001	0.07	0

The federal lead standard is quarterly average: 1.5 μg/m^3.

The state lead standard is 30 days average: 1.5 μg/m^3.

Monitoring site: San Bernardino 4th Street, San Bernardino County

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

Table 7.1-8c Concentration Air Pollution Data Summary for Lead at Rubidoux		
Year	**Highest 24-hour Concentration for Lead (μg/m^3)**	**Estimated Number of Days Exceeding Federal and State Standards (days)**
2005	0.03	0
2004	0.05	0
2003	0.03	0
2002	0.06	0
2001	0.07	0

The federal lead standard is quarterly average: 1.5 µg/m^3.

The state lead standard is 30 days average: 1.5 µg/m^3.

Monitoring site: Rubidoux, Riverside County, CA

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

Particulate Sulfates

Particulate sulfates are the product of further oxidation of SO_2. Sulfate compounds consist of primary and secondary particles. Primary sulfate particles are directly emitted from open pit mines, dry lakebeds, and desert soils. Fuel combustion is another source of sulfates, both primary and secondary. Secondary sulfate particles are produced when SO_X emissions are transformed into particles through physical and chemical processes in the atmosphere. Particles can be transported long distances. The South Coast Air Basin is in attainment with the state standard for sulfates, and there is no federal standard.

Other State-Designated Criteria Pollutants

Along with sulfates, California has designated hydrogen sulfide and visibility-reducing particles as criteria pollutants, in addition to the federal criteria pollutants. The entire state is in attainment for visibility-reducing particles, and the South Coast Air Basin is in attainment for hydrogen sulfide.

7.1.2 Environmental Consequences

This section describes the analyses conducted to assess the potential air quality impacts from the proposed project. Impacts due to the proposed project are considered significant if, when combined with background ambient concentrations, they would exceed an ambient air quality standard, or if by themselves they would exceed an applicable PSD significant impact level; these standards are discussed in Section 7.1.5. Emissions estimates for both construction and operation of the proposed project are presented in this section. Dispersion model selection and setup are also described (i.e., emissions scenarios and release parameters, building wake effects, meteorological data, and receptor locations) and analysis results are presented.

7.1.2.1 Project Construction Emissions

The primary emission sources during construction will include exhaust from heavy construction equipment and vehicles and fugitive dust generated in areas disturbed by grading, excavating, and erection of facility structures. The projected construction schedule has a duration of 22 months, during which different areas within the existing EGS and a number of nearby temporary laydown areas will be disturbed at different times. Estimated land disturbance for major construction activities is summarized in Chapter 2, Facility Description and Location.

Construction equipment and vehicle exhaust emissions were estimated using equipment lists and construction scheduling information provided by the project design engineering firm, which are presented in Chapter 2, Facility Description and Location, and Appendix K-2. Equipment-specific emissions factors were used to estimate mass emissions for all criteria pollutants from diesel-fueled construction equipment and vehicles using SCAQMD OFFROAD Emission Factors. Assumptions used in calculating project construction emissions included a 22-month construction period; 22 construction days per month; a single-shift, 10-hour workday; and a 50-hour workweek. The list of fueled equipment needed during each month of the construction effort (see Table 7.1-9) served as the basis for estimating pollutant emissions throughout the term of construction and helped to identify the periods of probable maximum short-term emissions. An ultra-low fuel sulfur content of 0.0015 percent by weight (15 ppm) was assumed for all diesel construction equipment operations.

Fugitive dust emissions resulting from onsite soil disturbances were estimated using SCAQMD CEQA Handbook (SCAQMD, 1993) emission factors for bulldozing and dirt-pushing, travel on unpaved roads, and handling/storage of aggregate materials. A dust control efficiency of 85 percent for project site and temporary construction area activities was assumed to be achieved for these activities by frequent watering or other measures when required.

Emissions from on-road delivery trucks and worker commute trips were estimated using trip generation information presented in Section 2.7 in Chapter 2 and emission factors provided by SCAQMD for Onroad Vehicles from the EMFAC2007 model. Construction workers were assumed to commute to the proposed project site from locations within the greater Los Angeles area.

The short-term maximum emissions were calculated using Month 6 construction equipment. Activities in month six include grading, bulldozing, excavating, on-site pipeline and turbine construction. Annual emissions were based on the worst 12 consecutive months of the construction period, which were Months 1-12.

The emissions from each disturbed area are presented as either area sources for fugitive dust or point sources for combustion emissions for all pollutants. Point sources were selected so that the ozone limiting method (OLM) version of the AERMOD dispersion model could be used to calculate NO_2 emissions. To apply the OLM option in AERMOD to predict NO_2 concentrations, hourly ozone data are required. Hourly ozone data recorded at the SCAQMD's Fontana monitoring station for the same 5 years as the input meteorological data were used in this analysis.

The equipment point source emissions were calculated by means of the emission spreadsheet in Appendix K-2 and stack parameters for different-sized (horsepower) equipment. These stack parameters were obtained from the CARB document *Risk Management Guidance for the Permitting of New Stationary Source Diesel-Fueled Engines, October 2000*.

Detailed spreadsheets are provided in Appendix K-2, which show the calculation of emissions from all project construction activities and equipment, and the data and assumptions used in these calculations. Tables 7.1-10 and 7.1-11, respectively, present the estimated maximum daily emissions and maximum annual emissions of air pollutants due to project construction.

Table 7.1-9
Estimated Pieces of Construction Equipment and Schedules

	Construction Equipment	Average Hours Per Day	Average Units on Site Per Month																						Total Months
			1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	
1	Trackhoe Excavator	8		4	6	8	8	6	2																34
2	Backhoe	8	1	3	3	3	3	3	3	1	1	1	1	1	1	1	1	1	1	1					30
3	Bulldozer	6		4	6	8	8	6	4																40
4	Front End Loader	8	4	4	4	4	4	4	4																28
5	Bobcat	7	3	3	3	3	3	3	3																21
6	Roller Compactor	6	2	2	4	4	6	6	6									1	1	1					33
7	Plate Compactor	6	4	4	4	4	6	6	6																34
8	Caisson Drilling Rig	8		1																					1
9	Dump Truck	6	4	5	5	5	5	5	4																33
10	Paving Machine	8															1	1	1						3
11	Concrete Pump (Daily Rental)	8		1	1	1	1	1	1	1	1	1	1												10
12	Grout Mixer	3						1	1	1	1	1	1	1	1	1	1	1	1						12
13	Rough Terrain Crane – 30 Ton	8			1	1	1	1	2	2	2	2	2	1	1	1	1	1	1	1					21
14	Rough Terrain Crane – 50 Ton	8								1	1	1	1	1	1	1	1								8
15	Truck Crane – 150 Ton (Daily Rental)	8						1	1	1	1	1	1	1	1	1	1	1	1						12
16	Truck Crane – 350 Ton (Daily Rental)	8							1	2	1				1	1									6
17	Crawler Crane – 150 Ton	8		1	1																				2
18	Turbine Gantry	4								1	2	2	2	1	1										9
19	Rough Terrain Forklift	6	1	1	1	1	1	2	2	2	2	2	2	2	2	2	1	1	1	1	1				28
20	Heavy Duty Forklift	6						1	1	1	1	1	1	1											7
21	Manlifts – 40’	8						2	2	3	3	3	3	2	2	2	2	2	1						27
22	Manlifts – 60’	8						1	1	1	2	3	3	2	2	1	1	1							18
23	Manlifts – 80’	8						1	1	1	2	3	3	2	2	1	1	1							18
24	Air Compressors	8		1	1	1	1	2	2	3	3	3	3	3	2	1	1	1	1	1					30
25	Welding Machines	8			2	2	2	4	8	12	12	12	12	6	4	4	4	2	2	2					90
26	Water Truck	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1						17
27	Pick-Up Trucks	3	11	11	11	11	15	15	15	15	15	13	13	13	11	9	9	9	9	9					214

Table 7.1-10
Daily Maximum Construction Emissions of Criteria Pollutants (lbs/day)

Activity	PM_{10}	$PM_{2.5}$	CO	ROC	NO_X	SO_X
Onsite Combustion Emissions						
Diesel Construction Equipment	18.67	17.18	150.32	45.53	333.46	0.30
Dump trucks, pickup trucks and worker vehicles	0.10	0.08	1.84	0.23	1.06	0.002
Construction Combustion Subtotal (lbs)	***18.8***	***17.3***	***152.2***	***45.8***	***334.5***	***0.3***
Onsite Fugitive Dust Emissions						
Vehicle Travel on Unpaved Roads and Parking Lot	12.36	2.62	-	-	-	-
Earth clearing/Bulldozing	9.24	1.92	-	-	-	-
Earth Loading/Storage	0.47	0.10	-	-	-	-
Subtotal of Offsite Emissions (lbs)	***22.1***	***4.6***	-	-	-	-
Offsite On-Highway Emissions						
Worker Passenger Vehicle – Combustion Emissions	0.03	0.02	4.17	0.43	0.44	0.004
Worker Passenger Vehicle – Paved Road Dust	2.53	0.43	-	-	-	-
Subtotal of Offsite Emissions (lbs)	***2.56***	***0.45***	***4.17***	***0.43***	***0.44***	***0.004***
Total Max. Daily Emissions (lbs)	**43.5**	**22.5**	**156.4**	**46.2**	**334.9**	**0.3**

Notes:

CO = carbon monoxide
NO_X = nitrogen oxide(s)
PM_{10} = particulate matter less than 10 micrometers in diameter
$PM_{2.5}$ = particulate matter less than 2.5 micrometers in diameter
ROC = reactive organic compounds
SO_X = sulfur oxide(s)

Table 7.1-11 Maximum Annual Construction Emissions of Criteria Pollutants (ton/year)						
Activity	**PM_{10}**	**$PM_{2.5}$**	**CO**	**ROC**	**NO_X**	**SO_X**
Onsite Combustion Emissions						
Diesel Construction Equipment	1.46	1.35	11.71	3.62	24.88	0.02
Dump trucks, pickup trucks and worker vehicles	0.01	0.01	0.05	0.01	0.07	0.0001
Construction Combustion Subtotal (lbs)	***1.5***	***1.4***	***11.8***	***3.6***	***25.0***	***0.0***
Onsite Fugitive Dust Emissions						
Vehicle Travel on Unpaved Roads and Parking Lot	1.05	0.22	-	-	-	-
Earth clearing/Bulldozing	4.80	1.00	-	-	-	-
Earth Loading/Storage	0.05	0.01	-	-	-	-
Subtotal of Offsite Emissions (lbs)	***5.9***	***1.2***	-	-	-	-
Offsite On-Highway Emissions						
Worker Passenger Vehicle – Combustion Emissions	0.00	0.00	0.55	0.06	0.06	0.001
Worker Passenger Vehicle – Paved Road Dust	0.33	0.06	-	-	-	-
Subtotal of Offsite Emissions (lbs)	***0.33***	***0.06***	***0.55***	***0.06***	***0.06***	***0.001***
Total Max. Daily Emissions (lbs)	**7.7**	**2.7**	**12.4**	**3.7**	**25.1**	**0.0**

Notes:

CO = carbon monoxide
NO_X = nitrogen oxide(s)
PM_{10} = particulate matter less than 10 micrometers in diameter
$PM_{2.5}$ = particulate matter less than 2.5 micrometers in diameter
ROC = reactive organic compounds
SO_X = sulfur oxide(s)

7.1.2.2 Operational Emissions

The proposed combustion turbines, the supplemental HRSG duct burners and the auxiliary boiler will all use pipeline quality natural gas fuel exclusively. Table 2.5-6 in Chapter 2 presents the expected composition of the natural gas to be supplied to the Project by Southern California Gas Company (SoCalGas). Estimated emissions of sulfur oxides for combustion of this fuel by equipment of the project assumed full oxidation of all fuel sulfur to SO_2 and a natural gas sulfur content of 0.20 grains per 100 dry standard cubic feet (dscf).

Normal Turbine/HRSG Operating Emissions

The most important emission sources of the Project will be the new combustion turbine generator/heat recovery steam generator (CTG/HRSG) trains. Maximum short-term operational emissions from the CTG/HRSGs were determined from a comparative evaluation of potential emissions corresponding to turbine commissioning, normal operating conditions (including HRSG duct-firing), and CTG startup/shutdown conditions. The long-term operational emissions from the CTG/HRSG were estimated by summing the emissions contributions from normal operating conditions (including hours with and without duct-firing) and CTG/HRSG startup/shutdown conditions. Estimated annual emissions of air pollutants for the CTG/HRSGs have been calculated based on the expected operating schedule for the CTG/HRSGs presented below in Table 7.1-12.

Table 7.1-12
Maximum Proposed CTG/HRSG Operating Schedule

Operating Conditions	Annual Numbers
Number of Starts per CTG/HRSG	260
– Hot Starts	200
– Warm Starts	50
– Cold Starts	10
Number of Shutdowns	260
Startup/Shutdown Time (hours)	345
Turbine/HRSG Operation with duct firing (hours)	4,000
Turbine Operation with no duct burners (hours)	3,446
Total CTG Normal Operating Hours (without startups/shutdowns)	7,446

Each turbine/HRSG unit will be equipped with a new stack with the following dimensions:

- Height – 150 feet, 6 inches
- Diameter – 19 feet

The criteria pollutant emission rates and stack parameters provided by the CTG/HRSG vendors for three load conditions (60 percent, 80 percent, and 100 percent) at three ambient temperatures (105°F, 63°F, and 25°F) are presented in Table 7.1-13. These cases encompass CTG operations with and without duct firing, and with and without evaporative cooling of the inlet air to the turbines. The combined scenarios presented in this table bound the expected normal operating range of each proposed CTG/HRSG.

Turbine Startup and Shutdown Emissions

The expected emissions and durations associated with CTG startup and shutdown events are summarized in Table 7.1-14. Based on vendor information, a cold startup of both CTGs is expected to take 150 minutes, with initiation of the startup of the second unit lagging the first by 1 hour, but proceeding somewhat more quickly. The startup of each unit includes a gas purge stage during which no fuel is introduced (6 minutes), light-off in the 7th minute, ramp up to the full speed-no load (FSNL) condition in about 17 minutes and then a ramp-up to full load over approximately 1 additional hour, although the second unit will complete its startup in a few minutes less time because of the effect of the first unit on HRSG temperature.

Similarly, the warm and hot start sequences for the two CTGs will occur over intervals of 120 minutes and 40 minutes, respectively, and shutdown of both units will be completed in 20 minutes. During a shutdown event, the efficiency of the emission controls will continue to function at normal operating levels down to a load of 60 percent; thus, shutdown periods and emissions are measured from the time this load is reached.

Table 7.1-13
1-Hour Operating Emission Rates for CTG/HRSG Operating Load Scenarios

Case	1A	1B	1C	1D	2A	2B	2C	2D	3A	3B	3C	3D
Ambient Temperature	105°F	105°F	105°F	105°F	63°F	63°F	63°F	63°F	25°F	25°F	25°F	25°F
Ambient Humidity	15%	15%	15%	15%	65%	65%	65%	65%	60%	60%	60%	60%
CT Load	Base	Base	80%	60%	Base	Base	80%	60%	Base	Base	80%	60%
Duct Burner	Fired	Unfired	Unfired	Unfired	Fired	Unfired	Unfired	Unfired	Fired	Unfired	Unfired	Unfired
Evap. Cooler	ON	ON	OFF	OFF	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF
Exhaust Temperature	205°F	220 °F	207 °F	197 °F	188 °F	209 °F	199 °F	190 °F	184 °F	211 °F	203 °F	193 °F
Exhaust Flow rate (fps)	63.22	63.85	50.94	43.16	64.22	65.43	54.61	45.72	67.42	69.48	58.62	48.39
NO_X Emissions per Turbine/HRSG Unit												
ppmvd @ 15% O_2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
lb/hr	17.2	12.7	9.7	8.1	17.9	13.3	10.9	9.0	18.7	14.3	11.8	9.7
CO Emissions per Turbine/HRSG Unit												
ppmvd @ 15% O_2	1.9	0.8	0.8	2.0	1.8	0.8	0.8	2.0	1.7	0.8	0.8	2.0
lb/hr	9.8	3.1	2.4	4.9	9.9	3.2	2.7	5.5	9.9	3.5	2.9	5.9
VOC Emissions per Turbine/HRSG Unit												
ppmvd @ 15% O2	0.4	0.4	0.8	1.8	0.4	0.4	0.8	1.8	0.4	0.4	0.8	1.8
lb/hr as CH4	1.2	0.9	1.4	2.5	1.3	1.0	1.5	2.7	1.3	1.0	1.7	3.0
PM_{10} Emissions per Turbine/HRSG Unit												
lb/hr	3.9	3.6	3.6	3.6	3.9	3.6	3.6	3.6	3.9	3.6	3.6	3.6
SO_X Emissions per Turbine/HRSG Unit												
ppmvd @ 15% O_2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
lb/hr	1.3	1.0	0.	0.6	1.4	1.0	0.9	0.7	1.5	1.1	0.9	0.8

Notes:
CO = carbon monoxide
CT = combustion turbine
CTG/HRSG = combustion turbine generator/heat recovery steam generator
lb/hr = pounds per hour
NO_X = nitrogen oxide
O_2 = oxygen
PM_{10} = particulate matter 10 microns in diameter
ppmvd = parts per million by volume, dry
SO_X = sulfur oxides
VOC = volatile organic compounds

Table 7.1-14
Criteria Pollutant Emission Rates During Startup and Shutdown (for both turbines)

Pollutant	Cold Startup 150 minutes duration		Warm Startup 120 minutes duration		Hot Startup 40 minutes duration		Shutdown 20 minutes duration	
	Emissions		Emissions		Emissions		Emissions	
	Maximum Instantaneous Rate (lb/hr)	Total Emissions (lb/event)	Maximum Instantaneous Rate (lb/hr)	Total Emissions (lb/event)	Maximum Instantaneous Rate (lb/hr)	Total Emissions (lb/event)	Maximum Instantaneous Rate (lb/hr)	Total Emissions (lb/event)
NO_X	116	216	116	167	65	48	62	44
CO	1,557	2,605	1,605	2,000	554	551	916	911
VOC	154	270	154	207	57	56	58	56
SO_2	2.0	1.9	2.0	1.5	2.0	0.4	2.0	0.2
PM_{10}	9	15	8	11	8	3	8	3

Note: Startup/shutdown duration defined as operation of CTG below 60 percent load when gaseous emission rates (lb/hr basis) exceed the controlled rates defined as normal operation
CO = carbon monoxide
NO_X = nitrogen oxide
PM_{10} = particulate matter 10 microns in diameter
SO_2 = sulfur dioxide
VOC = volatile organic compounds

Because hours that include startup and shutdown events will have higher NO_X, CO, and reactive organic compound (ROC) emissions than the normal operating condition with fully functioning selective catalytic reduction (SCR) and CO oxidation catalyst, they were incorporated (as applicable) into the worst-case short- and long-term emissions estimates in the air quality dispersion modeling simulations for these pollutants.

Auxiliary Boiler Emissions

The proposed project will also include the operation of a natural gas-fired auxiliary boiler, which will be used to provide heat for maintaining HRSG temperature in order to facilitate faster turbine startups, and thus, faster attainment of fully controlled emission levels. The rated fuel energy input capacity of this boiler is 56 million BTUs per hour (MMBTU/hr). The Applicant intends to permit this boiler for up to 4,000 operating hours per year. Representative stack parameters for the auxiliary boiler are provided in Table 7.1-15. Emission rates shown in this table are based on vendor supplied emission factors. NO_X emissions are based on 9 ppm and CO emissions are based on 50 ppm, which is consistent with recent Best Available Control Technology (BACT) determinations for similar boilers within SCAQMD.

No other emissions sources at the EGS would change as a direct result of the proposed project. Specifically, the operations of the existing Unit 3 and Unit 4 utility boilers are not expected to change from current levels.

Table 7.1-15
Auxiliary Boiler Emission Parameters

Pollutant	Emission Factor (lb/MMBtu LHV)	Emissions	
		lb/hr	ton/yr
NO_X	0.0137	0.69	1.39
CO	0.0471	2.38	4.75
PM_{10}	0.0064	0.32	0.64
SO_2	0.0008	0.04	0.08
VOC	0.0051	0.26	0.51

Notes:
NO_X emissions based on 9 ppm @ 3% O_2 dry.
Annual emissions based on 4,000 hours of operation
Boiler Heat Input: 56 MMBtu/hr (HHV)
Stack Height: 100 feet
Stack Diameter: 3 feet
Stack Exhaust Flow Rate at Full Firing: 15,246 ACFM
Stack Exhaust Temperature at Full Firing: 265 ºF
CO = carbon monoxide
NO_X = nitrogen oxide
PM_{10} = particulate matter 10 microns in diameter
SO_2 = sulfur dioxide
VOC = volatile organic compounds
MMBtu = million British thermal units
LHV = lower heating value

Emissions Scenarios for Modeling

Reasonable worst-case project emissions scenarios were developed for each pollutant and averaging time for which modeling is required to evaluate the proposed project's maximum potential impacts on air quality, acid deposition, and visibility. These scenarios form the basis for the air dispersion modeling analyses presented in Section 7.1.2.3. Some notes regarding the selection of these scenarios and the resulting emission calculations are provided below.

The PM_{10} non-startup or shutdown emission rates are based on test data from a similar turbine with a 20 percent margin and typical duct-burner vendor guaranteed values, and include both filterable (front-half) and condensable (back-half) particulate matter. The PM_{10} emission rate per turbine operating without duct firing is 3.6 lb/hr, for all loads and ambient temperatures. The PM_{10} emission rate per turbine operating with duct firing is 3.85 lb/hr, for 100 percent load and all ambient temperatures.

Estimated annual emission totals for all pollutants incorporate the maximum requested numbers of cold, warm, and hot startups and shutdowns, as well as the proposed maximum steady-state operating hours with and without duct firing (see Table 7.1-12). For purposes of developing the annual emission estimates, the contributions associated with all normal operating hours were calculated based on assumed 100 percent turbine load and ambient temperature of 63ºF for the specified number of hours per year. Emissions for normal operating hours with duct firing assumed the maximum duct burner fuel input rate at 63°F. The analysis is conservative because no credit was taken for estimated downtime associated with each shutdown. Estimated annual emissions for the two turbines are presented in Table 7.1-16. Emissions calculations for all scenarios are contained in Appendix K-3.

Short-term turbine/HRSG emissions were calculated for the pollutant and averaging times corresponding to the ambient air quality standards. The worst-case startup condition was assumed for purposes of estimating maximum 1-hour emission rates for all pollutants. A cold or warm startup for both turbines would produce the worst-case hourly NO_X emissions and a warm startup would result in the highest hourly CO emission rate. However, SO_X emissions would be directly proportional to fuel usage. Since the highest maximum fuel usage rate would occur when both turbines and duct burners are running at 100 percent with an ambient temperature of 25°F, this condition was selected to represent maximum hourly SO_X emissions.

The 3-hour SO_X emission rate was calculated based on a scenario with both turbines and duct burners running at 100 percent for the ambient temperature of 25°F. The 8-hour maximum CO emission rate was calculated assuming one full cold start, one shutdown, and the balance of time operating at the worst-case operating condition (both turbines and duct burners are running 100 percent and the ambient temperature is 25°F).

The maximum 24-hour turbine/HRSG emission rate for NO_X (used in modeling the proposed project's impacts to visibility) and the maximum PM_{10} rate for the same averaging period were calculated assuming both turbines undergo one cold start, one shutdown, and one additional hot startup, with the balance of the day spent at the worst-case operating condition (both turbines and duct burners are running at 100 percent and the ambient temperature is 25°F). The hot start is included to represent the emissions that could occur in the event a turbine trips and shuts down unintentionally, which would require a restart of the unit. This assumption clearly results in conservative 24-hour emissions estimates, in that no credit is taken for down time after the first shutdown or after the turbine trip. The SO_X worst-case 24-hour emission rate was calculated assuming both turbines and duct burners are running at 100 percent for 24 hours at the ambient temperature is 25°F.

Estimated annual emissions from the auxiliary boiler are based on 4,000 hours of operation per year at the maximum fuel input rate. Emissions for all short-term averaging periods (1 to 24 hours) assume continuous operation at this maximum rate (see Table 7.1-15).

Table 7.1-16 summarizes the worst-case emissions scenarios adopted to assess maximum impacts to air quality and air quality-related values in the modeling analyses presented in Section 7.1.2.3. Note that turbine commissioning impacts are evaluated separately in the modeling due to the temporary, one-time nature of this activity.

Table 7.1-16
Criteria Pollutant Sources and Emission Totals for the Worst-Case Project Emissions Scenarios for All Averaging Times

Averaging Time	Operating Equipment	Pollutant	Emissions in pounds – Entire Period: Both CTG/HRSGs	Emissions in pounds – Entire Period: New Auxiliary Boiler
1-hour	**NO_X:** Cold or warm startup hour (both turbines); **CO:** Warm startup hour (both turbines) **SO_X:** Full-load turbine operation with duct firing (both turbines) at 25ºF ambient temperature. **All:** Aux boiler operation at 100% fuel input rate	NO_X	116	0.69
		CO	1,605	2.38
		SO_X	2.9	0.04
3-hour	**SO_X:** Continuous full-load turbine operation with duct firing (both turbines) at 25ºF ambient temperature. **All:** Continuous aux boiler operation at 100% fuel input rate	SO_X	8.7	0.12
8-hour	**CO:** One cold start, one shutdown and remainder of period at full load operation with full duct firing (both turbines) at 25°F ambient temperature **All:** Continuous aux boiler operation at 100% fuel input rate	CO	3,084	19.04
24-hour	**NO_X, PM_{10}:** One cold start, one shutdown, one hot start and remainder of period at full load operation with full duct firing (both turbines) at 25°F ambient temperature **SO_X:** Continuous full-load turbine operation with duct firing (both turbines) at 25ºF ambient temperature. **All:** Continuous aux boiler operation at 100% fuel input rate	PM_{10}	185	7.68
		NO_X	1,075	16.56
		SO_X	70	0.96
Annual	**SO_X, NO_X, PM_{10}:** Both turbines operate at full load for 7,446 hours at 63°F (4,000 hours with duct firing), 200 hot starts, 50 warm starts, 10 cold starts and 260 shutdowns **All:** Aux boiler operation at 100% fuel input rate for 4,000 hours	NO_X	266,276	2,780
		PM_{10}	57,661	9,500
		SO_X	18,482	120

Notes:

CO = carbon monoxide
ºF = degrees Fahrenheit
NO_X = nitrogen oxide(s)
SO_X = sulfur oxides
PM_{10} = particulate matter less than 10 micrometers in diameter

Combined Annual Project Emissions

The total combined annual emissions from all emission sources of the proposed project are shown in Table 7.1-17, including the two turbine/HRSG units and the auxiliary boiler. Annual emissions of all pollutants were calculated assuming 200 hot startups, 50 warm startups and 10 cold startups, and 260 shutdown events, in addition to 7,446 hours of normal operational emissions calculated at 63°F (4,000 hours of which include duct firing).

Table 7.1-17
Total Project Annual Emissions of Criteria Pollutants

Pollutant	Emissions (tons/year)[1,2,3]
SO_2	9.26
NO_X	134.39
ROC	28.31
PM_{10}[4]	33.55
CO	292.15
Lead[5]	<0.6

Notes:
[1] Includes emissions from two new CTG/HRSG units and auxiliary boiler
[2] CTG emissions based on 7,446 hours of normal operation (4,000 hours with duct firing), 200 hot starts, 50 warm starts, 10 cold starts and 260 shutdowns
[3] Auxiliary boiler emissions based on 4,000 hours per year of operation at maximum fuel input.
[4] PM_{10} emissions includes both filterable (front-half) and condensable (back-half) particulates
[5] Lead emissions are 'non-detect' from AP-42 for CTGs firing natural gas
CO = carbon monoxide
NO_X = nitrogen oxides
PM_{10} = particulate matter less than 10 micrometers in diameter
ROC = reactive organic compounds
SO_2 = sulfur dioxide

Combustion Turbine Commissioning Emissions

Commissioning of each new combustion turbine will be performed in a defined series of tests that will be conducted following its installation at the proposed project facility. The specific tests to be run on each combustion turbine include:

- first fire,
- FSNL and first synchronization,
- manual trips/mechanical overspeed trip test,
- electronic overspeed tests,
- initial synchronization,
- emission-pulsation tune,
- low load,
- dry low NO_X (DLN) burner tune,
- loss of CT processor testing,
- individual CTG/HRSG steam blows,
- combined CTG/HRSG steam blows,
- full load performance and reliability testing, and
- Continuous Emission Monitoring Systems (CEMS) certification

The first four commissioning tests typically each take a day or less to complete. The DLN burner tuning test may take up to 3 days. The last two tests may be run simultaneously and typically last about 2 weeks. In addition, the combustion turbines will be run during the commissioning of both HRSGs and the steam turbine.

The duration of all tests may be affected by unforeseen events and therefore can only be only estimated in advance. A maximum of 500 hours of operation during commissioning of each combustion turbine with partially abated emissions is expected over a period not to exceed 5 months. A minimum of one turbine start would be needed for each test. Additional starts may be necessary. The annual frequency of turbine starts during the year when commissioning occurs is not expected to exceed the frequency of turbine starts during operation (see Table 7.1-12). Fuel flow monitoring will be conducted for all tests.

Cold, pre-operational equipment checks will be required. However, these checks will not require the equipment to be running or emitting air pollutants. The Applicant proposes a commissioning period of approximately 5 months during which all installed equipment will be run and tested. The period will be divided into four phases:

1. Gas Turbine 1 (GT-1) Commissioning,
2. Gas Turbine 2 (GT-2) Commissioning,
3. Commissioning of both HRSGs and the steam turbine, and
4. Performance and Reliability Testing of the entire plant together.

The gas turbine commissioning periods will begin when the turbines first burn natural gas. The Applicant will make every effort to minimize emissions of CO, VOC, and NO_X during the commissioning period. However, not all of the equipment to abate these emissions will be fully operational at the start of the commissioning period. The Applicant requests a maximum of 500 hours of partially abated emissions for each gas turbine train.

When it has been installed, the oxidation catalyst in each train will abate CO and VOC emissions from the gas turbine and the duct burners because it is essentially a passive device. While the oxidation catalyst will be in some cases able to be installed prior to initial startup of the combustion turbines, it may not be installed until late in the commissioning period. The SCR catalyst may not be installed at the same time as the oxidation catalyst. NO_X emissions from the gas turbines and the duct burners may be only partially abated during times that the gas turbine burners are being tuned and the SCR system is being tested. Regardless of the fact that the oxidation catalyst and SCR may not be installed until late in the commissioning process, the inherent low emissions of NO_X, CO, and VOC associated with the DLN combustors will ensure that the impacts of these emissions are kept to acceptable levels. Dispersion modeling to evaluate the impacts of commissioning tests on local air quality is presented in Section 7.1.2.3.

Conservative, worst-case turbine commissioning emissions were estimated by assuming that the control efficiency of the applicable abatement systems will essentially be zero during the initial commissioning phase. After the combined steam blows are completed, it is assumed that the oxidation and SCR catalysts are installed. The expected control efficiency of the SCR and CO catalyst during normal operation (without duct firing) is approximately 78 percent for NO_X, 80 percent for CO, and 30 percent for VOC. Therefore, the worst-case commissioning emission rates (at turbine loads greater than 60 percent) would be about 4.5 times the normal NO_X rate, 5 times the normal CO rate, and 1.5 times the normal VOC rate.

The durations and corresponding pollutant emission rates of individual commissioning tests for a single combustion turbine generator are shown in Table 7.1-18.

Table 7.1-18
Durations and Criteria Pollutant Emissions for Commissioning of a Single CTG

Activity	Duration (hours)	CT Load (%)	Exhaust Temp (ºF)	Exhaust Flow Rate (klbs/hr)	Pollutant Emission Rates				
					NO_X (lb/hr)	CO (lb/hr)	VOC (lb/hr)	SO_2 (lb/hr)	PM_{10} (lb/hr)
First fire to FSNL	12	0%	200	2,646	43	3,520	44	0.2	5
Green rotor run-in	12	0%	200	2,646	43	3,520	44	0.2	5
Manual Trips/Mechanical Overspeed trip test	8	0%	200	2,646	43	3,520	44	0.2	5
GT FSNL Lean-Lean Mode	8	0%	200	2,646	43	3,520	44	0.2	5
Electronic Overspeed Tests	8	0%	200	2,646	43	3,520	44	0.2	5
Unanticipated problems	8	0%	200	2,646	43	3,520	44	0.2	5
Initial Synchronization	4	4%	200	2,647.5	63	3,455	51	0.3	5
On-line excitation checks	16	4%	200	2,647.5	63	3,455	51	0.3	5
DLN Tuning/Load Testing – 0%	12	0%	200	2,646	43	3,520	44	0.2	5
DLN Tuning/Load Testing – 25%	12	25%	200	2,660	119	3,132	83	0.4	5
DLN Tuning/Load Testing – 50%	12	50%	200	2,675.5	59	361	24	0.6	5
DLN Tuning/Load Testing – 75%	12	75%	200	3,006	47	13	3	0.8	4
DLN Tuning/Load Testing – 100%	12	100%	200	3,679	109	66	1	1.4	4
Loss of CT Processor Testing	8	100%	200	3,679	109	66	1	1.4	4
CTG 1 steam blow 1	12	4%	200	2,647.5	63	3,455	51	0.3	5
CTG 1 steam blow 2	12	4%	200	2,647.5	63	3,455	51	0.3	5
CTG 1 steam blow 3	12	4%	200	2,647.5	63	3,455	51	0.3	5
CTG 1 steam blow 4	12	4%	200	2,647.5	63	3,455	51	0.3	5

CT = combustion turbine
CTG = combustion turbine generator
DLN = dry low nitrogen oxide(s)
FSNL = full speed, no load

Greenhouse Gas Emissions

In 2006, the California Assembly passed a law (AB32) directing CARB to develop regulations to reduce statewide greenhouse gas emissions to 1990 levels by 2020. Potential greenhouse gas emissions from the proposed project were calculated using the California Climate Action Registry power/utility protocol. The estimated greenhouse gas emissions from the project, which includes the two new CTG/HRSGs and auxiliary boiler, are presented in Table 7.1-19; the CO_2 emission rate for the proposed combined-cycle unit is approximately 910 lb/MW-hr. Additional calculation details are provided in Appendix K-4.

Table 7.1-19
Greenhouse Gas Emissions from the Project

Emission Rate (metric tons/year)			
CO_2	CH_4	N_2O	Total CO_2 Equivalent
1,889,268	138	48	1,907,170

CO_2 = carbon dioxide
CH_4 = methane
N_20 = nitrous oxide

7.1.2.3 Air Quality Impacts Analysis

The purpose of the air quality impact analyses is to evaluate whether criteria pollutant emissions resulting from the proposed project, would cause or contribute significantly to a violation of a California or national ambient air quality standard or contribute significantly to degradation of air quality related values in Class I areas. Mathematical models designed to simulate the atmospheric transport and dispersion of airborne pollutants are used to quantify the maximum expected impacts of project emissions for comparison with applicable regulatory criteria. Potential impacts of toxic air contaminant emissions from the proposed project are evaluated in Section 7.6, Public Health.

Separate criteria pollutant modeling analyses were conducted to address the air quality effects of emissions from project construction activities and facility operations because these activities would occur at different times. Impacts from construction activities include fugitive dust from grading and excavation of disturbed areas and exhaust combustion products from diesel- and gasoline-fueled construction equipment and vehicles. The impacts from operations would be associated with natural gas combustion in the CTGs and duct burners of the combined cycle units, as well as in the auxiliary boiler that will support these units.

The air quality modeling methodology described in this section has been documented in a formal modeling protocol, which has been submitted for comments to CEC, SCAQMD, and U.S. EPA Region IX. A copy of this protocol is provided in Appendix K-5. The modeling approaches used to assess various aspects of the proposed project's potential impacts to air quality are discussed below.

Model and Model Option Selections

The impacts of project construction and operations on criteria pollutant concentrations in receptor areas within 31 miles (50 kilometers) from the SGGS site were evaluated using the American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD) (version 04300). AERMOD is appropriate for this Application because it has the ability to assess dispersion of emission plumes from multiple point, area, or volume sources in flat, simple, and complex terrain and to use sequential hourly meteorological input data. The regulatory default options were used, including building and stack tip downwash, default wind speed profiles, exclusion of deposition and gravitational settling, consideration of buoyant plume rise, and complex terrain.

For the AERMOD simulations to evaluate construction and operations impacts of NO_2 concentrations, the ozone-limiting method option of the model was used to take into account the role of ambient ozone in limiting the conversion of emitted NO_X (which occurs mostly in the form of NO) to NO_2, the pollutant regulated by ambient standards. The input data to the AERMOD-OLM model includes representative hourly ozone monitoring data for the same years corresponding to the meteorological input record. These simulations used the ozone data from the SCAQMD Fontana monitoring station for the years 1994, 1995, 1997, 1998, and 1999.

To evaluate whether urban or rural dispersion parameters should be used in the model simulations, an analysis of land use adjacent to the proposed project site was conducted in accordance with Section 8.2.8 of the *Guideline on Air Quality Models* (U.S. EPA [2003] and Auer [1978]), EPA AERMOD implementation guide (2004), and its addendum (2006a). Based on the Auer land use classification procedure, more than 50 percent of the area within a 1.86-mile (3-kilometer) radius of the proposed project site is appropriately classified as urban. In addition, land use characteristics for the entire 360 degrees out to a distance of 1.86 miles (3 kilometers) surrounding both the project site and the Ontario Airport (the closest surface meteorological station) are entirely urban. Thus, according to the EPA AERMOD implementation guide, AERMOD's urban option was selected. Accordingly, the land use parameter values shown in Table 7.1-20 were used when processing the Ontario meteorological data.

Table 7.1-20
AERMET Land Use Characteristics

Land Use Characteristic	Spring	Summer	Autumn	Winter
Albedo	0.14	0.16	0.14	0.14
Bowen Ratio	2.0	4.0	4.0	2.0
Surface Roughness (m)	1.0	1.0	1.0	1.0

Building Wake Effects

The effects of building wakes (i.e., downwash) on the plumes from the proposed project's CTGs and auxiliary boiler were evaluated in the modeling for operational emissions, in accordance with U.S. EPA guidance (U.S. EPA, 1985). Data on the buildings within new and existing areas of the EGS site that could potentially cause plume downwash effects for the new Units 61 and 62 stacks and the auxiliary boiler stack were determined for different wind directions using the U.S. EPA Building Profile Input Program – Prime (BPIP-Prime) (Version 98086) (U.S. EPA, 1995). Eight structures were identified within the EGS site to be included in the downwash analysis:

- Air-cooled condenser
- CTG1
- CTG2
- HRSG1
- HRSG2
- Steam turbine
- Oil tank 1
- Oil tank 2

Additional structures, including in the BPIP-Prime simulations to support modeling of cumulative emission sources, with the existing EGS Units 3 and 4, were as follows:

- Unit 3 cooling tower
- Unit 4 cooling tower
- Warehouse

- Shops
- Unit 3 and 4 structure
- Unit 1 and 2 structure
- North deionizing tank
- South deionizing tank

The results of the BPIP-Prime analysis were included in the AERMOD input files to enable downwash effects to be simulated. Input and output electronic files for the BPIP-Prime analysis are included with those from all other dispersion modeling analyses on the digital versatile discs (DVDs) that are being submitted to accompany this Application.

Meteorological Data

Meteorological data suitable for direct input to AERMOD were purchased from Trinity Consulting. Hourly surface data in CD144 format for calendar years 1994, 1995, 1997, 1998, and 1999 were obtained for the Ontario International Airport meteorological station located in Ontario, about 3.7 miles southwest of the proposed project site. The data from this station for 1996 did not meet the 90 percent data capture rate that is normally required for regulatory permitting in California, and was thus replaced by 1994 data to complete a valid 5-year input dataset. Concurrent upper air sounding data collected at Edwards Air Force Base in California were used with the Ontario surface data to run the AERMET preprocessor program in order to generate an AERMOD-ready meteorological input file for the selected 5-year period.

The meteorological data recorded at Ontario International Airport are acceptable to represent dispersion conditions at the SGGS facility for two reasons: proximity and terrain similarity. The terrain immediately surrounding the proposed project site can be categorized as flat, or gradually sloping urban area. The terrain around the Ontario International Airport is also a relatively flat, or gradually sloping urban area; thus, the land use and the location with respect to near-field terrain features are similar. Additionally, there are no significant terrain features separating the Ontario Airport from the project site that would cause differences in wind or temperature conditions between these respective areas. Therefore, the 5 years of meteorological data selected from the Ontario International Airport were determined to be representative for purposes of evaluating the proposed project’s air quality impacts. The Ontario International Airport is the closest full-time meteorological recording station to the project site; therefore, meteorological conditions at the sites will be very similar.

The Edwards Air Force Base upper air data monitoring station is located approximately 60 miles northwest of proposed project site. This is the closest upper air station and the data from Edwards were determined to be the most representative data available for use in this modeling analysis.

Figure 7.1-2 presents the annual windrose based on the 1994-1999 meteorological data from the Ontario Airport. Seasonal windroses based on the 5 years of Ontario Airport surface meteorological data are provided as Appendix K-1. Winds for all seasons and all years blow predominantly from the west and southwest directions, although the directional pattern is more variable during the winter.

Receptor Locations

The receptor grids used in the AERMOD modeling analyses described in this protocol for operational sources were as follows:

- 25-meter spacing along the fence line and extending from the fence line out to 100 meters beyond the property line;

- 100-meter spacing from 100 m to 1 km beyond the property line;

- 500-meter spacing within 1 to 5 km of property line; and
- 1,000-meter spacing within 5 to 10 km of property line.

Figures 7.1-3 and 7.1-4 show the placement of near-field and far-field receptor points, respectively. Terrain heights at receptor grid points were determined from U.S. Geological Survey (USGS) digital elevation model (DEM) files. In the course of the refined modeling analysis to evaluate operational project emissions, if a maximum predicted concentration for a particular pollutant and averaging time was located within a portion of the receptor grid with spacing greater than 25 meters, a supplemental dense receptor grid was placed around the original maximum concentration point and the model was rerun. The dense grid used 25-meter spacing and extended to the next grid point in all directions from the original point of maximum concentration. Terrain heights specifically corresponding to the supplementary grid points will be determined from the USGS DEM files in the same manner as for the original receptors.

Due to the large computational time required to run AERMOD for multiple sources and 5 years of hourly meteorological input data, this receptor grid, with the additional dense nested grid points, was determined to best balance the need to predict maximum pollutant concentrations and allow all operational modeling runs to be completed within a reasonable period of time.

Because construction emission sources release pollutants to the atmosphere from small equipment stacks or from soil disturbances at ground level, maximum predicted construction impacts for all pollutants and averaging times typically occur within the first kilometer from the SGGS site boundary. Accordingly, only receptors out to a distance of 1 km were used for the construction modeling.

Construction Impacts Modeling

Section 7.1.2.1 describes the development of project emissions estimates over the planned 22-month construction period. For purposes of evaluating construction air quality impacts, it is useful to break the construction schedule into a sequence of essentially nonoverlapping phases, each occurring on specific areas of the proposed project site and with characteristic equipment and vehicle requirements. An Excel workbook was created to estimate pollutant emissions from construction activities, with separate worksheets for the equipment exhaust and fugitive dust emissions associated with short-term and annual construction activities. Emissions from worker commuter trips to and from the project site during specific construction activities were also included (see Appendix K-2).

Worst-case modeling was conducted for short-term averaging times using all construction equipment from Month 6. Annual emissions were modeled for Months 1-12 of the construction schedule.

All construction activities were assumed to occur during a 10-hour work day. Calculation of annual emissions was based on all construction activities over the consecutive 12-month period that would produce the highest emissions of all pollutants. The OLM option of AERMOD was used to account for the role of ambient ozone levels on the atmospheric conversion rate of NO_X emissions (initially mostly in the form of NO) to NO_2 (the pollutant addressed by ambient standards). The record of hourly ozone measurements at the SCAQMD Fontana monitoring station during the same 5 years of the meteorological input data set were used to support the OLM calculations.

Turbine Impact Screening Modeling

As described previously, a screening modeling analysis was performed to determine which CTG/HRSG operating mode and stack parameters produced worst-case offsite impacts (i.e., maximum ground-level concentrations for each pollutant and averaging time). Only the emissions from the CTGs with and without duct firing and evaporative cooling were considered in this preliminary modeling step. The screening modeling used AERMOD, as described in the previous sections. Building wake information and the receptor grid described above were also used. All 5 years of meteorological data were used in the screening analysis.

The AERMOD model simulated natural gas combustion emissions from both 19-foot-diameter (5.79 meters), 150.5-foot-tall (45.87 meters) stacks for the two CTG/HRSG units. The stacks were modeled as point sources at their proposed locations within the EGS site. Table 7.1-21 summarizes the combustion CTG screening results for the different CTG operating loads and ambient temperature condition. First, the model was run with unit emissions (1.0 grams per second) from each stack to obtain normalized concentrations that are not specific to any pollutant. CTG vendor data used to derive the stack parameters for the different operating conditions evaluated in this screening analysis are included in Appendix K-3.

The maximum ground-level concentrations predicted to occur offsite with unit turbine emission rates for each of the 12 operating conditions shown in Table 7.1-21 were then multiplied by the corresponding turbine emission rates for specific pollutants. The highest resulting concentration values for each pollutant and averaging time were then identified (see bolded values in the table).

The stack parameters associated with these maximum predicted impacts were used in all subsequent simulations of the refined AERMOD analyses described in the next subsection. Note that the lower exhaust temperatures and flow rates at reduced turbine loads correspond to reduced plume rise, in some cases resulting in higher offsite pollutant concentrations than the higher baseload emissions. Model input and output files for the screening modeling analysis are included with those from all other modeling tasks on the Air Quality and Public Health Modeling DVDs that are provided separately with this Application.

Refined Modeling

A refined modeling analysis was performed to estimate offsite criteria pollutant impacts from operational emissions of the proposed project. The modeling was performed as described in the previous sections, using 5 years of hourly meteorological input data. The new project CTG/HRSGs were modeled assuming the worst-case emissions corresponding to each averaging time and the turbine stack parameters that were determined in the turbine screening analysis (see previous subsection). The maximum mass emission rates that would occur over any averaging time, whether during turbine startups, normal operations, turbine shutdowns, or a combination of these activities, were used in all refined modeling analyses (see Table 7.1-16). Emissions from the new auxiliary boiler operating at maximum capacity were also included in the refined modeling runs. Emission rate calculations and assumptions used for all pollutants and averaging times are documented in Appendix K-3.

Fumigation Analysis

Fumigation may occur when a plume that was originally emitted into a stable layer of air is mixed rapidly to ground level when unstable air below the plume reaches plume height. Fumigation can cause relatively high ground-level concentrations for some elevated point sources. Fumigation can occur during the breakup of the nocturnal radiation inversion by solar warming of the ground surface (inversion breakup fumigation), or by the transport of pollutants from a stable marine environment to an unstable inland environment (shoreline fumigation). In general, this phenomenon will be transient, seldom persisting for as long as an hour.

The U.S. EPA SCREEN3 model (Version 9600043) is frequently used to estimate peak short-term fumigation pollutant concentrations. However, according to U.S. EPA modeling guidance, this procedure is only appropriate for rural areas. Since, as described previously, the proposed project vicinity is decidedly urban, SCREEN3 fumigation modeling was not conducted.

Table 7.1-21
Turbine Screening Modeling Results

Stack Parameters Normal and Operational Emissions per Turbine												
Case	**Case 1A**	**Case 1B**	**Case 1C**	**Case 1D**	**Case 2A**	**Case 2B**	**Case 2C**	**Case 2D**	**Case 3A**	**Case 3B**	**Case 3C**	**Case 3D**
Ambient Temperature	**105°F – 15% RH**				**63°F – 65% RH**				**25°F – 60% RH**			
CTG Load Level	**Base**	**Base**	**80%**	**60%**	**Base**	**Base**	**80%**	**60%**	**Base**	**Base**	**80%**	**60%**
Duct Burner Status	Fired	Unfired	Unfired	Unfired	Fired	Unfired	Unfired	Unfired	Fired	Unfired	Unfired	Unfired
Evaporative Cooler Status	ON	ON	OFF	OFF	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF
Stack Outlet Temperature (°F)	204.6	220	206.5	197.3	188.1	208.6	198.7	190.2	183.9	211.3	202.8	192.9
Stack Exit Velocity (ft/s)	63.22	63.85	50.94	43.16	64.22	65.43	54.61	45.72	67.42	69.49	58.62	48.39
Stack Outlet Temperature (°K)	369.0	377.6	370.1	365.0	359.9	371.3	365.8	361.0	357.5	372.8	368.0	362.5
Stack Exit Velocity (m/s)	19.27	19.46	15.53	13.16	19.58	19.94	16.65	13.94	20.55	21.18	17.87	14.75
NO_X (lb/hr)	17.2	12.7	9.7	8.1	17.9	13.3	10.9	9.0	18.7	14.3	11.8	9.7
CO (lb/hr)	9.8	3.1	2.4	4.9	9.9	3.2	2.7	5.5	9.9	3.5	2.9	5.9
SO_2 (lb/hr)	1.3	1.0	0.8	0.6	1.4	1.0	0.9	0.7	1.5	1.1	0.9	0.8
PM_{10} (lb/hr)	3.9	3.6	3.6	3.6	3.9	3.6	3.6	3.6	3.9	3.6	3.6	3.6
NO_X (g/s)	2.17	1.60	1.23	1.02	2.25	1.68	1.38	1.13	2.36	1.80	1.49	1.22
CO (g/s)	1.23	0.40	0.30	0.62	1.25	0.41	0.34	0.69	1.25	0.44	0.36	0.74
SO_2 (g/s)	0.17	0.12	0.10	0.08	0.18	0.13	0.11	0.09	0.18	0.14	0.12	0.10
PM_{10} (g/s)	0.49	0.45	0.45	0.45	0.49	0.45	0.45	0.45	0.49	0.45	0.45	0.45
Model Results – Maximum X/Q concentration ($\mu g/m^3/(g/s)$) predicted from AERMOD												
1 hour	5.850	5.315	8.618	10.548	6.054	5.237	7.996	10.149	5.491	4.268	7.014	9.519
3 hour	3.557	3.484	4.582	6.855	3.545	3.406	4.292	6.641	3.349	3.160	3.897	6.553
8 hour	2.439	2.343	3.035	3.917	2.491	2.344	2.909	3.827	2.408	2.299	2.544	3.755
24 hour	1.828	1.793	2.167	2.281	1.899	1.851	2.052	2.230	1.865	1.797	1.922	2.217
Annual	0.392	0.368	0.495	0.622	0.410	0.373	0.471	0.598	0.396	0.344	0.429	0.553
Maximum Predicted Offsite Pollutant Concentrations due to Turbine Emissions for Each Averaging Time												
NO_X 1 hour	12.711	8.500	10.556	10.745	13.639	8.791	11.024	11.513	**12.958**	7.671	10.460	11.623
NO_X annual	0.852	0.589	0.606	0.633	0.924	0.625	0.650	0.678	**0.934**	0.617	0.639	0.675
CO 1 hour	7.221	2.070	2.571	6.542	**7.562**	2.141	2.685	7.010	6.875	1.868	2.548	7.077
CO 8 hour	3.011	0.913	0.905	2.429	**3.111**	0.958	0.977	2.643	3.016	1.006	0.924	2.792
SO_2 1 hour	0.988	0.661	0.821	0.837	**1.060**	0.684	0.858	0.897	1.008	0.597	0.814	0.905
SO_2 3 hour	0.601	0.433	0.437	0.544	0.621	0.445	0.460	0.587	0.615	0.442	0.452	**0.623**
SO_2 24 hour	0.309	0.223	0.207	0.181	0.333	0.242	0.220	0.197	**0.342**	0.251	0.223	0.211
SO_2 Annual	0.066	0.046	0.047	0.049	0.072	0.049	0.051	0.053	**0.073**	0.048	0.050	0.053
PM_{10} 24 hour	0.887	0.814	0.984	**1.036**	0.922	0.840	0.932	1.013	0.905	0.816	0.873	1.007
PM_{10} Annual	0.190	0.167	0.225	**0.282**	0.199	0.169	0.214	0.271	0.192	0.156	0.195	0.251

Notes:
Bold = highest concentration for that pollutant and averaging time
CO = carbon monoxide — PM_{10} = particulate matter less than 10 microns in diameter
NO_X = nitrogen oxide(s) — SO_2 = sulfur dioxide
ºF = degrees Fahrenheit — % = percent

7.1.2.4 Modeling Results – Compliance with Ambient Air Quality Standards

Air dispersion modeling was performed according to the methodology described in Section 7.1.2.3 to evaluate the maximum increase in ground-level pollutant concentrations resulting from proposed project emissions, and to compare the maximum predicted impacts, including background pollutant levels, with applicable short-term and long-term CAAQS and NAAQS. The impacts from construction activities and plant operations were analyzed separately because they would occur during different time periods. The same 5-year record of hourly meteorological data described in Section 7.1.2.3 was used in the AERMOD modeling to evaluate both construction and operational impacts.

In evaluating both construction and operational impacts, the AERMOD model was used to predict the increases in criteria pollutant concentrations at all receptor concentrations due to project emissions only. Next, the maximum modeled incremental increases for each pollutant and averaging time were added to the maximum background concentrations, based on air quality data collected at the most representative monitoring stations during the last 5 years (i.e., 2002 through 2006). These background concentrations are presented and discussed in Section 7.1.1.2. The resulting total pollutant concentrations were then compared with the most stringent CAAQS or NAAQS.

Construction Impacts

The section on construction emissions of air pollutants described how Month 6 of the construction schedule was selected to represent worst-case emission conditions for the purpose of analyzing peak short-term impacts to local air quality. Annual impacts were modeled with all emissions that would occur during the first 12 months of construction, since this period will have a higher intensity of construction activity than any subsequent part of the schedule. Some notes regarding the modeling results for specific pollutants are provided below.

As reflected in the construction modeling results presented in Table 7.1-22, high PM_{10} and $PM_{2.5}$ background concentrations have been recorded frequently at San Bernardino County monitoring stations during recent years. Because of the land use characteristics of this area, it is highly probable that these conditions result primarily from high wind episodes and mobile pollution sources. The predicted contribution of the proposed construction activities would be minor by comparison with these sources, but would have the potential to temporarily contribute to existing violations of the state and federal PM_{10} standards if construction occurs during a period of high background concentrations.

AERMOD with OLM predicted maximum 1-hour and annual NO_2 concentration due to project construction emissions which, when added to conservative background values from the nearest SCAQMD monitoring stations, are below the 1-hour California standard. Predicted maximum impacts for CO and SO_2 are also less than the most stringent ambient standards.

Operational Impacts

As described previously, the emissions used in the AERMOD simulations for the project operations were selected to ensure that the maximum potential impacts would be addressed for each pollutant and averaging time corresponding to an ambient air quality standard. The emissions used for each pollutant and averaging time are explained and quantified in Table 7.1-16. This subsection describes the maximum predicted operational impacts of the proposed project for normal combined cycle operating conditions. Commissioning impacts, which would occur on a temporary, one-time basis and would not be representative of normal operations, were addressed separately, as described in the next subsection.

Table 7.1-22
Maximum Modeled Criteria Pollutant Impacts Due to SGGS Site Grading, Laydown, Building, and Pipeline Excavation Emissions (Short-Term Impact Estimates Based on Month 6 Construction Activities)

Pollutant	Averaging Period	Maximum Modeled Impact ($\mu g/m^3$)	Background[1] ($\mu g/m^3$)	Maximum Total Predicted Concentration ($\mu g/m^3$)	Most Stringent AAQS ($\mu g/m^3$)	UTM Coordinates	
						East (m)	North (m)
Construction Impacts –							
CO	1 hour	108.3	5,830.00	5,938	23,000	450,962	3,772,351
	8 hour	35.8	5,145.00	5,181	10,000	451,738	3,771,894
NO_2	1 hour[2]	89.9	229.09	319.0	470[4]	450,913	3,772,325
	Annual[2]	1.91	67.59	69.5	100[4]	451,738	3,771,894
PM_{10}	24 hour	10.8	164[3]	174.8	50	450,559	3,771,667
	Annual	1.29	56.2[3]	57.49	20	450,355	3,772,285
$PM_{2.5}$	24 hour	2.49	106.2[3]	108.69	35	450,575	3,772,229
	Annual	0.15	27.4[3]	27.55	12	451,738	3,771,894
SO_2	1 hour	0.23	62.75	63.0	655	450,962	3,772,351
	3 hour	0.18	41.83	42.0	1,300	450,987	3,772,352
	24 hour	0.05	39.22	39.3	105	450,913	3,772,201
	Annual	0.003	10.46	10.5	80	451,738	3,771,894

Notes:
1 Background represents the maximum values measured at the monitoring stations described in previous sections, for 2002-2006
2 Results for NO_2 during construction used ozone limiting method (OLM) with ambient ozone data collected at the Fontana monitoring station for the years 1994, 1995, 1997, 1998, and 1999
3 PM_{10} and $PM_{2.5}$ background levels exceed ambient standards.
4 In February 2007, the CARB approved new, more stringent CAAQS for NO_2. In the units used in this table, the new standards, which are expected to take effect fully in late 2007, are 338 $\mu g/m^3$ (1 hour) and 56 $\mu g/m^3$ (annual).

$\mu g/m^3$ = micrograms per cubic meter
AAQS = Most stringent ambient air quality standard for the averaging period
CO = carbon monoxide
NA = Not applicable
NO_2 = nitrogen dioxide
OLM = ozone limiting method
PM_{10} = particulate matter less than or equal to 10 microns in diameter
$PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter.
SO_2 = sulfur dioxide
UTM = Universal Transverse Mercator

Table 7.1-23 summarizes the maximum predicted criteria pollutant concentrations due to the operational combined cycle plant. The incremental impacts of project emissions would be below the federal PSD significant impact levels (SILs) for all attainment pollutants, despite the use of worst-case emissions scenarios for all pollutants and averaging times. Although maximum predicted values for PM_{10} are below the SILS, these thresholds do not apply to this pollutant because the South Coast Air Basin is designated nonattainment with respect to the federal ambient standards. No SILS have been established yet for $PM_{2.5}$.

Table 7.1-23 also shows that the modeled impacts due to the project emissions, in combination with conservative background concentrations, would not cause a violation of any NAAQS and would not significantly contribute to the existing violations of the federal and state PM_{10} and $PM_{2.5}$ standards. In addition, as described later, all of the proposed project's operational emissions of nonattainment pollutants and their precursors will be offset to ensure a net air quality benefit.

Table 7.1-23
AERMOD Refined Modeling Results for the Operational Project

Pollutant	Averaging Period	Maximum Predicted Impact (μg/m³)	PSD Class II Significance Level (μg/m³)	SCAQMD Significant Change (μg/m³)	Monitoring Significance Level (μg/m³)	Background Concentration (μg/m³) [1]	Total Concentration (μg/m³)	NAAQS (μg/m³)	CAAQS * (μg/m³)	Maximum UTMX NAD27 (m)	Maximum UTMY NAD27 (m)	Elevation (m)
NO_2	1-hour[2]	**49.31**	NA	20	NA	229.09	**278.39**	NA	470[5]	451150	3772125	339.55
	Annual[2]	**0.96**	1	1	14	67.59	**68.55**	100	100[5]	451182.41	3772354.3	343.22
SO_2	1-hour	**1.31**	NA	NA	NA	62.75	**64.06**	NA	655	451150	3772125	339.55
	3-hour	**1.45**	25	NA	NA	41.83	**43.28**	1300	NA	451150	3772125	339.55
	24-hour	**0.38**	5	NA	13	39.22	**39.60**	365	105	450650	3772075	339.04
	Annual	**0.06**	1	NA	NA	10.46	**10.52**	80	NA	451425	3772425	344.42
CO	1-hour	**656.12**	2,000	1,100	NA	5830.00	**6,486**	40,000	23,000	451150	3772125	339.55
	8-hour	**63.09**	500	500	575	5145.00	**5,208**	10,000	10,000	450600	3772100	339.65
PM_{10}	24-hour[3]	**1.99**	5 (NA)	2.5 (NA)	10	164	**165.99**	150	50	451182.41	3772354.3	343.22
	Annual[3]	**0.46**	1	1	NA	56.2	**56.66**	NA	20	451182.41	3772354.3	343.22
$PM_{2.5}$	24-hour[3,4]	**1.99**	NA	NA	NA	106.2	**108.19**	35	NA	451182.41	3772354.3	343.22
	Annual[3,4]	**0.46**	NA	NA	NA	27.4	**27.86**	15	12	451182.41	3772354.3	343.22

Notes:
1 Background represents the maximum values measured at the monitoring stations identified in Section 7.1.1.2
2 Results for NO_2 during construction used ozone limiting method (OLM) with ambient ozone data collected at the Fontana monitoring station for the years 1994, 1995, 1997, 1998, and 1999
3 PM_{10} and $PM_{2.5}$ background levels exceed ambient standards.
4 All PM_{10} emissions from Project sources were also considered to be $PM_{2.5}$.
5 In February 2007, the CARB approved new, more stringent CAAQS for NO_2. In the units used in this table, the new standards, which are expected to take effect fully in late 2007, are 338 μg/m³ (1-hour) and 56 μg/m³ (annual).

The locations of predicted maximum impacts would vary by pollutant and averaging time, but in all cases would be within 1,000 feet from the EGS facility fenceline. The peak annual NO_2 impact and the annual and 24-hour maxima for both PM_{10} and $PM_{2.5}$ are predicted to occur on the northern boundary of the power plant. Short-tem maxima for NO_2, SO_2, and CO are predicted adjacent to the fenceline south of the combined cycle units. The highest SO_2 annual concentration is expected to occur a few hundred feet north of the plant site. Maximum 24-hour SO_2 and 8-hour CO impacts are predicted to occur on the planned SCE substation property about 1,000 feet southwest of the combined cycle plant. Figure 7.1-5 shows the locations of the maximum predicted operational impacts for all pollutants and averaging times.

Turbine Commissioning

Each of the proposed project CTGs could be operated for up to 500 hours with partially abated emissions for purposes of commissioning the new generating equipment. The expected sequence of commissioning tests and the associated emissions during each stage of CTG commissioning are presented in Section 7.1.2.2. Separate modeling was conducted using AERMOD to evaluate maximum short-term effects of these activities in terms of the impacts on offsite 1-hour NO_2 concentrations and 1-hour and 8-hour CO concentrations. These are the pollutants (along with volatile organic compounds [VOCs], which are not modeled) for which emissions would be expected to be significantly higher than during normal operations, owing to the nonoperability of the SCR and oxidation catalyst emission control systems during some of the commissioning tests. Emissions of SO_X and PM depend primarily on the rate of fuel combustion and are unaffected by the availability or nonavailability of the SCR and oxidation catalyst. Thus, emissions of these pollutants during commissioning are not expected to exceed the levels that would occur during full-load normal operations of the turbines and separate modeling for commissioning impacts on SO_X and PM levels is unnecessary.

Stack exhaust flow rates and temperature for individual turbine commissioning tests were presented in Table 7.1-18, along with the corresponding NO_X and CO emission rates. Modeling was conducted for the tests that were expected to produce the highest offsite concentrations at ground level, i.e., the test with the highest emission rate in combination with the lowest exhaust flow and temperature. For the NO_X modeling, the emissions and stack parameters for the row labeled "DLN Tuning/Load Testing – 25%" in Table 7.1-18 were used. Maximum CO impacts were evaluated for the case labeled "DLN Tuning/Load Testing – 0%." It is not expected that these worst-case tests would be conducted concurrently on both turbines. The Applicant would accept a permit condition prohibiting simultaneous execution of the commissioning tests that produce the highest emissions. Accordingly, the modeling analysis considered emissions from only one turbine conducting these high emission tests at a time. However, there will be a need to conduct the final steam blow tests (bottom of Table 7.1-18) with both turbines in operation. These tests are expected to produce considerably lower per-turbine NO_X emissions than the worst-case tests. Thus modeling was conducted for both the worst-case commissioning tests with one turbine and the steam blow tests with both turbines.

Table 7.1-24 shows the results of the simulations for turbine commissioning. The tabulated impacts are the highest concentrations for the indicated averaging that are predicted by AERMOD to occur for the worst-case emission condition and the two-turbine steam blow tests using 5 years of hourly meteorological input data. As noted above, modeling was conducted for commissioning of each turbine alone under worst-case emission conditions and both turbines during the two-turbine steam blow tests. Table 7.1-24 demonstrates that when the maximum incremental commissioning impacts are added to applicable background concentrations and compared with the most stringent state or national ambient standards, no violations of the applicable ambient air quality standards for these pollutants are predicted to occur.

Table 7.1-24
Project Commissioning Modeling Results

Modeling Scenario	Pollutant	Averaging Period	Maximum Estimated Impact ($\mu g/m^3$)	Background[2] ($\mu g/m^3$)	Total Predicted Concentration ($\mu g/m^3$)	Most Stringent Standard ($\mu g/m^3$)
worst-case commissioning[1]	CO	1 hour	3,255	5,830	9,085	23,000
		8 hour	1297	5,145	6,442	10,000
	NO_2	1 hour	110.06	229.09	339.15	470[3]
steam blow commissioning tests	CO	1 hour	4,830	5,830	10,660	23,000
		8 hour	1,748	5,145	6,893	10,000
	NO_2	1 hour	88.07	229.09	317.16	470[3]

Notes:
1 Indicated maximum impacts are the higher of the maxima obtained from separate simulations for worst-case commissioning emissions for the west or east turbine.
2 Background represents the maximum values measured at the monitoring stations presented in Section 7.1.1.2
3 In February 2007, the CARB approved new, more stringent CAAQS for NO2. In the units used in this table, the new 1-hour standard, which is expected to take effect fully in late 2007, is 338 $\mu g/m^3$.

$\mu g/m^3$ = micrograms per cubic meter
CO = carbon monoxide
NO_2 = nitrogen dioxide

Impacts for Nonattainment Pollutants and their Precursors

The emission offset program described in the SCAQMD Rules and Regulations was developed to facilitate net air quality improvement when new sources locate within the District. Project impacts of nonattainment pollutants (PM_{10} and O_3) and their precursors (NO_X, SO_2, and ROC) will be fully mitigated by emission offsets. The emission reductions associated with these offsets have not been accounted for in the modeled impacts noted above. Thus, the impacts indicated in the foregoing presentation of model results for the proposed project may be significantly overestimated.

Effects on Visibility from Plumes

Modern combined cycle power plants burning natural gas fuel emit PM at levels far below the concentration corresponding to visible smoke. Combustion sources also emit water vapor that sometimes may condense in the atmosphere to form visible plumes. However, the generally warm, dry conditions in San Bernardino County are not conducive to lengthy visible stack plumes, and the historical operation of the existing EGS Units 3 and 4 indicates that moisture plumes rarely extend to appreciable distances. Evaporative cooling towers are another potentially more important source of visible moisture plumes at power plants, but the proposed project will employ air-cooled condensers that do not produce moisture plumes.

7.1.2.5 Impacts on Air Quality and Air Quality Related Values – PSD Modeling Analyses

U.S. EPA has promulgated PSD regulations applicable to Major Sources and Major Modifications, as these terms are defined in 40 CFR 51.166. The proposed project would be a Major Modification to an existing Major Source because of the increases that would result in CO and NO_X emissions. Many of the PSD requirements are the same as those that must be met for compliance with SCAQMD's New Source Review rule (Rule 1303) and CEC's guidance for air quality impact evaluations (e.g., quantification of project emissions, demonstration of BACT, ambient air quality standards analysis). However, PSD requires the following additional analyses:

- An analysis of the potential incremental impacts from the new emissions from the proposed project relative to PSD SILs and, if necessary, with the PSD increments.
- An analysis of air quality-related values (AQRV) to ensure the protection of visibility in federal Class I National Parks and National Wilderness Areas within 100 km of the proposed project site;
- An evaluation of potential impacts on soils and vegetation of commercial and recreational value; and
- An evaluation of potential growth-inducing impacts.

Impacts in Class II PSD Areas

As the proposed project would trigger PSD as a Major Modification, modeling is required to determine whether its incremental impacts on ambient levels of attainment pollutants (NO_2, SO_2, and CO) would exceed Class II SILs. The SILs for PM_{10} are not applicable because of the nonattainment status of the South Coast Air Basin for this pollutant. If project emissions were predicted to cause the SILs for attainment pollutants to be exceeded, then an analysis of total increment consumption since the local PSD baseline date would be required. However, as demonstrated by Table 7.1-23, the maximum modeled incremental pollutant concentrations for all attainment pollutants are below the Class II SILs; thus, no further analysis of impacts in PSD Class II areas is required.

Impacts in Class I PSD areas

An evaluation of impacts in Class I areas within 100 km of the proposed project site was conducted because the potential emissions increases from the project would be sufficient to trigger federal PSD requirements. A major modification to an existing PSD source with emissions exceeding the PSD Significant Emissions Increase thresholds must evaluate impacts to visibility and other air quality-related values at all Class I areas that are located within a 100-km radius of the facility in order to satisfy the federal PSD program requirements, which are incorporated within SCAQMD Rule 1703 – PSD Analysis. In addition, SCAQMD Rule 1303 requires plume visibility impact analyses for new emission sources proposing to locate within prescribed distances of several specific Class I areas. This section describes the dispersion modeling techniques that have been used in performing the Class I area air quality analyses for the proposed project. The objectives of the modeling are to demonstrate that air pollutant emissions from the proposed project would not cause or contribute to an exceedance of any of the proposed Class I SILs, or cause a significant impact on visibility, regional haze, or sulfur or nitrogen deposition in any Class I area.

In accordance with U.S. EPA modeling guidance, AERMOD was used to analyze air quality impacts in the Class I areas located within 50 km of the proposed project site, and CALPUFF-Lite was used for the Class I areas located more than 50 km from the project site. CALPUFF-Lite was also used for the analyses of the proposed project's impacts to sulfur and nitrogen deposition in all Class I areas because the current deposition algorithm in AERMOD appears to produce erroneous predictions.

For the plume visibility analysis required by SCAQMD Rule 1303 and the federal PSD program, VISCREEN (Tier 1 and 2) were used for the Class I areas located within 50 kilometers (km) of the proposed project site. The CALPUFF-Lite (screening version of the CALPUFF model) was used to evaluate visibility impacts in the Class I areas that are outside a 50-km perimeter from the facility. These modeling analyses are summarized in Table 7.1-25.

Table 7.1-25
Model Selection and Receptor Description for Class I Area Analyses

Distance from the Project	Class I Areas	Class I area Air Quality Impact Analysis	Model to be Used	Receptors
Within 50 km	– Cucamonga Wilderness Area – San Gabriel Wilderness Area	PSD Analysis	AERMOD	Discrete receptors in Class I areas
		Deposition	CALPUFF-Lite	Discrete receptors in Class I areas
		Visibility	VISCREEN	Discrete observer/vista points
Beyond 50 km	– San Gorgonio Wilderness Area – San Jacinto Wilderness Area – Agua Tibia Wilderness Area – Joshua Tree National Park	PSD Analysis	CALPUFF-Lite	Three rings of receptors in each Class I area
		Visibility	CALPUFF-Lite	
		Deposition	CALPUFF-Lite	

Figure 7.1-6 shows the locations of these Class I areas relative to the proposed project site, and Table 7.1-26 lists the distances from the project site to the closest and farthest points in each Class I area. The federal authority in charge of the five wilderness areas identified above is the United States Forest Service (USFS), and the National Park Service (NPS) has jurisdiction over Joshua Tree National Park. The visibility analyses for these six areas have been conducted in a manner consistent with guidance from the NPS and USFS following the procedures set forth in the Federal Land Managers' Air Quality Related Values Workgroup (FLAG) Phase I Report (USFS, 2000).

Table 7.1-26
Class I Areas Within 100-km Radius of the Project Site

Class I Areas	Distance from the SGGS (km)	
Cucamonga Wilderness Area	Closest	14
	Farthest	21
San Gabriel Wilderness Area	Closest	36
	Farthest	49
San Gorgonio Wilderness Area	Closest	52
	Farthest	76
San Jacinto Wilderness Area	Closest	74
	Farthest	96
Agua Tibia Wilderness Area	Closest	84
	Farthest	96
Joshua Tree National Park	Closest	99
	Farthest	210

The Cucamonga Wilderness Area and San Gabriel Wilderness Area are located within 50 km from the SGGS site. The San Gorgonio Wilderness Area, San Jacinto Wilderness Area, Agua Tibia Wilderness Area, and Joshua Tree National Park are located beyond 50 km and within 100 km from the proposed facility. San Rafael Wilderness Area and Dome Land Wilderness Area are located within 250 km of the project site but were not included in the modeling analysis because they lie downwind of Cucamonga and San Gabriel Wilderness Areas.

Near-Field Class I Areas Air Quality Impacts Analysis

The AERMOD model was used to evaluate the maximum incremental effects of the project emissions within the two Class I areas (Cucamonga and San Gabriel Wilderness Areas) that are located less than 50 km from the SGGS site. Discrete receptors for both of these Class I areas were obtained from the NPS. Project emissions and stack parameters, as well as meteorological data input to AERMOD for each pollutant and averaging time were identical to those used in the analyses for non-Class I areas, as described in Section 7.1.3. The results of the Class I impact modeling analysis are summarized in Table 7.1-27. In this table, the maximum incremental concentrations due solely to emissions of the proposed project are compared with proposed Class I area SILs. In all cases, the highest predicted values are below these significance thresholds. As a result, a full Class I increment analysis is not required under the PSD rules.

Table 7.1-27 AERMOD Results – Predicted Maximum Concentrations in Near-Field Class I Areas						
	NO_X Annual	**SO_2 3-hr**	**SO_2 24-hr**	**SO_2 Annual**	**PM_{10} 24-hr**	**PM_{10} Annual**
Proposed Class I SIL (μg/m^3)	0.10	1.00	0.20	0.10	0.30	0.20
Maximum Predicted Class I Area Impacts (μg/m^3)						
Cucamonga Wilderness Area	0.0006	0.00725	0.00131	0.00004	0.00357	0.00013
San Gabriel Wilderness Area	0.00079	0.00832	0.00174	0.00005	0.00478	0.00017

Near-Field Class I Areas Plume Visibility Analysis

SCAQMD Rule 1303(b)(5) (C)(i) requires a plume visibility analysis if the net emissions increase from a new source will exceed 15 tons per year (tpy) of PM_{10} or 40 tpy of NO_X, provided that the source is located within specified distances from the nearest boundary of a federal Class I area. The proposed project site is within the distance specified in Rule 1303 for one Class I area, the Cucamonga Wilderness Area. In addition, the project emissions are expected to exceed the threshold values for both NO_X and PM_{10}. Accordingly, a plume visibility analysis in Cucamonga Wilderness Area was conducted in the manner consistent with the requirements of Rule 1303 Appendix B, along with the PSD requirements described below.

As shown in Table 7.1-25, two Class I areas lie within a 50-km radius from the proposed facility (Cucamonga and San Gabriel Wilderness Areas). For these two Class I areas, a screening-level VISCREEN modeling analysis was performed to address the proposed project's impacts in terms of plume contrast and color difference index. This analysis is required under SCAQMD Rule 1303, as well as the federal PSD program, which is incorporated in SCAQMD regulations under rule 1703. For all VISCREEN modeling, the maximum 24-hour averaged emission rates of NO_X and PM_{10} from two turbines and one auxiliary boiler were used, in accordance with the Plume Visual Impact Screening Workbook (U.S. EPA, 1988 and 1992).

Initially, a series of Tier I visibility screening analyses were conducted to ensure a conservative evaluation of the proposed project's potential to adversely affect visibility in the closest two Class I areas (Cucamonga Wilderness Area and San Gabriel Wilderness Area). This level of analysis entailed the use of the EPA VISCREEN model with simple, worst-case default input assumptions (i.e., extremely stable [Class F] atmospheric turbulence conditions and a very low wind speed [1.0 meter per second] persisting for 12 consecutive hours in a direction) that would transport the proposed turbine plumes toward a hypothetical observer at each Class I area. The only inputs required to execute the Tier I analysis with the default parameter settings are (1) projected short-term maximum turbine emission rates of fine particulate, and nitrogen oxides, per U.S. EPA Plume Visual Impact Screening Workbook (U.S. EPA, 1988 and 1992); (2) the distances between the proposed project stacks and a hypothetical observer at the nearest and farthest park boundaries; and (3) representative background visual range for the region(s) of concern.

The VISCREEN output for a Class I analysis provides the results of the following plume impact tests:

- Plume perceptibility based on color differences between the plume and a sky or terrain background (dE), and
- Plume contrast relative to a sky or terrain background (C).

The VISCREEN model calculates the color difference index (dE) and the contrast (C) for four different lines of sight corresponding to two types of background (sky and terrain), and two assumed worst-case sun angles (10 degrees and 140 degrees). As part of the standard output, the four lines of sight are calculated for both the observer's view inside the Class I area and the view outside the area. However, both the NPS and the USFS use only the views inside the Class I area in evaluating the potential significance of a proposed emission source's plume visual impacts.

Based on the FLAG workbook, the significance threshold for the dE is 2.0 and 0.05 for C. As recommended by the FLAG document, a Tier II screening procedure should be conducted when the potential for impacts greater than these screening criteria is indicated by the results of the Tier I analysis described in the Plume Visual Impact Screening Workbook (U.S. EPA, 1988 and 1992).

The Tier I analysis indicated the potential for plume visibility impacts above the significance criteria used in VISCREEN. Thus, a Tier II analysis was undertaken. The Tier II procedure is similar to the Tier I analysis, but allows more site-specific meteorological input data to be used in place of the extremely conservative default assumptions. Specifically, the frequency of occurrence of the different dispersion conditions in the project vicinity is established and ranked in terms of increasing values of the dispersion parameter '$\sigma_z u$' (i.e., the product of the wind speed [u] and the plume vertical spread parameter [σ_z] for the appropriate stability class) and the source-receptor distance. The VISCREEN model is then run for the most restrictive combination of wind speed, wind direction and atmospheric stability that corresponds to a cumulative frequency, with all the other parameter combinations of lesser $\sigma_z u$ values, of 1 percent. In addition, a worst-case regional background ozone concentration is incorporated in the analysis.

The meteorological condition for each Class I area with a cumulative frequency of 1 or greater, and with a wind speed fast enough to transport the plume to the given park within 12 hours was selected as input for the Tier II VISCREEN analysis. The area, including the proposed project site and the Cucamonga and San Gabriel Wilderness Areas, is characterized by complex terrain. The elevation gain from the SGGS to Cucamonga is greater than 500 meters, and there is terrain with an elevation gain of greater than 500 meters between the project site and the front edge of San Gabriel as well. According to the Plume Visual Impact Screening Workbook (U.S. EPA, 1988 and 1992), the selected worst-case stability class may be shifted one category less stable when an elevation increase of this magnitude exists between the modeled source and the Class I area. Thus the VISCREEN model may be run with one class less stable and the wind speed determined by the techniques described above for the corresponding Class I areas to determine whether impacts above the model's screening criteria would be predicted. Actual background visual range measurements have been conducted in San Gabriel Wilderness Area. The average measured background visible range value for 2001 – 2003 from the best 20 percent visibility days at San Gabriel Wilderness Area of 213 km has been selected for use in the simulation for both Cucamonga and San Gabriel Wilderness Areas.

Table 7.1-28 summarizes the Tier II VISCREEN results for the Cucamonga and San Gabriel Wilderness Areas. If the plume parameters predicted by VISCREEN are above the screening criteria for locations inside the Class I areas, an analysis using the EPA PLUVUE II plume visibility model would be required to determine whether a less conservative screening approach would result in predicted significant impacts within the two near-field Class I areas. However, as shown in this table, use of PLUVUE II was unnecessary because the Tier II VISCREEN simulations resulted in impacts below the significance thresholds for both the plume color difference index and contrast parameters.

A full detail of the VISCREEN Tier II meteorological analysis used in developing realistic worst-case impact scenario is provided in Appendix K-6. Model input/output files for the VISCREEN simulations are provided on the electronic media submitted with this AFC.

Table 7.1-28
VISCREEN Tier II Results for Nearest Class I Areas

Class I Area	Color difference index (Delta E)				Contrast (C)			
Background	**Sky**		**Terrain**		**Sky**		**Terrain**	
Sun Azimuth Angle	10º	140 º	10º	140 º	10º	140 º	10º	140 º
Significance Threshold	2.0	2.0	2.0	2.0	0.05	0.05	0.05	0.05
Cucamonga Wilderness Area	0.871	0.636	1.966	0.099	0.009	0.008	0.008	0.001
San Gabriel Wilderness Area	0.126	0.077	0.193	0.018	0.001	0.001	0.001	0.000

Near-Field Class I Areas Acid Deposition Analysis

Due to the lack of a suitable, U.S. EPA-approved model for evaluation of near-field deposition impacts, the screening version of the CALPUFF model was used to estimate the proposed project's impacts on sulfur and nitrogen deposition in Class I areas less than 50 km from the project site, as well as those more than 50 km away. The modeling methods and results of the deposition analyses are presented in the next subsection.

Far-Field Class I Areas Air Quality, Deposition and Visibility Impact Analyses

Methodology

The U.S. EPA-approved regulatory air quality dispersion model CALPUFF (version 5.711a) was used to evaluate long-range impacts of project emissions in Class I areas in accordance with recommendations in the following regulatory guidance documents. In addition, all supporting Version 5 editions of the pre- and post-processors were used:

- FLAG Phase I Report (FLAG, 2000), and
- Interagency Workgroup on Air Quality Modeling (IWAQM) Phase 2 Summary Report and Recommendations for Modeling Long Range Transport Impacts (U.S. EPA, 1998).

The IWAQM report recommends CALPUFF for use in long-range transportation and dispersion analyses involving one or more emission sources. Key inputs and model options are discussed below. Discussions with the FLMs from the USFS and NPS helped define appropriate model inputs.

The CALPUFF-Lite model (the screening mode of CALPUFF) was used to analyze incremental air quality, acid deposition, and visibility impacts within the four Class I areas beyond 50 km from the proposed project site (San Gorgonio Wilderness Area, San Jacinto Wilderness Area, Agua Tibia Wilderness Area, and Joshua Tree National Park), and deposition and soil and vegetation impacts for the Class I areas within 50 km from the proposed project site. In keeping with applicable regulatory guidance, the refined CALPUFF model would be used in conjunction with the CALMET diagnostic meteorological model if significant impacts were predicted using CALPUFF-Lite. However, as described below, the findings of the CALPUFF-Lite simulations indicated that all impacts in Class I areas would be below a level of significance; thus, additional modeling with the refined CALPUFF was not required.

CALPUFF is a transport and dispersion model that simulates the advection and dispersion of "puffs" of material emitted from modeled sources. CALPUFF can incorporate three-dimensionally varying wind fields, wet and dry deposition, and atmospheric gas and particle phase chemistry. When run in the screening mode, CALPUFF-Lite uses enhanced ISC meteorological data from a single meteorological station. For this analysis, meteorological input data files were prepared using hourly surface data obtained at the Ontario International Airport for the years 1994 through 1999 (except 1996), which were combined with twice daily upper-air soundings from Edwards Air Force Base to create the required data set. The input files were prepared by Trinity Consulting using PCRAMMET (Version, 99169) according to U.S. EPA-approved protocols for use with wet/dry deposition models. Solar radiation was derived by PCRAMMET based on cloud cover data and the latitude of the project site.

The CALPUFF models incorporate assumptions regarding land-use classification, leaf-area index, and surface roughness length to estimate deposition during transport. For the CALPUFF-Lite analysis the urban land use characteristics and dispersion coefficients were selected.

The background ammonia level was set to 5.5 parts per billion (ppb), which is an average of the values recommended for desert shrub and grassland. The IWAQM report specified the background ammonia concentration of 1 ppb for desert scrub and 10 ppb for grass land. An ozone concentration of 65 ppb was assumed for every month in the CALPUFF-Lite model.

CALPUFF-Lite was run in the screening mode to assess the potential for significant visibility degradation due to project emissions. In CALPUFF-Lite, the terrain is represented in each of the Class I Areas as circular rings of receptors spaced at 1 degree intervals at the closest, middle and farthest distances into the Class I area from the modeled source. The elevation assigned to each receptor on a given ring is the highest point on the portion of the ring that lies within the Class I area. The distance between ring receptors and the project site and the elevation of the ring receptors are presented in Table 7.1-29. The use of these model receptor grids is extremely conservative, in that it ensures that at least some potential degradation of the visibility will be predicted for any plume reaching the distance of the rings, regardless of the actual wind direction.

Table 7.1-29
CAPUFF-Lite Ring Receptor Distances and Elevations

Class I Areas	Distance from the SGGS (km)		Ring Receptor Elevation (m)
San Gorgonio Wilderness Area	Closest	52	2,357
	Middle	64	3,340
	Farthest	76	1,488
San Jacinto Wilderness Area	Closest	74	1,261
	Middle	85	2,798
	Farthest	96	2,017
Agua Tibia Wilderness Area	Closest	84	745
	Middle	90	1,358
	Farthest	96	1,466
Joshua Tree National Park	Closest	100	1180
	Middle	155	1,219

For the analysis of visibility effects, CALPUFF requires project emission rate inputs for six pollutant species, i.e., directly emitted PM_{10}, NO_X, and SO_2, and secondary sulfate (SO_4), nitric acid (HNO_3), and nitrate (NO_3). Emission rates for PM_{10}, NO_X, and SO_2 were calculated for the two CTGs/HRSGs of the proposed SGGS operating under maximum load emission conditions with the auxiliary boiler. The maximum 24-hour averaged emission rates were used for the visibility analysis and the total CTG/HRSG emissions of SO_2 were speciated to SO_2 and SO_4, as indicated in the NPS' Particulate Matter Speciation (PMS) Guidelines for Natural Gas Turbines (NPS, 2007). Total CTG/HRSG PM_{10} emissions were speciated to elemental carbon and organic carbon (emitted as Secondary Organic Aerosol [SOA]) per the PMS. For CALPUFF-Lite, the natural gas auxiliary boiler was assumed to directly emit fine PM (PMF), NO_X, and SO_2; therefore, no speciation was applied to these emissions. Direct emissions of the remaining species (HNO_3 and NO_3) are assumed to be zero for the natural gas burning sources of the proposed project.

Detailed specification of additional input parameters to CALPUFF and the post processing programs used to assess impacts to sulfur and nitrogen deposition and regional haze are provided in the modeling protocol contained in Appendix K-5.

Results

Table 7.1-30 summarizes the results of the CALPUFF-Lite model simulations to estimate maximum incremental air quality effects of project emissions in the four Class I areas located more than 50 km from the project site. The tabulated values represent the highest predicted pollutant concentrations for each averaging time from simulations conducted with 5 years of hourly meteorological input data. The modeling was conducted only for NO_2, SO_2, and PM_{10}, as these are the pollutants for which Class I SILs have been proposed. As demonstrated in the table, peak predicted values for all three pollutants and for all applicable averaging times are far below these proposed thresholds in all four Class I areas.

Table 7.1-30
CALPUFF-Lite Results – Predicted Maximum Concentrations in Far-Field Class I Areas

	NO_2 Annual	**SO_2 3-hr**	**SO_2 24-hr**	**SO_2 Annual**	**PM_{10} 24-hr**	**PM_{10} Annual**
Proposed Class I SILs (µg/m^3)	0.10	1.00	0.20	0.10	0.30	0.20
Maximum Predicted Class I Area Impacts (µg/m^3)						
San Gorgonio Wilderness Area	0.0081	0.0281	0.00717	0.000778	0.0175	0.00126
San Jacinto Wilderness Area	0.00041	0.022	0.00525	0.000487	0.00501	0.000632
Agua Tibia Wilderness Area	0.00287	0.0191	0.00483	0.000418	0.0027	0.000497
Joshua Trees National Park	0.00162	0.0164	0.00432	0.000344	0.00206	0.000356

Sulfur and nitrogen deposition results are presented in Table 7.1-31. As described previously, CALPUFF-Lite was determined to be the most reliable approved model currently available to estimate deposition of the project emissions within both the near-field and far-field Class I areas. Total deposition rates for each pollutant were obtained by summing the modeled wet and/or dry deposition rates. The annual average emission rates for project sources were used since annual deposition rates were to be estimated.

For sulfur deposition, the wet and dry fluxes of SO_2 and SO_4 are calculated, normalized by the molecular weight of sulfur, and expressed as total sulfur. Total nitrogen deposition is the sum of nitrogen contributed by wet and dry fluxes of HNO_3, NO_3, ammonium nitrate (NH_4NO_3), and the dry flux of NO_X.

Table 7.1-31
CALPUFF-Lite Results – Predicted Maximum Sulfur and Nitrogen Deposition Rates in Near-Field and Far-Field Class I Areas

	Nitrogen	**Sulfur**
Class I Significant Level ($g/m^2/sec$)[1]	**1.59E-11**	**1.59E-11**
Maximum Predicted Class I Area Impacts ($g/m^2/sec$)		
Cucamonga Wilderness Area	6.78E-12	1.48E-12
San Gabriel Wilderness Area	1.13E-12	3.31E-13
San Gorgonio Wilderness Area	8.57E-12	1.64E-12
San Jacinto Wilderness Area	5.28E-12	1.11E-12
Agua Tibia Wilderness Area	4.46E-12	9.72E-13
Joshua Trees National Park	3.62E-12	8.18E-13

[1]Significance thresholds are in the units used in CALPUFF and are equivalent to 0.005 kg per hectare per year.

The maximum total modeled nitrogen and sulfur deposition rates predicted from model simulations using 5 years of meteorological input data are compared in Table 7.1-31 with the NPS/USFS Deposition Analysis Threshold (DAT) for western states. The DATs for nitrogen and sulfur are each 0.005 kilogram per hectare per year (kg/ha-yr), which is equivalent to 1.59E-11 grams per square meter per second ($g/m^2/sec$). Maximum predicted annual deposition rates are well below the significance criteria currently used by the federal land managers in all six Class I areas for which modeling was performed.

Regional haze modeling was conducted by means of CALPUFF-Lite and the appropriate post-processing programs to obtain estimates of the maximum percent change in light extinction coefficient (background extinction coefficient vs. modeled extinction coefficient), in each far-field Class I area. The predicted extinction coefficient percent changes were compared to the level of acceptable change (LAC) of 5 percent used by NPS/USFS. The maximum predicted values, presented in Table 7.1-32, are below the LAC in *each* Class I area for *each* of the 5 years of meteorological input data, i.e., there are zero predicted instances of significant impacts. Based on this result, no further analysis of the proposed project's impacts in Class I areas is required.

Table 7.1-32
CALPUFF-Lite Results – Predicted Percent Change in Light Extinction Coefficient in Far-Field Class I Areas

Class I Area	**1994**	**1995**	**1997**	**1998**	**1999**
San Gorgonio Wilderness Area	2.59	3.09	3.6	2.31	3.07
San Jacinto Wilderness Area	1.72	2.52	2.76	1.57	2.53
Agua Tibia Wilderness Area	1.55	2.53	2.75	1.45	2.32
Joshua Trees National Park	1.2	2.41	2.4	1.33	1.95

7.1.3 Cumulative Impacts Analysis and Protocol

CEC requirements specify that an analysis may be required to determine the cumulative impacts of the proposed project and other projects within a 6-mile radius that have received construction permits but are not yet operational or that are in the permitting process. The cumulative impact analysis is intended to assess whether the emissions of the combined effects of these sources may cause or contribute to a violation of any ambient air quality standard.

In addition, CEC staff have specifically requested that additional modeling simulations be performed to evaluate the combined effects of emissions from the proposed combined cycle plant with those from existing Units 3 and 4 of the EGS, which will continue to operate when the combined cycle plant becomes operational. Both units are 320-MW utility boilers burning natural gas exclusively that have been retrofitted in recent years with SCR systems for NO_X control. Also, SCE has permitted and is planning to install as early as the summer of 2007 a new General Electric LM6000 peaking turbine on the property immediately adjacent to the western edge of the EGS. This section describes the modeling that has been conducted with AERMOD to evaluate the local impacts of these combined sources.

A more extensive cumulative analysis to include other new or imminent emission sources within a 6-mile radius will be conducted later when sufficient information on these sources, if any, becomes available. A request has been made to SCAQMD for information on all new facilities within this radius that are either currently in the permitting process or under construction. The required information will include permitted emission rates, source location coordinates, and stack parameters required for inclusion in the cumulative AERMOD simulations. When this information is received, it will be forwarded to CEC for approval as the basis for the full cumulative analysis.

The results of the final cumulative impact analysis will be reported under separate cover. The following describes the partial cumulative analysis that has already been conducted for the combined EGS units and the adjacent SCE peaker.

Table 7.1-33 shows the stack parameters and emission rates used to represent EGS Units 3 and 4, as well as those estimated for the SCE peaker that will be located just west of the proposed project site. Stack parameters and location information for EGS Units 3 and 4 were provided by the Applicant. CEMS data for 2005 and 2006 were reviewed to determine the average hourly emission rates of NO_X and SO_X and average power output for each unit during periods when they were in operation. Maximum hourly rates for these pollutants were estimated by linearly scaling the average hourly emissions up to the full generating capacity for each unit. These maximum values were assumed in the cumulative modeling for all averaging times from 1 hour to 24 hours. Annual emissions of NO_X and SO_X used the actual average emission rates over the 2 years of CEMS data. Emission factors for other pollutants were derived from historical emissions tests on Units 3 and 4:

- CO = 92.3 lb/mmcf
- PM = 7.37 lb/mmcf

Emissions and stack parameters from the new SCE peaker were estimated based on data from other recent LM6000 units that have been permitted in Southern California, assumed compliance of this unit with current BACT requirements for simple cycle gas turbines, and a maximum usage rate of 1,300 hours per year, consistent with the SCAQMD definition for peaker units.

Table 7.1-33 **Emission Parameters Used for Cumulative Modeling Analysis**				
Stack Parameters		**EGS Unit 3**	**EGS Unit 4**	**SCE Peaker**
Stack Base Elevation (feet)		1,120.45	1,120.45	1,114.2
Stack Height (feet)		198.93	198.93	60
Stack Diameter (feet)		19.1	19.1	13
Exhaust Flow Rate (ACFM)		1,081,835	1,081,835	522,434
Exhaust Temperature (ºF)		248	248	837
Averaging Time	**Pollutant**	**Emission Rates (lb/hour)**		
1-hour	NO_X	23.28	23.28	3.98
	SO_2	2.24	2.24	0.22
	CO	330.79	330.79	5.81
3-hour	SO_2	2.24	2.24	0.22
8-hour	CO	330.79	330.79	5.81
24-hour	SO_2	2.24	2.24	0.22
	PM_{10}	26.41	26.41	4.00
Annual average	NO_X	6.79	6.79	0.59
	SO_2	0.65	0.65	0.03
	CO	96.60	96.60	0.86
	PM_{10}	7.71	7.71	0.59

Emissions for each pollutant and averaging time for the proposed combined cycle units and auxiliary boiler were the same as those described previously in the discussion of project impacts. The same five-year meteorological data set and receptor grids were also used for the cumulative analysis. The predicted maximum concentrations due to the emissions of the new combined cycle Units 61 and 62, existing EGS Units 3 and 4, and the proposed SCE peaker plant are provided in Table 7.1-34.

Based on the above analysis, cumulative impacts would be less than significant.

7.1.4 Mitigation Measures

This section discusses the mitigation measures proposed by the Applicant that will be implemented to reduce project-related impacts to air quality.

> **AIR-1 Emission Reduction Credits.** The Applicant is required to provide emissions offsets for increases in emissions of nonattainment pollutants in excess of specified thresholds that will result from the operation of the proposed facility. Based on expected project emission levels, the SGGS will be required to supply offsets for NO_X, PM_{10}, SO_2, and VOC. Estimated annual emissions of these pollutants due to project operations are summarized in Table 7.1-17. It is assumed that CO offsets will not be required because of the impending redesignation of the South Coast Air Basin to attainment for this pollutant in 2007.

Table 7.1- 34 AERMOD Results for Initial Cumulative Modeling						
Pollutant	**Averaging Period**	**Maximum Predicted Impact ($\mu g/m^3$)**	**Background Concentration ($\mu g/m^3$)[1]**	**Total Concentration ($\mu g/m^3$)**	**NAAQS ($\mu g/m^3$)**	**CAAQS ($\mu g/m^3$)**
NO_2	1-hour	49.31	229.09	278.40	NA	470[4]
	Annual	1.22	67.59	68.81	100	100[4]
SO_2	1-hour	2.24	62.75	64.99	NA	655
	3-hour	2.02	41.83	43.85	1300	NA
	24-hour	1.47	39.22	40.69	365	105
	Annual	0.10	10.46	10.56	80	NA
CO	1-hour	656.13	5,830.00	6,486.13	40,000	23,000
	8-hour	266.31	5,145.00	5,411.31	10,000	10,000
PM_{10}	24-hour	17.36	164.00[2]	181.36	150	50
	Annual	0.80	56.2[2]	57.0	NA	20
$PM_{2.5}$	24-hour[3]	17.36	106.2[2]	123.56	35	NA
	Annual[3]	0.80	27.40[2]	28.20	15	12

1 Background represents the maximum values measured at the monitoring stations presented in Section 7.1.1.2
2 PM_{10} and $PM_{2.5}$ background levels exceed ambient standards.
3 All PM_{10} emissions from Project and cumulative sources were also considered to be $PM_{2.5}$.
4 In February 2007, the CARB approved new, more stringent CAAQS for NO_2. In the units used in this table, the new standards, which are expected to take effect fully in late 2007, are 338 $\mu g/m^3$ (1 hour) and 56 $\mu g/m^3$ (annual).

Under SCAQMD rules, the proposed project offset requirements for all pollutants other than NO_X will be determined based on the maximum expected monthly emissions (in pounds) divided by 30, i.e., essentially the average day of the worst-case month. The offset ratio for emission reduction credits (ERCs) or Priority Reserve Credits is 1.2 to 1. NO_X RECLAIM credits requirements are calculated based on the annual project emissions of this pollutant using a 1 to 1 ratio. Based on these criteria, the expected offset requirements for the SGGS are as shown in Table 7.1-35.

The actual mix of emission credits used to offset proposed project emissions will be determined based on availability and market conditions. SGPG has prepared a confidential offset plan that has been submitted under a Request for Confidential Designation.

Table 7.1-35
Estimated Emission Credit Requirements to Offset SGGS Project Emissions

Parameter	Units	Pollutant Emissions			
		NO_X	VOC	PM_{10}	SO_X
Maximum Hourly Emissions[1]	lb/hour – one turbine/HRSG	18.7	1.35	3.85	1.46
	lb/hour – aux boiler	0.69	0.26	0.32	0.04
Daily Emissions[2]	lb/day – one turbine/HRSG	448.8	32.4	92.4	35.04
	lb/day – both turbines/HRSGs	897.6	64.8	184.8	70.08
	lb/day – aux boiler	16.6	6.2	7.7	1.0
	lb/day – total project	914.2	71.0	192.5	71.0
Annual Emissions[3]	lb/year – total project	269,000	56,600	59,000	18,600
Offset Ratio		1	1.2	1.2	1.2
Required RECLAIM credits	lb/year	269,000			
Required ERCs or Priority Reserve Credits	lb/day		85.2	231.0	85.2

[1] Based on normal operations at 100% load with 100% duct firing
[2] Based on 24 hours of normal operation at 100% load with 100% duct firing
[3] Based on 4,000 hours of auxiliary boiler operation at 100% load, 4000 operating hours for both turbine/HRSGs with 100% duct firing, 3,446 hours operating hours for both turbines at 100% load, 10 cold starts, 50 warm starts, 200 hot starts and 260 shutdowns for both turbines

7.1.5 Best Available Control Technology Analysis

In accordance with the PSD regulations, as well as the requirements of SCAQMD rules, the proposed project will be required to use BACT to minimize emissions from the proposed combustion turbine/HRSG trains and the auxiliary boiler. A detailed BACT analysis was conducted to evaluate available control options for the proposed project and is presented in Appendix K-7. A summary of the proposed BACT is provided below

Table 7.1-36 presents the proposed BACT emission levels for the proposed SGGS, based on the assessment described in Appendix K-7.

7.1.6 Laws, Ordinances, Regulations, and Standards

The applicable laws, ordinances, regulations, and standards (LORS) related to the potential air quality impacts from the SGGS are described below. These LORS are administered (either independently or cooperatively) by the SCAQMD, U.S. EPA Region IX, the CEC, and the CARB.

7.1.6.1 Federal

The federal Clean Air Act (CAA) of 1970, 42 USC 7401 et seq., as amended in 1977 and 1990, is the basic federal statute governing air pollution. The provisions of the CAA that are potentially relevant to this project are listed below and discussed in the following sections:

- Air Quality Control Regions;
- National Ambient Air Quality Standards;
- Prevention of Significant Deterioration;

Table 7.1-36
Summary of Proposed BACT

Pollutant	Control Technology	Concentration
Turbine/HRSG Units		
NO_X	Dry low-NO_X Burner, SCR	2.0 ppmvd (3-hr average) at 15 percent O_2
CO	Catalytic oxidation	2.0 ppmvd at 15 percent O_2
ROC	Catalytic oxidation	2.0 ppmvd at 15 percent O_2
SO_2	Pipeline quality natural gas	NA
PM_{10}	Pipeline quality natural gas	NA
Ammonia slip	Operational limitation	5.0 ppmvd at 15 percent O_2
Auxiliary Boiler (56 MMBtu/hr)		
NO_X	Low-NO_X Burner	9 ppmvd at 3 percent O_2
CO	NA	<50 ppmvd at 3 percent O_2
ROC	NA	NA
SO_2	Pipeline Quality Natural gas	NA
PM_{10}	Pipeline Quality Natural gas	NA

Notes:
BACT = Best Available Control Technology
CO = carbon monoxide
NA = not applicable
NO_X = nitrogen oxides
O_2 = oxygen
PM_{10} = particulate matter less than or equal to 10 microns in diameter
ppm = parts per million
SCR = Selective catalytic reduction
ROC = reactive organic compounds
SO_2 = sulfur dioxide

- Acid Rain Program;
- New Source Review;
- New Source Performance Standards;
- Maximum Achievable Control Technology Standards;
- Title V Operating Permits; and
- Risk Management Program.

Applicable requirements of the State of California and the local SCAQMD are discussed in Section 7.1.6.2, including regulations that apply to both construction and operations.

Air Quality Control Regions

Because air pollution is a regional problem and not limited to political or state boundaries, the CAA established Air Quality Control Regions (AQCR). This is a method of dividing the country into regional air basins. The proposed project site is located in the non-desert portion of San Bernardino County belonging to the Metropolitan Los Angeles Air Quality Control Region (Title 40 CFR Part 81.17).

National Ambient Air Quality Standards

U.S. EPA, in response to the federal CAA of 1970, established federal NAAQS in 40 CFR Part 50. The federal NAAQS include both primary and secondary standards for six “criteria” pollutants. These criteria pollutants are O_3, CO, NO_2, SO_2, PM_{10}, and Pb.

Primary standards were established to protect human health, and secondary standards were designed to protect property and natural ecosystems from the effects of air pollution.

The 1990 Clean Air Act Amendments (CAAA) established attainment deadlines for all designated areas that were not in attainment with the federal NAAQS. In addition to the federal NAAQS described above, a new federal standard for $PM_{2.5}$ and a revised O_3 standard were promulgated in July 1997. The new federal standards were challenged in a court case during 1998.

The court required revisions in both standards before U.S. EPA could enforce them. The U.S. Supreme Court upheld an appeal of the District Court decision in February 2001. Under an interim policy, the preexisting federal PM_{10} and 1-hour O_3 standards would continue to be implemented for the next several years until any required actions by U.S. EPA were completed. In 1997, EPA established annual and 24-hour NAAQS for $PM_{2.5}$ for the first time. In 2006, the federal annual PM_{10} standard was revoked by the federal EPA due to a lack of evidence linking health problems to long-term exposure to coarse particle pollution. The 3-year average of the 98th percentile of 24-hour PM_{10} concentrations (35 $\mu g/m^3$) was effective on December 17, 2006. The State of California has adopted CAAQS that are in some cases more stringent than the federal NAAQS. The state and federal AAQS relevant to the proposed project are summarized in Table 7.1-37.

The U.S. EPA, CARB, and the local air pollution control districts determine air quality attainment status by comparing local ambient air quality measurements from the state or local ambient air monitoring stations with the federal and state AAQS. Those areas that meet ambient air quality standards are classified as “attainment” areas; areas that do not meet the standards are classified as “nonattainment” areas. Areas that have insufficient air quality data may be identified as unclassifiable areas. These attainment designations are determined on a pollutant-by-pollutant basis. The proposed project site is designated a federal nonattainment area for O_3, CO, PM_{10}, and $PM_{2.5}$ based on air quality monitoring data showing exceedances of the federal standards. On February 24, 2006, based on no violations in the last 5 years, the CARB adopted the Maintenance Plan for CO and submitted it to U.S. EPA as a SIP revision, along with a request to EPA to approve a redesignation to attainment. U.S. EPA has not yet ruled on this redesignation. Thus the South Coast Air Basin is still officially designated as nonattainment for CO but is expected to be redesignated to attainment sometime in 2007. The proposed project vicinity is designated a state nonattainment area for O_3, $PM_{2.5}$, and PM_{10} based on air quality monitoring data showing exceedances of the state standards. Table 7.1-38 presents the attainment status (both federal and state) for the portion of San Bernardino County that lies within the SCAQMD.

As mentioned above, both U.S. EPA and CARB are involved with air quality management in the South Coast Air Basin, along with SCAQMD. The area of responsibility for each of these agencies is described below.

U.S. EPA has ultimate responsibility for ensuring, pursuant to the CAAA, that all areas of the United States meet, or are making progress toward meeting, the federal NAAQS. The State of California falls under the jurisdiction of U.S. EPA Region IX, which is headquartered in San Francisco. U.S. EPA requires that all states submit SIPs for nonattainment areas that describe how the federal NAAQS will be achieved and maintained. Attainment plans must be approved by CARB before they are submitted to U.S. EPA.

Regional or local air quality management districts (or air districts) such as SCAQMD are responsible for preparation of plans for attainment of federal and state standards. CARB is responsible for overseeing attainment of the CAAQS, implementation of nearly all phases of California’s motor vehicle emissions program, and oversight of the operations and programs of the regional air districts. Each air district is responsible for establishing and implementing rules and control measures to achieve air quality attainment within its district boundaries. The air district also prepares an air quality management plan

Table 7.1-37
National and California Ambient Air Quality Standards

Pollutant	Averaging Time	NAAQS[1]		CAAQS[2]
		Primary[3,4]	Secondary[3,5]	Concentration[3]
Ozone (O_3)	1-Hour	Revoked [8]	Same as Primary Standard	0.09 ppm (180 µg/m^3)
	8-Hour	0.08 ppm		0.07 ppm (137 µg/m^3)
Carbon Monoxide (CO)	8-Hour	9 ppm (10 mg/m^3)	None	9.0 ppm (10 mg/m^3)
	1-Hour	35 ppm (40 mg/m^3)		20 ppm (23 mg/m^3)
Nitrogen Dioxide (NO_2)	Annual Average	0.053 ppm (100 µg/m^3)	Same as Primary Standard	-
	1-Hour	-		0.25 ppm (470 µg/m^3)
Sulfur Oxides (SO_2)	Annual Average	0.03 ppm (80 µg/m^3)	-	-
	24-Hour	0.14 ppm (365 µg/m^3)	-	0.04 ppm (105 µg/m^3)
	3-Hour	-	0.5 ppm (1300 µg/m^3)	-
	1-Hour	-	-	0.25 ppm (655 µg/m^3)
Suspended Particulate Matter (PM_{10})	24-Hour	150 µg/m^3	Same as Primary Standard	50 µg/m^3
	Annual Arithmetic Mean	Revoked [6]		20 µg/m^3
Fine Particulate Matter ($PM_{2.5}$) [7]	24-Hour	35 µg/m^3	Same as Primary Standard	-
	Annual Arithmetic Mean	15 µg/m^3		12 µg/m^3
Lead (Pb)	30-Day Average	-	-	1.5 µg/m^3
	Quarterly Average	1.5 µg/m^3	Same as Primary Standard	-
Hydrogen Sulfide (HS)	1-Hour	No Federal Standards		0.03 ppm (42 µg/m^3)
Sulfates (SO_4)	24-Hour			25 µg/m^3
Visibility Reducing Particles	8-Hour (10 am-6 pm, Pacific Standard Time)			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.

µg/m^3 = micrograms per cubic meter; mg/m^3 – milligram per cubic meter; ppm – parts per million
Source: U.S. EPA-NAAQS (http://www.epa.gov/air/criteria.html); CARB-CAAQS (http://www.arb.ca.gov/aqs/aaqs2.pdf)

1. National standards (other than ozone, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration in a year, averaged over 3 years, is equal to or less than the standard. For PM_{10}, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m^3 is equal to or less than one. For $PM_{2.5}$, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over 3 years, are equal to or less than the standard. Contact U.S. EPA for further clarification and current federal policies.
2. California standards for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, suspended particulate matter—PM_{10}, $PM_{2.5}$, and visibility-reducing particles, are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.
3. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.
4. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.
5. National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.
6. Due to a lack of evidence linking health problems to long-term exposure to coarse particle pollution, the agency revoked the annual PM_{10} standard in 2006 (effective December 17, 2006).
7. To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 µg/m^3 (effective December 17, 2006)
8. On June 15, 2005, the 1-hour ozone standard (0.12 ppm) was revoked for all areas except the 8-hour ozone nonattainment Early Action Compact Areas (EAC) areas.

Table 7.1-38
Attainment Status for San Bernardino County with Respect to Federal and California Ambient Air Quality Standards

Pollutant	Federal Attainment Status	State Attainment Status
Ozone	Nonattainment	Nonattainment
CO	Nonattainment	Attainment
NO_2	Unclassified/Attainment	Attainment
SO_2	Attainment	Attainment
PM_{10}	Nonattainment	Nonattainment
$PM_{2.5}$	Nonattainment	Nonattainment
Lead	Unclassified	Attainment

Source: National Area Designations and Proposed 2006 State Area Designations, CARB (http://www.arb.ca.gov/desig/adm/adm.htm)
Notes:
CO = carbon monoxide
NO_2 = nitrogen dioxide
SO_2 = sulfur dioxide
PM_{10} = particulate matter less than 10 microns in diameter
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter

(AQMP) that includes an inventory of all emission sources within the district (both manmade and natural), a projection of future emissions growth, an evaluation of current air quality trends, and an assessment of any rules or control measures needed to attain the federal and state AAQS. This AQMP is submitted to CARB, which then compiles AQMPs from all air districts within the state into the SIP. The responsibility of the air districts is to maintain an effective permitting system for existing, new, and modified stationary sources, to monitor local air quality trends, and to adopt and enforce such rules and regulations as may be necessary to achieve the federal and state AAQS.

Prevention of Significant Deterioration Requirements

In addition to the ambient air quality standards described above (NAAQS), the federal PSD program has been established to protect deterioration of air quality in those areas that already meet national ambient air quality standards. Specifically, the PSD program establishes allowable concentration increases for attainment pollutants due to new emission sources that are classified as major sources. These increases allow economic growth, while preserving the existing air quality, protecting public health and welfare, and protecting Class I areas (national parks and wilderness areas).

The PSD regulations define a “major stationary source” as any source type belonging to a list of 28 source categories that emits, or has the “potential to emit” 100 tons per year or more of any pollutant regulated under the CAA, or any other source type that has the potential to emit such pollutants in amounts equal to or greater than 250 tons per year. If a source is considered major for PSD purposes because of one pollutant, then PSD review is applicable for those other pollutants emitted from the source in amounts greater than the PSD significance levels. The PSD regulations require major stationary sources to undergo a preconstruction review that includes an analysis and implementation of BACT, a PSD increment consumption analysis, an ambient air quality impact analysis, and analysis of AQRVs (impacts on visibility and vegetation). The SGGS is subject to these requirements.

The incremental proposed project emissions for SO_2, NO_X, PM_{10}, VOC, and CO are as shown in Table 7.1-39 and compared with the PSD significance thresholds. The project emissions of CO and NO_X,

Table 7.1-39
PSD Emission Threshold Triggers for New Stationary Sources

Pollutant	Significant Thresholds (tpy)	Project Emissions (tpy)	PSD Triggered by Project?
CO	100	292.15	Yes
SO_2	40	9.26	No
NO_X	40	134.39	Yes
PM_{10}	15	33.55	No
VOCs	40	28.31	No

Source: SCAQMD rule 1702 (http://www.aqmd.gov/rules/reg/reg17/r1702.pdf)
Project emissions include all emissions from natural gas.
Notes:
tpy = tons per year
CO = carbon monoxide
SO_2 = sulfur dioxide
NO_X = nitrogen oxide(s)
PM_{10} = particulate matter less than 10 microns in diameter
VOCs = volatile organic compounds

would be above these PSD triggers, thus the Applicant must demonstrate through modeling that such emissions will not interfere with the attainment or maintenance of the applicable NAAQS and will not cause an exceedance of the applicable PSD increments shown in Table 7.1-40. For project emissions of CO that would exceed the trigger levels, the Applicant must demonstrate through modeling that the increase in emissions would not interfere with the attainment or maintenance of the CO NAAQS. Allowable PSD increments for SO_2 and NO_X, in Class I and II areas are summarized in Table 7.1-40. Note that PSD is not triggered for PM_{10} because the project area is non-attainment for this pollutant. However, the contribution of project emissions of PM_{10} are included in the evaluation of project impacts to visibility in Class I areas as described in Section 7.1.2.5.

As described in Section 7.1.2.5, there are six Class I areas within 100 km of the SGGS site (Cucamonga Wilderness Area, San Gabriel Wilderness Area, San Gorgonio Wilderness Area, San Jacinto Wilderness Area, Agua Tibia Wilderness Area, and Joshua Tree National Monument). In accordance with PSD requirements, a Class I AQRV analysis was conducted for each Class I area within 100 km of the proposed project site.

Acid Rain Program Requirements

Title IV of the CAAA applies to sources of air pollutants that contribute to acid rain formation, including certain sources of SO_2 and NO_X emissions. Title IV is implemented by the U.S. EPA under 40 CFR 72, 73, and 75. Allowances of SO_2 emissions are set aside in 40 CFR 73. Sources subject to Title IV are required to obtain SO_2 allowances, to monitor their emissions, and obtain SO_2 allowances when a new source is permitted. Sources such as the proposed project that use pipeline-quality natural gas are exempt from many of the acid rain program requirements. However, these sources must still estimate SO_2 and carbon dioxide (CO_2) emissions, and monitor NO_X emissions with certified CEMS. All subject facilities must submit an acid rain permit application to U.S. EPA within 24 months of commencing operation.

Table 7.1-40
Allowable PSD Increments for SO_2, NO_X, and PM_{10}

Pollutant	Averaging Times	Maximum Allowable Increase (Micrograms Per Cubic Meter)
Class I		
SO_2	Annual arithmetic mean	2
	24-hr maximum	5
	3-hr maximum	25
NO_X	Annual arithmetic mean	2.5
Class II		
SO_2	Annual arithmetic mean	20
	24-hr maximum	91
	3-hr maximum	512
NO_X	Annual arithmetic mean	25

Source: SCAQMD rule 1702 (http://www.aqmd.gov/rules/reg/reg17/r1702.pdf)
Notes:
1. PM_{10} increments are not applicable because the entire Project area is non-attainment with respect to federal ambient standards for this pollutant.
SO_2 = sulfur dioxide
NO_X = nitrogen oxide(s)
PM_{10} = particulate matter less than 10 microns in diameter

New Source Review Requirements

The federal CAA, U.S. EPA regulations, and the California CAA establish the criteria for siting new and modified emission sources. The federally mandated process for permitting new or modified sources in federal nonattainment areas is referred to as Nonattainment New Source Review (NNSR). SCAQMD is responsible for NNSR rule development and enforcement for sources in the South Coast Air Basin. The SCAQMD's NNSR rules are contained in Regulation XIII, Rules 1301-1313. The rules require that BACT must be applied to any new source with emissions above the levels specified in Regulation XIII, or Rule 2005. Second, all potential emission increases from the sources above specified thresholds must be offset by real, quantifiable, surplus, permanent, and enforceable emission decreases in the form of ERCs, Regulation XIII, Rule 1309 "Emission Reduction Credits" (see Section 7.1.4). Third, an ambient air quality impact assessment must be conducted to confirm that the proposed project does not cause or contribute to a violation of a federal or state AAQS (see Section 7.1.2.4) or jeopardize public health (see Section 7.6). Finally, the Applicant must certify that all major sources owned or operated in the State of California are either in compliance or on an approved schedule for compliance with applicable air quality regulations.

New Source Performance Standards

New source performance standards (NSPS) have been established by U.S. EPA to limit air pollutant emissions from certain categories of new and modified stationary sources. The NSPS regulations are contained in 40 CFR Part 60 and cover many different industrial source categories. Stationary gas turbines are regulated under Subpart KKKK. The enforcement of NSPS has been delegated to the SCAQMD, and the NSPS regulations are incorporated by reference into the District's Regulation IV Rule 4001. In general, local emission limitation rules or BACT requirements in California are far more restrictive than the NSPS requirements. For example, the controlled NO_X emission rate from the proposed project's gas turbines of less than 0.08 pound (lb) of NO_X per megawatt (MW)-hour will be well below the Subpart KKKK requirement of 0.39 lb of NO_X per MW-hour. Similarly, the projected maximum SO_2 emissions from the SGGS gas turbines will be about 0.011 lb of SO_2 per MW-hour, which is substantially less than the Subpart KKKK requirement of 0.58 lb of SO_2 per MW-hour.

NSPS fuel requirements for SO_2 will be satisfied by the use of natural gas, and emissions and fuel monitoring that will be performed to meet the requirements of BACT will comply with NSPS, acid rain, and other regulatory requirements.

40CFR 60 Subpart Dc, Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units, applies to new steam generating units that have a maximum design heat input capacity between 10 and 100 MMBtu/hr. The proposed auxiliary boiler has a design heat input capacity of 56 MMBtu/hr, and is thus subject to this NSPS. Since natural gas will be used exclusively to fuel this boiler, the emission limits for SO_2 and opacity do not apply. However, the limit on PM_{10} emissions (0.03 lb/MMBtu) is applicable. Subpart Dc also specifies acceptable performance test methods and procedures, as well as reporting and recordkeeping requirements for documenting compliance. Heat recovery steam generators that are associated with combined cycle gas turbines and meet the requirements of Subpart KKKK (see above), are not subject to Subpart Dc.

Maximum Achievable Control Technology

The CAAA of 1990, under revisions to Section 112, require a proposed project to list and promulgate national emission standards for hazardous air pollutants (NESHAPS) in order to control, reduce, or otherwise limit the emissions of hazardous air pollutants (HAPs) from major categories and area sources. As these standards are promulgated, they are published in 40 CFR 63.

Stationary gas turbines are on the list of 174 categories of major and area sources that would be henceforth subject to emission standards. The specific Maximum Achievable Control Technology (MACT) standard potentially applicable to new stationary gas turbines is 40 CFR 63 Subpart YYYY. Also potentially applicable to the project is 40 CFR 63 Subpart DDDD, which regulates HAP emissions from boilers. MACT standards are intended to reduce emissions of air toxics through the installation of control equipment rather than through risk-based emission limits. However, since the proposed facility will not be a major source of HAPs, no additional controls under these NESHAPS are required.

Federally Mandated Operating Permits

Title V of the CAA requires U.S. EPA to develop a federal operating permit program that is implemented under 40 CFR 70. This program is administered by SCAQMD under Regulation XXX, Rules 3000-3008. Permits must contain emission estimates based on potential-to-emit, identification of all emission sources and controls, a compliance plan, and a statement indicating each source's compliance status. The permits must also incorporate all applicable federal, state, or Air Quality Control District orders, rules and regulations. Because the new facility will expand the existing EGS site as a modified stationary source, the proposed project will apply for a modification to the Title V permit.

Consistency with Federal Requirements

The SCAQMD in not currently authorized by the U.S. EPA to issue PSD permits for projects in the South Coast Air Basin. Thus, a separate application for the PSD permit will need to be made to EPA Region IX. The SCAQMD has authority to implement and enforce most other applicable federal requirements, including the NSPS, NESHAPS, Title IV Acid Rain, and Title V Federal Operating Permit requirements. The Applicant will apply for a modification to the Title V permit that will include Title IV Acid Rain provisions. As stated above, these federal programs are tied to the existing EGS RECLAIM permit.

Risk Management Plan

Regulations (40 CFR 68) under the CAA are designed to prevent accidental releases of hazardous materials. The regulations require facilities that store more than a threshold quantity of a listed regulated substance to develop a Risk Management Plan, including an offsite-consequence analysis for the worst-case accidental release of a hazardous substance, hazard assessments and response programs to prevent accidental releases of listed chemicals. Section 112(r)(5) of the CAA discusses the regulated substances. These substances are listed in 40 CFR 68.130. Aqueous ammonia, which will used as a reagent to the SGGS project SCR NO_X control system, is a listed substance and its Threshold Quantity for solutions of 20 percent and greater is 20,000 pounds of solution.

7.1.6.2 State

The CARB was created by the Mulford-Carrell Air Resources Act in 1968. The primary responsibilities of the CARB include (1) to develop, adopt, implement and enforce the state's motor vehicle pollution control program; (2) to administer and coordinate the state's air pollution research program; (3) to adopt and update the state's ambient air quality standards; (4) to review the operations of the local air pollution control districts; and (5) to review and coordinate the SIPs for achieving federal ambient air quality standards.

State Implementation Plan

The federal CAA requires each state to prepare a SIP to demonstrate how it will attain the NAAQS within the federally imposed deadlines. In California, local districts adopt new rules to demonstrate attainment of the NAAQS by reducing emissions. CARB reviews the SIP. The relevant SCAQMD Rules and Regulations that have been incorporated into the SIP are presented below under the local LORS.

California Clean Air Act

In 1989, California established state ambient air quality standards, including stringent enforcement of the NAAQS and additional standards for visibility-reducing particles, sulfates, and hydrogen sulfide. Local districts prepare air quality plans to demonstrate how the ambient air quality standards will be attained.

Toxic Air Contaminant Program

The Toxic Air Contaminant Identification and Control Act of 1983 created a state process to identify toxic air contaminants and to 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 (OEHHA) evaluates the corresponding health effects. These agencies prepare a risk assessment report to determine if the substance poses a significant health risk and should be identified as a toxic air contaminant. This program includes the 189 hazardous air pollutants (HAPs) named by the CAAA. If necessary, CARB develops air toxics control measures to reduce emissions. No measures in this program are applicable to the proposed project, since the project would not exceed the Title V threshold of 10 tpy of any single HAP, or 25 tpy of a combination of HAPs. The HAPs are addressed by the Federal Title V Operating Permit.

Air Toxics Hot Spots Program

As required by the California Health and Safety Code Section 44300 (originally Assembly Bill 2588 – Air Toxics "Hot Spots" Information and Assessment Act). This program was created in 1987 to develop a statewide inventory of air toxics emissions from stationary sources. Applicable facilities must prepare: (1) an emissions inventory plan identifying air toxics; (2) an emission inventory report quantifying air toxics emissions; and (3) a health risk assessment, if air toxics emissions are at high levels. Facilities whose air toxics pose a significant health risk must prepare and implement risk reduction plans. This requirement is applicable only after the start of operations. Section 7.6, Public Health, indicates that air toxics impacts from the proposed project would be insignificant.

Permit to Construct and Permit to Operate

Under Regulation II, SCAQMD administers the air quality regulatory program for the construction, alteration, replacement, and operation of new power plants within its jurisdiction. Regulation II, Rules 201 and 203 incorporate other SCAQMD rules that pertain to sources that may emit air contaminants through the issuance of air permits (i.e., Permit to Construct [PTC] and Permit to Operate [PTO]). This permitting process allows the SCAQMD to adequately review new and modified air pollution sources to ensure compliance with all applicable prohibitory rules and to ensure that appropriate emission controls are used. A PTC allows for the construction of the air pollution source and remains in effect until the PTO application is granted, denied, or canceled. For power plants under the siting jurisdiction of the CEC, the SCAQMD issues a Determination of Compliance (DOC). The DOC is incorporated into the CEC license. Once the CEC issues a license, the SCAQMD is able to issue a PTC. Once the project commences operations and demonstrates compliance with the PTC, SCAQMD will issue a PTO. The PTO specifies conditions that the air pollution source must meet to comply with other air quality standards and will incorporate applicable PTC requirements.

Power Plant Sitting Requirements

Under the California Environmental Quality Act (CEQA), the CEC has been charged with assessing the environmental impacts of each new power plant and considering the implementation of feasible mitigation measures to prevent potential significant impacts. CEQA Guidelines [Title 14, California Administrative Code, Section 15002(a)(3)] state that the basic purpose of CEQA is to “prevent significant, avoidable damage to the environment by requiring changes in projects through the use of alternatives or mitigation measures when the governmental agency finds the changes to be feasible.”

The CEC siting regulations require that, unless certain conditions justifying an override are shown, a new power plant can only be approved if the proposed project complies with all federal, state, and local air quality rules, regulations, standards, guidelines, and ordinances that govern the construction and operation of the proposed project. A project must demonstrate that facility emissions will be appropriately controlled to mitigate significant impacts from the project and that it will not jeopardize attainment and maintenance of the state and federal AAQS. Cumulative impacts, impacts due to pollutant interaction, and impacts from non-criteria pollutants must also be considered.

CEC and CARB Memorandum of Understanding

This Memorandum of Understanding establishes requirements of the CEC to assure protection of environmental quality during AFC review.

Consistency with State Requirements

State law invests local air pollution control districts and air quality management districts with the responsibility for regulating emissions from stationary sources. As discussed previously in this section, the proposed project is under the local jurisdiction of the SCAQMD. Compliance with District rules and regulations will ensure compliance with state air quality requirements.

7.1.6.3 Local

The SCAQMD is the local district with authority to implement and enforce air quality regulations. The SCAQMD prepares an Air Quality Plan to define its strategies for attaining the state and federal ambient air quality standards, and its relevant control measures for implementing those strategies (Health and Safety Code Section 40914).

The SCAQMD Rules and Regulations are authorized by Health and Safety Code (H&SC) Section 4000 et seq., and Section 40200 et seq. This section presents the SCAQMD requirements that are applicable to the proposed project. The SCAQMD has the delegated authority for implementing local, state, and federal air quality regulations in Los Angeles, Orange, and the non-desert portions of Riverside and San Bernardino counties. The proposed project is subject to District regulations that apply to new source review of emissions, prohibitory regulations, and requirements for toxic air pollutants. The following sections evaluate the proposed project's compliance with applicable District requirements.

The proposed project is required to secure a preconstruction Determination of Compliance from the District, and to demonstrate continued compliance with regulatory limits. The preconstruction review includes BACT and offsetting of emissions.

Rules and Regulations

The following paragraphs outline the SCAQMD rules and regulations that apply to the proposed project.

Regulation II – Permits

This regulation establishes the framework of the application for construction and operating permits for new or modified equipment that emits air pollutants.

Rule 201 – Permit to Construct

A project shall not construct or modify any nonexempt equipment that emits or controls air pollution without first obtaining a Permit to Construct. For power plant projects subject to CEC licensing, the PTC is effectively replaced by the Determination of Compliance process.

Rule 202 – Temporary Permit to Operate

This rule allows for new equipment that was issued a Permit to Construct to be operated temporarily, upon notification of the Air Pollution Control Officer, until the final Permit to Operate is issued. The Applicant does not anticipate the need for a temporary Permit to Operate at this time.

Rule 203 – Permit to Operate

This rule prohibits operation of any equipment that emits or controls air pollutants without first obtaining a permit to operate, except as provided in Rule 202. The Applicant has a RECLAIM/Title V Operating Permit and will seek modification of the Permit prior to installation of the Project.

Rule 212 – Standards for Approving Permits

Rule 212 specifies the standard requirements for a Permit to Construct and a Permit to Operate, including public notification requirements for projects located within 1,000 feet from a school boundary, projects that pose a potential risk of nuisance, or facilities that pose a cancer risk of ten in a million during a 70-year lifetime. Additionally, RECLAIM facilities that exceed the daily maximums specified in the Rule must conduct public notification to the broadest possible scope of interested parties, including federal, state, and local interested agencies, for a 30-day public comment period. Public notification must include all applicable provisions of 40 CFR Part 51.161(b) and 40 CFR Part 124.10. The proposed project will not be located within 1,000 feet from the outer boundary of a school, but daily estimated emissions will exceed those stated in Rule 212(g). However, the project will not expose an individual to a cancer risk greater than, or equal to, ten in a million (1×10^{-6}) during a lifetime (70 years), as documented by the Rule 1402 and presented in Section 7.6, Public Health of this AFC. The Applicant will be in compliance with Rule 212 by conducting public notification according to the requirements specified by the Rule, including the 30-day notification and public comment requirements of 40 CFR Part 124.10 and 40 CFR Part 51.161(b).

Rule 218 – Continuous Emission Monitoring

This rule describes the installation, quality control and assurance, and reporting requirements for CEMS to determine the concentration or mass emissions of a source. This rule does not apply to the CEMS required under RECLAIM Regulation XX for NO_X monitoring.

Regulation III – Fees

Rule 301 – Permit Fees

This rule identifies the fees that are applicable to permit modifications, new facilities, and permitted emissions. Review of the fee schedules identifies the fees in Rule 301 for processing of this application. The Applicant will submit the required fees with the application for permit modification, in compliance with this rule.

Regulation IV – Prohibitions

This regulation restricts visible emissions, odor nuisance, fugitive dust, various air emissions, fuel contaminants, startup/shutdown exemptions, and breakdown events.

Rule 401 – Visible Emissions

Rule 401 prohibits the discharge of any air contaminant from a single source for more than three minutes in any one hour that produces visible emissions of specified opacity or shade (designated on the Ringlemann Chart). No visible emissions are expected with proper, normal operation of the proposed turbines and auxiliary boiler using natural gas fuel and the BACT equipment specified in this AFC.

Rule 402 – Nuisance

Rule 402 implements H&SC 41700 to prohibit the discharge from any source of any air contaminant that may cause injury, detriment, nuisance, or annoyance to any considerable number of persons or the public, or which endangers such persons or public, or which may cause injury or damage to business or property. No nuisance is expected with proper, normal operation of the proposed turbines and auxiliary boiler utilizing natural gas fuel and the control equipment specified in this AFC.

Rule 403 – Fugitive Dust

Under this rule the Applicant must prevent, reduce, or mitigate fugitive dust emissions from the proposed project site. The Applicant must use best available control measures to implement this rule. Mitigation may include adding freeboard to haul vehicles, covering loose material on haul vehicles, watering, or using chemical stabilizers on roads or dirt areas, or ceasing all activities. A contingency plan may be required by the U.S. EPA. The Applicant will submit a fugitive dust plan to both the District and the Commission. The Applicant will also implement appropriate measures to control fugitive dust emissions during construction, including (1) use of water or chemical dust suppressants on unpaved surfaces; (2) use of vacuum or water flushing on paved surfaces; (3) covering or maintaining freeboard to haul vehicles; (4) limiting traffic speed on unpaved areas to 15 mph; (5) installing erosion control measures; (6) replanting disturbed areas as soon as possible; (7) using gravel pads and wheel washers as needed; and (8) using wind breaks and dust suppression as needed to control wind erosion.

Rule 407 – Liquid and Gaseous Air Contaminants

Rule 407 prohibits the discharge of CO and sulfur compounds into the atmosphere at specified concentrations (2,000 ppm of CO, and 500 ppm of SO_2) averaged over 15 minutes. The SGGS turbines and auxiliary boilers will meet the CO emission limit of 2,000 ppm with (or without) the installation of the control system, as substantiated by the emission calculations in Appendix K-3. The sulfur emission requirement does not apply per Rule 407 (c)(2), since the fuel complies with the gaseous fuel sulfur content limits of Rule 431.1 (see below). The proposed project will be in compliance with this rule.

Rule 408 – Circumvention

This rule allows the concealment of emissions released to the atmosphere in cases where the only violation involved is of Section 48700 of H&SC or District Rule 402. The Applicant will not circumvent any District rules or regulations.

Rule 409 – Combustion Contaminants

Rule 409 specifies emission limits for equipment that is used to combust fuels. The provisions of this rule do not apply to internal combustion engines, thus is not applicable to the proposed project turbines. The combustion contaminant discharge limit for fuel burning equipment is 0.1 grains per cubic foot (scf) of flue gas calculated to 12 percent of CO_2 at standard conditions. The proposed SGGS will be in compliance with this rule for the auxiliary boiler due to exclusive use of natural gas.

Rule 431.1 – Sulfur Content of Gaseous Fuels

This rule specifies fuel sulfur content limits applicable to any person who burns gaseous fuels containing sulfur compounds. The rule's limit requirements are based on fuel type. The rule also provides test methods, monitoring, recordkeeping, and reporting requirements. Compliance with this rule is expected with usage of pipeline grade natural gas. The total sulfur compounds are limited to a maximum of 0.20 grains/100 dscf (4 ppmv as Hydrogen Sulfide [H_2S]), which is less than the rule's 16 ppmv limit for natural gas (calculated as hydrogen sulfide). The proposed project will therefore be in compliance with this rule.

Rule 475 – Electric Power Generating Equipment

This rule applies to power generating equipment greater than 10 MW installed after May 7, 1976. Requirements establish a limit for combustion contaminants (particulate matter) of 11 lbs/hr or 0.01 grains/scf. Compliance is achieved if either the mass limit or the concentration limit is met. Composite emissions calculations for all turbine operations (cold startup, hot startup, base load, and planned shutdown) indicate that the average rate of PM_{10} emissions per turbine will be less than 11 lb/hr. The proposed project will, therefore, be in compliance with this Rule.

Regulation VII – Emergencies

Rule 701 – Air Pollution Emergency Contingency Actions

This rule requires facilities employing 100 or more people or emitting 100 or more tons of air pollutants (NO_X, SO_X, or VOCs) per year to reduce those pollutants by at least 20 percent upon declaration or prediction of a Stage 2 or 3 episode. Upon declaration of a state of emergency by the Governor, a facility must comply with the Governor's requirements. A power plant may be exempt if it is determined to be an essential service responding to public emergency or utility outage. The Applicant will respond appropriately to the Governor's declaration of a state of emergency.

Regulation IX – Standards of Performance for New Stationary Sources

Standards of Performance for Electric Utility Steam Generating Units for which construction is commenced after September 18, 1978, specifies NO_X, SO_2, PM_{10}, and opacity emission limits; emission monitoring; and reporting requirements for Electric Utility Steam Generating Units. Regulation IX incorporates provisions of Part 60, Chapter I, Title 40 of the Code of Federal Regulations (40 CFR Part 60). It is applicable to all new, modified or reconstructed sources of air pollution. Sections of this regulation apply to small steam generators (Subpart Dc) and stationary gas turbines (Subpart KKKK). These subparts establish limits of particulate matter, SO_2 and NO_2 emissions from the facility, and their corresponding monitoring and testing requirements. The proposed project is expected to be well below these emissions limits with the proposed NO_X SCR controls and use of low-sulfur natural gas fuel.

Regulation XI – Source Specific Standards

Rule 1110.1 – Emissions from Stationary Internal Combustion Engines

This rule generally applies to engines larger than 50 brake-horsepower (bhp) and restricts NO_X and CO emissions from rich-burn or lean-burn engines. Emergency standby engines operating less than 200 hours per year are exempt. The proposed project does not include emergency stand-by engines.

Rule 1110.2 – Emissions from Gas and Liquid Fueled Engines

This rule establishes NO_X, VOC, and CO emission limits from stationary and portable engines over 50 bhp. Emergency standby engines operating less than 200 hours per year are exempt. The proposed project does not include any new emergency standby engines.

Rule 1134 Emissions of Oxides of Nitrogen from Stationary Gas Turbines

Rule 1134 applies to stationary gas turbines, which provide guidelines/requirements for controlling NO_X emissions. The proposed project is exempt from the requirements of this rule since this facility is in the NO_X RECLAIM program under Regulation XX – RECLAIM.

Rule 1135 Emissions of Oxides of Nitrogen from Electric Power Generating Systems

Rule 1135 applies to electric power generating systems, which provide guidelines/requirements for controlling NO_X emissions. The proposed project is exempt from the requirements of this rule since this facility is in the NO_X RECLAIM program under Regulation XX – RECLAIM.

Regulation XIII – New Source Review

This regulation requires preconstruction review for new, modified, or relocated facilities to ensure that the facility does not interfere with progress in attainment of the NAAQS, and that future economic growth in the South Coast Air Basin is not unnecessarily restricted. This regulation limits the emissions of non-attainment contaminants and their precursors and ozone depleting compounds and ammonia, by requiring the use of BACT. The Applicant intends to comply with all requirements of Regulation XIII.

The South Coast Air Basin, including Rancho Cucamonga, is a nonattainment region for O_3, CO, PM_{10}, and $PM_{2.5}$. Precursors to nonattainment pollutants are also considered nonattainment for regulatory purposes of SCAQMD review. Therefore, SCAQMD considers the following pollutants to be nonattainment:

- Reactive organic gases (ROG) as a precursor to O_3 and the organic fraction of suspended particulate matter;
- NO_X as a precursor to O_3, NO_2 and the nitrate fraction of suspended particulate matter;

- SO_X as a precursor to SO_2, SO_4, and the sulfate fraction of suspended particulate matter; and
- Inorganic gases such as ammonia (NH_3), hydrogen fluoride (HF), and hydrogen chloride (HCl) as precursors to particulate matter.

Under NSR (Regulation XIII), Rule 1303 (Requirements), there are four specific requirements that apply to an applicable permit unit: (1) Installation of BACT (1303(a)); (2) modeling to substantiate that there will be no significant increase in an air quality concentration (1303(b)(1)); (3) obtaining emission offsets for the proposed increase in facility emissions (1303(b)(2)); and (4) facility compliance verification (1303 (b)(3)).

This regulation applies to all new or modified existing permit units that may cause the issuance of any nonattainment air contaminant (or precursor), halogenated hydrocarbon, or ammonia. The proposed project is expected to have emissions of NO_X, CO, SO_X, ROG, and PM_{10}. For RECLAIM facilities, this rule only applies to those nonattainment pollutants, or their precursors, not regulated under the RECLAIM program. Since the EGS is a RECLAIM facility for NO_X, only the Regulation XIII requirements for CO, SO_X, ROG, PM_{10}, and NH_3 will apply.

1. Since CO and PM_{10} emissions are below BACT limits, the proposed project should not cause a significant increase in ambient air concentrations of CO, PM_{10}, or sulfates. However, a detailed air quality modeling analysis for CO, PM_{10}, and sulfates will be required under this rule. Modeling for ROC and SO_X is not required by this rule. A Health Risk Assessment (HRA) for emissions of toxic contaminants is discussed in Section 7.6, Public Health.

2. Under Rule 1304 (d)(2)(B), emission offsets will be required if the permit units (i.e., the project) post-modification potential-to-emit (PTE) for an individual criteria pollutant is greater than actual emissions discounted to BACT levels, based on actual process rate data during the previous two years. No 2-year internal offsets will be available to apply toward the new gas turbines, HRSGs and auxiliary boiler; therefore, the Applicant will provide all the ERCs needed for the new equipment emissions according to the provisions of Rules 1303(b)(2) and 1309.

3. Pursuant to Rule 1303 (b)(4) and Regulation II (Permits), the Applicant shall certify that its facility complies with all applicable rules and regulations of SCAQMD. The new gas turbines will be considered a major modification as defined by Rule 1302. The Applicant shall also certify the other sources operated by the Applicant are in compliance with applicable federal emissions standards. Statewide compliance certification will also be required.

Regulation XIV – Toxics

Rule 1401 – New Source Review of Carcinogenic Air Contaminants

The SCAQMD regulates air toxic contaminants from new, modified, or relocated permit units by specifying limits for the maximum individual cancer risk and excess cancer cases that may result from exposure to carcinogenic air contaminants from these sources.

Requirements for BACT for Toxics (T-BACT), maximum individual cancer risk (MICR), and risk assessment guidelines for toxic pollutants are the primary provisions of SCAQMD Rule 1401. The proposed modifications to the Applicant's facility permit will trigger increases of Rule 1401 toxic pollutants, along with combustion pollutants. Emissions of organic hazardous air pollutants will be reduced by the CO oxidation catalyst at a rate of 85 percent for formaldehyde and 55 percent for other species. The CO oxidation catalyst is proposed as T-BACT for compliance with this rule. The proposed project would not cause an incremental cancer risk of a 10 in 1 million, as documented in Section 7.6 of this AFC.

Regulation XVII – Prevention of Significant Deterioration

This regulation establishes preconstruction requirements for stationary sources to ensure the air quality in attainment areas does not significantly deteriorate while maintaining a margin for future growth. It establishes maximum allowable increases over ambient baseline concentrations for each pollutant.

Rule 1703 – PSD Analysis

The SCAQMD Rule in 1703(a)(2) requires that each permit unit is constructed using BACT for each criteria air contaminant for which there is federally significant net emission increase. Since SCAQMD is nonattainment for O_3, and PM_{10}, and NSR applies, the proposed project will not trigger any federally significant pollutant emission increases for these pollutants. However, the proposed project triggers a significant emission increase for NO_X and CO, and the Applicant conducted the required PSD modeling. The proposed project will also apply BACT for the NO_X and CO emissions. The proposed project will be in compliance with this rule.

Regulation XX – Regional Clean Air Incentives Market

The RECLAIM is a program designed to distribute emission allocations (or credits) for two primary non-attainment pollutants: NO_X and SO_X. A facility under the program may emit NO_X and/or SO_X only according to the amount of credits in the facility's possession. Facilities that emit more than 4 tons per year of NO_X or SO_X are automatically included in the program. Other facilities may opt into the RECLAIM program. Regulation XX sets specific NO_X and/or SO_X requirements for RECLAIM facilities and exempts the facilities from other NO_X and/or SO_X requirements in a number of command and control rules according to Tables 1 and 2 in Rule 2001. The existing EGS operates as a RECLAIM NO_X facility per Rule 2001. The facility will continue to comply with the requirements of Rule 2004 prior to and after the installation and operation of the proposed project units. Additionally, the Applicant will comply with the CEMS, recordkeeping, and reporting requirements for NO_X per Rule 2012. The proposed project will be in compliance with this rule.

Rule 2005 – New Source Review for RECLAIM

Similar to Regulation XIII, Rule 2005 defines the preconstruction review requirements for new RECLAIM facilities and modifications to existing RECLAIM facilities. The requirements of Rule 2005 are virtually identical to Rule 1303, except for different offset NO_X requirements. NO_X emission increases must be below the facility's current RECLAIM Trading Credit (RTC) allocation or additional RTCs must be provided by the Applicant. RECLAIM facilities have no Community Bank for NO_X. Compliance certification requirements are identical to Rule 1303. The Applicant has a RECLAIM permit for the existing EGS that will be modified to include the proposed project. The proposed project will result in an increase in NO_X, thus triggering BACT, modeling, and emissions offsetting. As presented in this AFC, the Applicant has conducted dispersion modeling of the potential air impacts to substantiate that operational emissions of NO_X will not significantly affect air quality. The Applicant will apply BACT to the turbines as dry low-NO_X burners and SCR to control NO_X, and will offset the increased NO_X emissions by ERCs or RECLAIM credits.

Regulation XXX – Federal Operating Permits (Title V, Part 70)

Regulation XXX administers the 40 CFR Part 70 Federal Permitting Program, established by Title V of the CAAA, within the SCAQMD jurisdiction. The EGS is a Title V major source with an existing Title V permit. Regulation XXX defines the permit application and issuance, and the compliance requirements of the program. The proposed project will require a permit modification, and U.S. EPA Region IX review is required. Regulation XXX integrates the Title V permit with the RECLAIM permit so that the Project can't proceed without the other. The Applicant will apply for Title V permit modification.

Regulation XXXI – Acid Rain Permit

Title IV of the federal CAAA establishes acid rain permitting for qualifying facilities. Regulation XXXI integrates the Title IV program with the RECLAIM program. The regulation requires a facility to obtain emission allowances for SO_X emissions, and requires monitoring of SO_X, NO_X, and CO_2. The Applicant will apply for modification to the existing EGS RECLAIM permit to incorporate revisions to Title IV.

7.1.6.4 Industry

No industry-based air quality LORS are applicable to the proposed project.

Table 7.1-41 presents the applicable federal, state, local regulations that the SGGS must adequately address as part of the permitting process.

Table 7.1-41
Applicable Air Quality Laws, Ordinances, Regulations, and Standards

Laws, Ordinances, Regulations, and Standards	Applicability	Administering Agency	AFC Section
Federal			
Clean Air Act 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 and 52 (40 CFR Parts 51 and 52) Prevention of Significant Deterioration Program)	Requires prevention of significant deterioration (PSD) review and facility permitting for construction of new or modified major stationary sources of air pollution. PSD review applies to pollutants for which ambient concentrations are lower than NAAQS.	SCAQMD, with EPA Region IX oversight	7.1
CAA 171-193, 42 USC 7501 et seq. (New Source Review)	Requires new source review (NSR) facility permitting for construction or modification of stationary sources. NSR applies to pollutants for which ambient concentrations are higher than NAAQS.	SCAQMD, with EPA Region IX oversight	7.1
CAA 401 (Title IV), 42 USC 7651 (Acid Rain Program)	Requires reductions in NO_X and SO_2 emissions.	SCAQMD, with EPA Region IX oversight	7.1.2
CAA 501 (Title V), 42 USC 7661 (Federal Operating Permits Program)	Establishes comprehensive permit program for major stationary sources.	SCAQMD, with EPA Region IX oversight	7.1.6 7.1.8
CAA 111, 42 USC 7411, 40 CFR Part 60 (New Source Performance Standards, or NSPS)	Establishes national standards of performance for new stationary sources.	SCAQMD, with EPA Region IX oversight	7.1
State			
H&SC 44300-44384; Title 17 of the California Code of Regulations (17 CCR 93300-93347 (Toxic “Hot Spots” Act)	Requires preparation and biennial updating of facility emission inventory of hazardous substances; health risk assessments.	SCAQMD, with CARB oversight	7.6, Public Health

Table 7.1-41
Applicable Air Quality Laws, Ordinances, Regulations, and Standards

Laws, Ordinances, Regulations, and Standards	Applicability	Administering Agency	AFC Section
H&SC 41700 (Nuisance)	Provides that no person shall discharge from any source quantities of air contaminants or material which cause injury, detriment, nuisance, or annoyance to considerable number of persons or to the public which endanger the comfort, repose, health or safety or which can cause injury or damage to business or property.	SCAQMD, with CARB oversight	7.1 7.6
California Public Resources Code 25523(a); 20 CCR 1752, 2300-2309 and Div. 2, Chap. 5, Art. 1, Appendix B, Park (k) (CEC and CARB Memorandum of Understanding)	Requires that CEC's decision on the AFC include requirements to assure protection of environmental quality; AFC is required to address air quality protection.	CEC	7.1.2 7.1.3
Local			
SCAQMD Rule 201 Permit to Construct	Requires a Permit to Construct before construction of an emission source occurs.	SCAQMD, with CARB and EPA Region IX oversight	7.1.8
SCAQMD Rule 203 Permit to Operate	Prohibits operation of any equipment that emits or controls air pollutants without first obtaining a permit to operate, except as provided in Rule 202.	SCAQMD	7.1.8
SCAQMD Rule 212 Standards for Approving Permits	Specifies the standard requirements for a Permit to Construct and Permit to Operate, including public notification requirements.	SCAQMD	7.1.8
SCAQMD Rule 218 Continuous Emission Monitoring	Describes the installation, quality control and assurance, and reporting requirements for continuous emissions monitoring (CEMS) to determine the concentration of mass emissions of a source.	SCAQMD	7.1.6
SCAQMD Rule 301 Permit Fees	Identifies fees that are applicable to permit modifications, new facilities, and permitted emissions.	SCAQMD	7.1.8
SCAQMD Rule 401 Visible Emissions	Prohibits the discharge of any air contaminant from a single source for more than 3 minutes in any one hour that produces visible emissions of specified opacity or shade designed on the Ringlemann Chart.	SCAQMD	7.1.2

Table 7.1-41
Applicable Air Quality Laws, Ordinances, Regulations, and Standards

Laws, Ordinances, Regulations, and Standards	Applicability	Administering Agency	AFC Section
SCAQMD Rule 402 Nuisance (H&SC 41700)	Prohibits the discharge from any source of any air contaminant that may cause injury, detriment, nuisance, or annoyance to any considerable number of persons or the public, or which endangers such persons or public or which may cause injury or damage to business or property.	SCAQMD	7.1 7.6
SCAQMD Rule 403 Fugitive Dust	Visible fugitive dust is restricted to the Project property line. PM_{10} emissions are limited to less than 50 $\mu g/m^3$. Bulk materials may not be tracked onto public roads. Best available control measures must be employed for mitigation. Contingency plan may be required by the U.S. EPA.	SCAQMD	7.1.2 7.1.3
SCAQMD Rule 407 Liquid and Gaseous Air Contaminants	Prohibits the discharge of CO and sulfur compounds into the atmosphere at specified concentrations.	SCAQMD	7.1.2 7.1.3
SCAQMD Rule 408 Circumvention	Allows the concealment of emissions released to the atmosphere in cases where the only violation is HSC 48700 or Rule 402.	SCAQMD	7.1.8
SCAQMD Rule 409 Combustion Contaminants	Specifies emission limits for equipment combusts fuels. Combustion contaminant discharge limit is 0.1 grains per cubic foot of flue gas calculated to 12% of CO_2 at standards conditions.	SCAQMD	7.1.2
SCAQMD Rule 431.1 Sulfur Content of Gaseous Fuels	Specifies fuel sulfur content limits; test methods, monitoring, recordkeeping and reporting.	SCAQMD	2.0
SCAQMD Rule 431.2 Sulfur Content of Liquid Fuels	Establishes sulfur content of 0.05% by weight for diesel fuel.	SCAQMD	2.0
SCAQMD Rule 475 Electric Power Generating Equipment	Establishes limit on particulate matter of 11 lb/hr or 0.01 grains/scf.	SCAQMD	7.1.2 7.1.3
SCAQMD Rule 701 Air Pollution Emergency Contingency Actions	Employers of 100 people or more, or emitting 100 tons or more of air pollutants must reduce pollutants by 20% upon Stage 2 or 3 episode, or a state of emergency issued by Governor.	SCAQMD	7.1.6

Table 7.1-41
Applicable Air Quality Laws, Ordinances, Regulations, and Standards

Laws, Ordinances, Regulations, and Standards	Applicability	Administering Agency	AFC Section
SCAQMD Regulation IX Standards of Performance for New Stationary Sources (NSPS)	Establishes emission limits, monitoring and reporting requirements for electric utility steam generating units under NSPS Subpart Da; and for stationary gas turbines under Subpart KKKK.	SCAQMD, with EPA Region IX oversight	7.1
SCAQMD Rule 1110.1 Emissions from Stationary Internal Combustion Engines	Establishes NO_X and CO limits from rich-burn or lean-burn engines. Engines operating less than 200 hours per year are exempt.	SCAQMD	7.1.2 7.1.3
SCAQMD Rule 1110.2 Emissions from Gas and Liquid Fueled Engines.	Establishes NO_X, VOC and CO emission limits from stationary and portable engines over 50 bhp. Engines operating less than 200 hours per year are exempt.	SCAQMD	7.1.2 7.1.3
SCAQMD Rule 1135 Emissions of Oxides of Nitrogen from Electric Power Generating Systems	Establishes guidelines for controlling NO_X emissions. (SCAQMD Regulation XX RECLAIM facilities are exempt).	SCAQMD	7.1.2
SCAQMD Regulation XIII – New Source Review	Requires pre-construction review for new, modified or relocated facilities to ensure that the facility does not interfere with progress in attainment of the NAAQD. Limits emissions of non-attainment contaminants and their precursors, ozone depleting compounds and ammonia; requires BACT, modeling, emission offsetting, and compliance verification.	SCAQMD, with CARB and EPA Region IX oversight	7.1
SCAQMD Regulation XIV Rule 1401 – New Source Review of Toxic Air Contaminants	Specifies risk limits which may result from exposures to carcinogenic air contaminants; requires BACT for toxics at certain level.	SCAQMD, with CARB and EPA Region IX oversight	7.1
SCAQMD Regulation XVII, Rule 1703 PSD Analysis	Establishes preconstruction requirements for sources to ensure air quality in attainment areas does not significantly deteriorate while maintaining a margin for future growth; Requires BACT for each criteria pollutant for which there is a federally significant net emission increase.	SCAQMD, with EPA Region IX oversight	7.1
SCAQMD Regulation XX – Regional Clean Air Incentives Market (RECLAIM)	Distributes emission allocations for NO_X and SO_X for facilities emitting over 4 tons per year. Sets specific requirements for RECLAIM facilities.	SCAQMD	7.1.2 7.1.3

Table 7.1-41
Applicable Air Quality Laws, Ordinances, Regulations, and Standards

Laws, Ordinances, Regulations, and Standards	Applicability	Administering Agency	AFC Section
SCAQMD Rule 2005 New Source Review for RECLAIM	Defines pre-construction review for RECLAIM facilities, including offsetting using RECLAIM Trading Credits (RTC).	SCAQMD, with EPA Region IX oversight	7.1
SCAQMD Regulation XXX – Federal Operating Permits (Title V)	Administers the 40 CFR Part 70 Federal Permitting Program; defines permit application and issuance, and the compliance requirements of the program. Integrates with RECLAIM permit.	SCAQMD, with CARB and EPA Region IX oversight	7.1.8
SCAQMD Regulation XXXI – Acid Rain Permit	Establishes acid rain permitting required by Title IV of CAA. Integrates with RECLAIM permit.	SCAQMD, with CARB and EPA Region IX oversight	7.1.8
Industry			
None Applicable	None Applicable		None Applicable

7.1.7 Involved Agencies and Agency Contacts

Agency contacts regarding public health assessment of the proposed project are as follows

Agency/Address	Contact/Title	Telephone
Air Quality – California Energy Commission 1519 Ninth Street Sacramento, CA 95814	Joe Loyer, Associate Mechanical Engineer	(916) 654-4287
Air Quality – South Coast Air Pollution Control District 21865 Copley Dr, Diamond Bar, CA 91765	Tom Chico, Senior Modeler	(909) 396-3149
Air Quality – U.S. Environmental Protection Agency 75 Hawthorne Street San Francisco, CA 94105	Carol Bohnenkamp, Regional Modeler Gerardo Rios, Chief, New Source Review Section	(415) 744-1500
Air Quality – California Air Resources Board P.O. Box 2815 Sacramento, CA 95812	Michael Tollstrup, Chief, Project Assessment Branch Stationary Source Division	(916) 322-6026

7.1.8 Permits Required and Permitting Schedule

Responsible Agency	Permit/Approval	Schedule
South Coast Air Quality Management District (SCAQMD)	Authority to Construct/Permit to Operate	Application to be filed concurrent with AFC filing. 180-day application review period will be requested.
U.S. Environmental Protection Agency	Prevention of Significant Deterioration (PSD) Permit	Application to be filed concurrent with AFC filing. 180-day application review period will be requested.

Under Regulation II, SCAQMD regulates the construction, alteration, replacement, and operation of new power plants. The proposed project is required to obtain a preconstruction Determination of Compliance from the SCAQMD. Regulation II, Rules 201 and 203 incorporates other SCAQMD rules pertaining to sources that may emit air contaminants through the issuance of air permits (i.e., Authority to Construct and Permit to Operate). This permitting process allows the SCAQMD to adequately review new and modified air pollution sources to ensure compliance with all applicable prohibitory rules and to ensure that appropriate emission controls are used. An Authority to Construct allows for the construction of the air pollution source and remains in effect until the Permit to Operate application is granted, denied, or canceled. For power plants under the siting jurisdiction of the CEC, the SCAQMD issues a Determination of Compliance in lieu of an ATC. The DOC is incorporated into the CEC license. When the proposed project commences operation and demonstrates compliance with the DOC, SCAQMD will issue a Permit to Operate (PTO). The PTO specifies conditions that the air pollution source must meet to comply with other air quality standards and will incorporate applicable DOC requirements. The final DOC should be issued within 6 months after receipt of complete applications.

7.1.9 References

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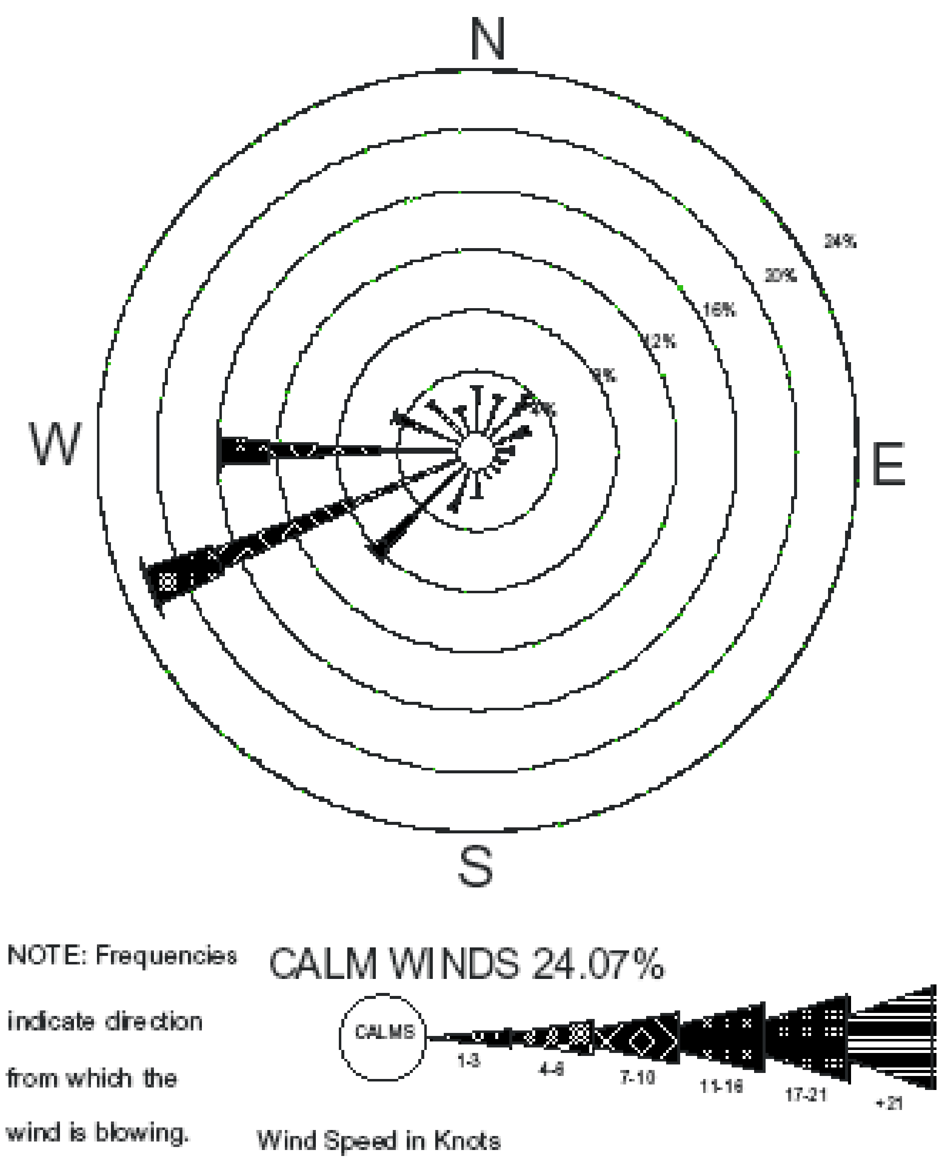

Source:
National Weather Service, 1994, 1995, 1997 through 1999.

WINDROSE FOR ALL MONTHS 1994, 1995, 1997, 1998 AND 1999, ONTARIO AIRPORT

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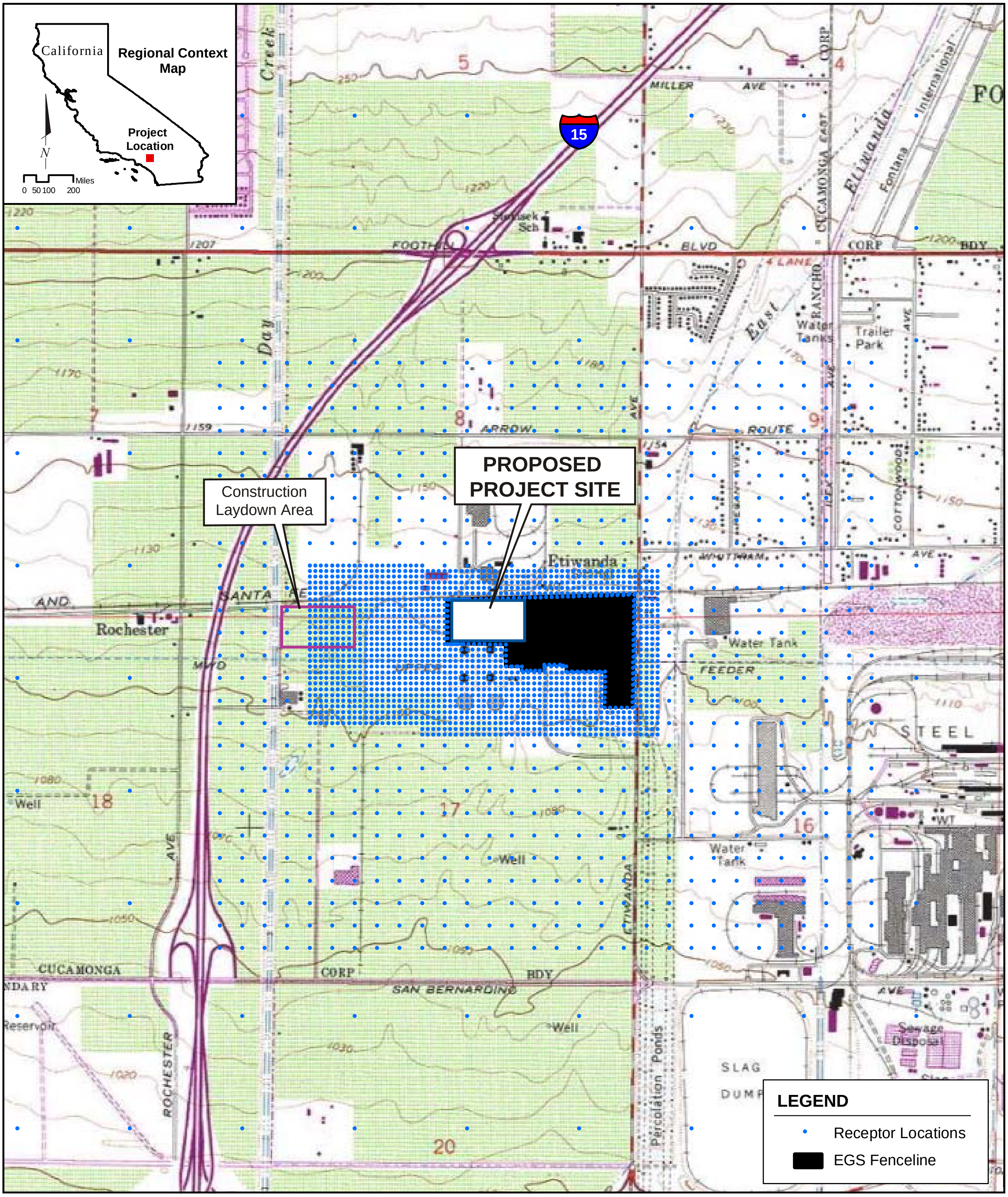
FIGURE 7.1-2

Path: G:\gis\projects\1577\28067169\mxd\airquality_windrose.mxd, 03/20/07, Jamie_Nyholt

3/27/07 vsa ..\Reliant Etiwanda\Graphics\7.01 Air Quality\7.1-2_windrose.ai



Feet
0 1000 2000 3000
SCALE: 1" = 2,000' (1:24,000)

N

SOURCE:
USGS TOPO! (Guasti Quad 1981);
ESRI (roads).

NEAR-FIELD MODEL RECEPTOR GRID

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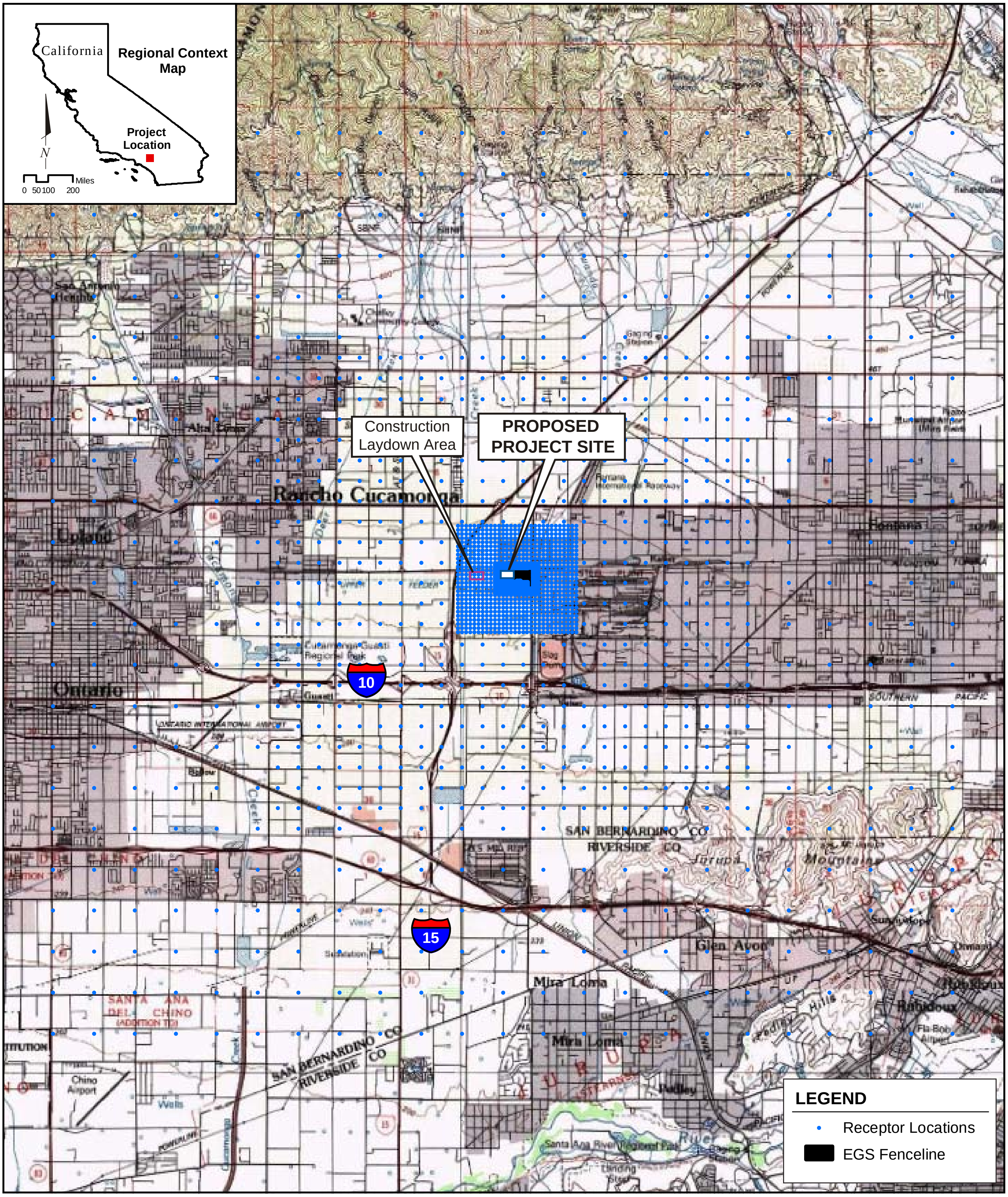
FIGURE 7.1-3

Path: G:\gis\projects\1577\28067169\mxd\airquality_near_field_receptors.mxd, 03/19/07, Jamie_Nyholt

4/09/07 vsa ..\Reliant Etiwanda\Graphics\7.01 Air Quality\7.1-3_near_field_receptors.ai



0 5500 11000 16500 Feet

SCALE: 1" = 11,000' (1:132,000)

N

SOURCE:
USGS TOPO! (Quads: Corona North 1981, Cucamonga Peak 1988, Devore 1988, Fontana 1980, Guasti 1981, Mount Baldy 1988, Ontario 1981, Prado Dam 1981, Riverside West, 1980).

FAR-FIELD MODEL RECEPTOR GRID

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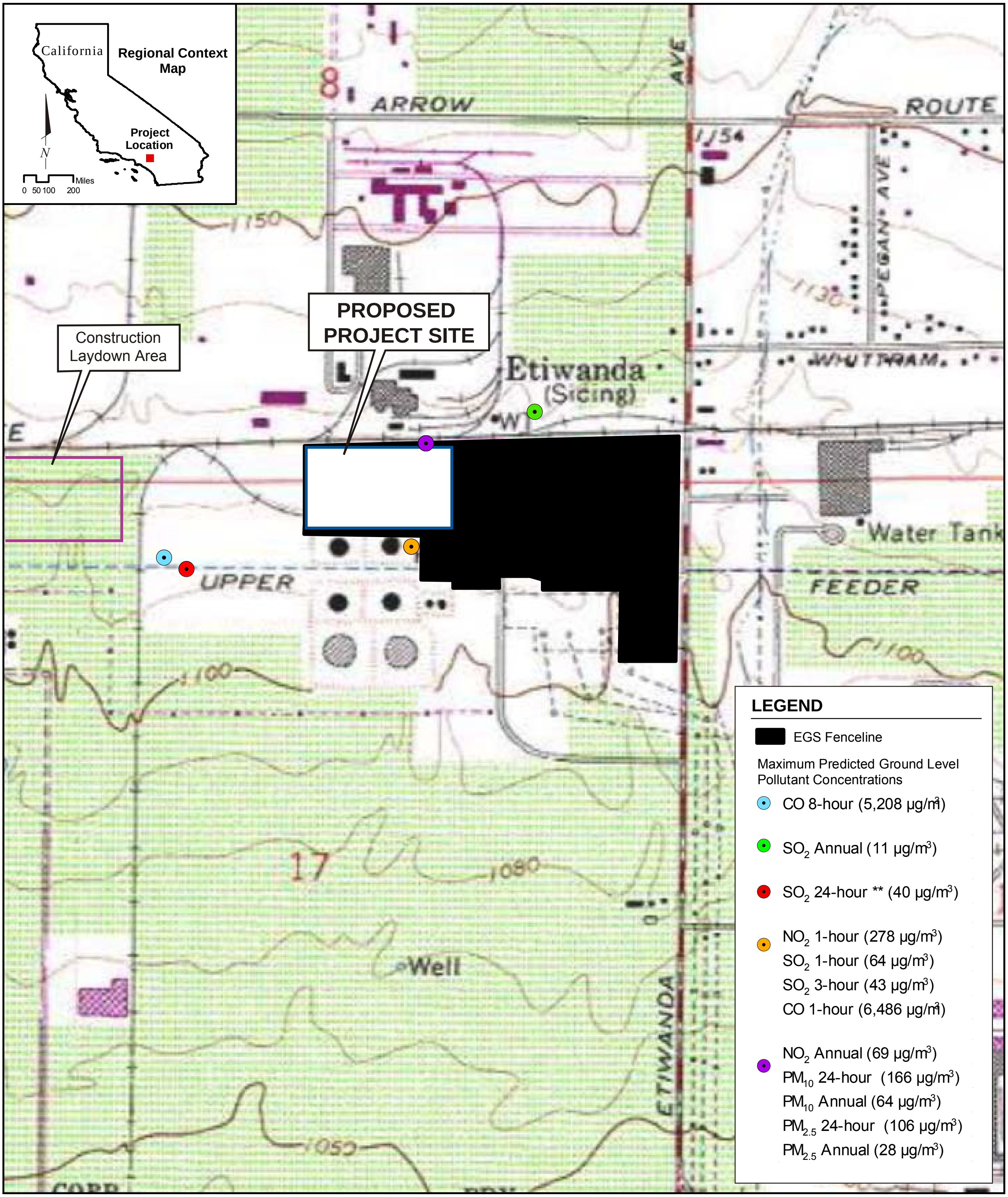
FIGURE 7.1-4

Path: G:\gis\projects\1577\28067169\mxd\airquality_far_field_receptors.mxd, 03/19/07, Jamie_Nyholt

4/09/07 vsa ..\Reliant Etiwanda\Graphics\7.01 Air Quality\7.1-4_far_field_receptors.ai



0 500 1000 1500 Feet

SCALE: 1" = 1,000' (1:12,000)

N

SOURCE:
USGS TOPO!
(Guasti Quad 1981).

LOCATIONS OF MAXIMUM PREDICTED GROUND LEVEL POLLUTANT CONCENTRATIONS FOR THE OPERATIONAL PROJECT

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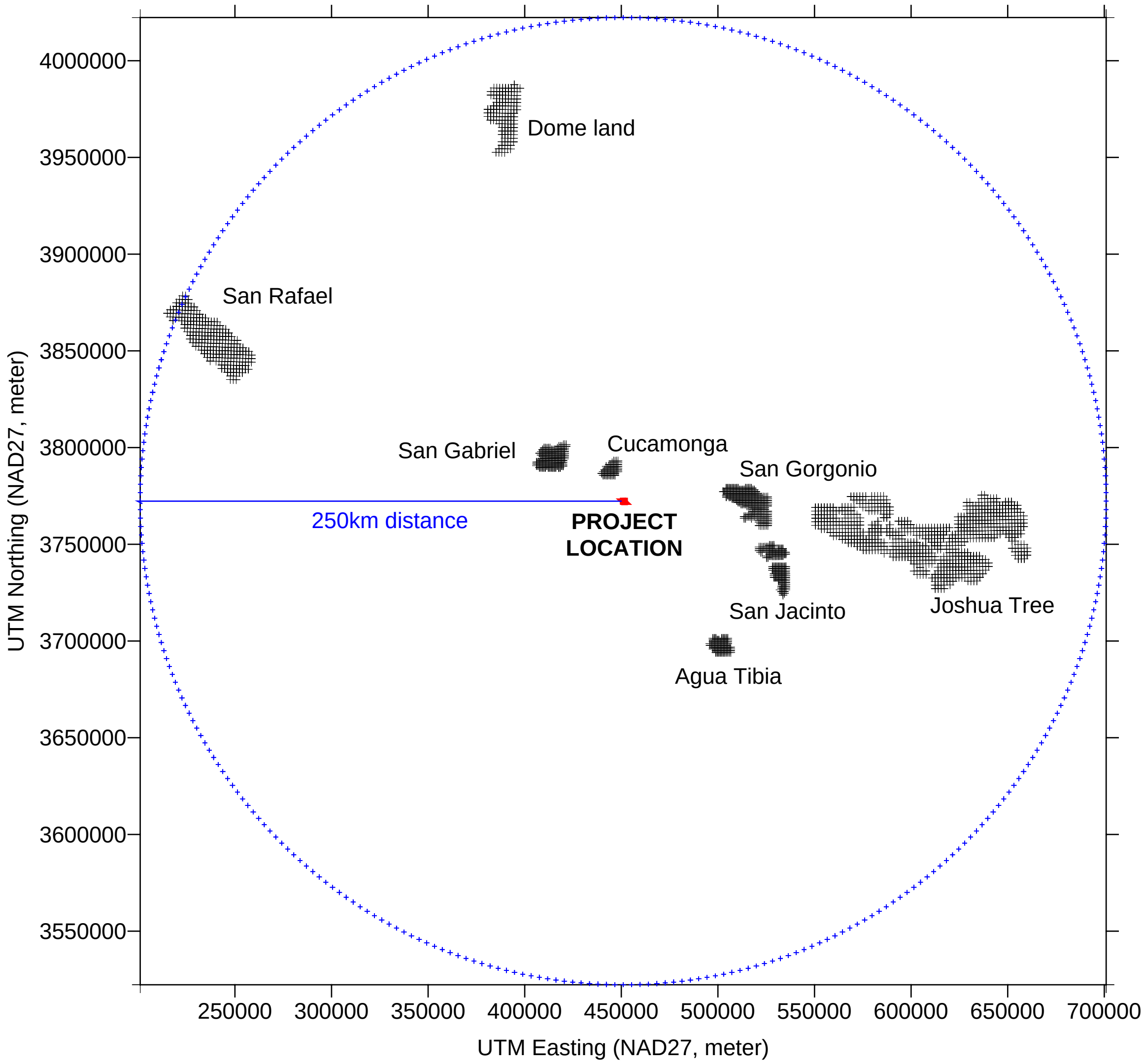
FIGURE 7.1-5

Path: G:\gis\projects\1577\28067169\mxd\airquality_pollutant_conc.mxd, 03/20/07, Jamie_Nyholt

4/09/07 vsa ..\Reliant Etiwanda\Graphics\7.01 Air Quality\7.1-5_pollutant_conc.ai



CLASS I AREAS WITHIN A 250-KILOMETER RADIUS SURROUNDING THE SGGS SITE

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FIGURE 7.1-6