5.2 AIR QUALITY

This analysis of the potential air quality effects of the SES Solar Two, LLC (Solar Two or Applicant) Project and its ancillary systems (Project) has been conducted according to California Energy Commission (CEC) power plant siting requirements. It also addresses Imperial County Air Pollution Control District (ICAPCD) permitting requirements for Determination of Compliance/Authority to Construct and National Environmental Policy Act of 1969 requirements. The analysis is organized as depicted below.

- Section 5.2.1, Affected Environment, describes elements of the local environment that are relevant to evaluation of the Project's potential air quality effects. These include topography, climate, and existing air quality. The most representative meteorological data, including wind speed and direction, temperature, relative humidity, and precipitation, and the most representative recent measurements of ambient air pollutant concentrations in the Project vicinity are summarized. Air pollutants emitted by the Project may travel in the atmosphere over long distances, but for practical purposes, the Project air quality study area can be considered to be the western section of Imperial County.
- Section 5.2.2, Environmental Consequences, evaluates the maximum potential air quality effects due to the Project's emissions of criteria pollutants [nitrogen oxides (NO_x), carbon monoxide (CO), sulfur oxides (SO_x), volatile organic compounds (VOC), particulate matter less than 10 microns in diameter (PM_{10}), and particulate matter less than 2.5 microns in diameter ($PM_{2.5}$)]. Estimated emissions of these pollutants are presented for the construction phase of the Project, as well as for operation of the installed equipment. Because of the nature of the Project, operational emissions will be small; however, a modeling analysis conducted for operational emissions of nitrogen dioxide (NO_2), CO, sulfur dioxide (SO_2), and particulate matter ($PM_{2.5}$ and PM_{10}) is presented. The results show that the Project will neither cause an exceedance of the California and/or National Ambient Air Quality Standards (CAAQS and NAAQS), nor contribute significantly to an existing exceedance.
- Section 5.2.3, Cumulative Effects, addresses the cumulative effects of the Project emissions with other potential new sources of air pollution in the area around the Solar Two Project Site.
- Section 5.2.4, Mitigation Measures, describes the emission mitigation measures proposed for Project construction. Emission sources associated with the operational Project will be limited to exhaust from vehicles working on the site in support of solar collector cleaning and facility maintenance, in addition to diesel internal combustion engine drivers for one emergency fire water pump and one backup generator. These engines will only be tested periodically to ensure their operability in the event of a fire or emergency loss of grid power.
- Section 5.2.5, Compliance with LORS, describes all applicable laws, ordinances, regulations, and standards (LORS).
- Section 5.2.6, References, lists the references used to conduct the air quality assessment.

The focus of this assessment of the Project's potential air quality effects is on criteria pollutants, i.e., those pollutants for which federal and California ambient standards have been promulgated. Information on the Project's emissions of toxic air contaminants and the associated health risks is presented in Section 5.16, Public Health and Safety.

5.2.1 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 Project region. The data presented in this section are considered to be reasonably representative of the Solar Two Project Site.

The Solar Two Project Site will be a newly constructed solar power plant located in an undeveloped area of Imperial County, California approximately 100 miles east of San Diego, California and 14 miles west of El Centro, California. It will be located just south of Plaster City and adjacent to Interstate 8 at the Dunaway Road exit. The Solar Two Project Site will encompass approximately 6,500 acres of fenced area, including approximately 6,140 acres of public land administered by the Bureau of Land Management and approximately 360 acres of private land. The Project Site and related areas are located on portions of 52 contiguous parcels of land, including Township 16 South Range 11 East of the San Bernardino Meridian, California: Sections 17 and 18 and portions of Sections 7, 9, 14, 15, 16, 19, 20, 21, 22; and Township 16 South Range 10 East of the San Bernardino Meridian, California: Sections 23 and portions of Sections 12, 13, 14, 22, 24, 25, 26, 27; and on the north by the Union Pacific Railroad right-of-way south of Evan Hewes Highway. The eastern portion of the Project Site is generally flat, sloping gently to the northeast. The central and western portions of the Project Site are characterized by low and moderate relief alluvial zones and washes. The few existing residences are located approximately 1 mile northeast, northwest, and west of the Project Site boundary. The nearest Class I area is Joshua Tree National Park, about 75 miles to the north. Figure 5.2-1, General Vicinity Plot Plan and Fence Line, shows the general vicinity, plot plan, and fence line defining the proposed Solar Two Project Site.

5.2.1.1 Climate and Meteorology

Imperial County is classified as having a desert climate characterized by low precipitation, hot summers, mild winters, low humidity, and strong temperature inversions. It is separated from the coastal regions by the San Jacinto and Santa Rosa mountain ranges to the northwest and west. To the north (approximately 108 miles), the San Gorgonio Pass represents a passageway between the interior and coastal portions of Southern California. The area's climatic conditions are strongly influenced by the large-scale sinking and warming of air in the semi-permanent subtropical high-pressure center over the eastern Pacific. This high pressure system effectively blocks out most mid-latitude storms, except in winter when the ridge is weaker and farther south. The coastal mountains on the western edge of the Imperial Valley also have a major influence on climate, serving as a meteorological boundary that effectively removes moisture from the marine air flowing inland from the Pacific. An annual wind rose representing data collected at the Imperial County Airport during the years 1991 to 1995 is presented on Figure 5.2-2, Annual Wind Rose for Imperial County Airport. Wind roses for all calendar quarters are provided in Appendix V, Air Quality Data.

The generally flat terrain of the valley floor, combined with the strong temperature differentials created by intense solar heating, produce moderate winds and deep thermal convection currents. The combination of subsiding air, protective mountains, and distance from the ocean all combine to severely limit precipitation. The valley area experiences surface inversions in the early morning hours almost every day of the year, causing air stagnation. These inversions are usually broken by noon due to solar heating of the earth's surface.

Temperature and precipitation means and extremes from the nearest long-term National Weather Service (NWS) Station in El Centro over a 30-year period (1971 through 2000) are presented in Table 5.2-1, Climatological Normals – Historical Temperature and Precipitation Data in Imperial County (National Climate Data Center 1971-2000 Monthly Normals). The coordinates of this weather station are: latitude 32°46'N, longitude 115°34'W. The hottest month, August, has a highest mean temperature of 94.6 degrees Fahrenheit (ºF) and a lowest mean temperature of 87.6°F. The coldest month, December, has a highest mean temperature of 59°F, and a lowest mean temperature of 50.6°F.

Table 5.2-1
Climatological Normals – Historical Temperature and Precipitation Data in Imperial County (National Climate Data Center 1971-2000 Monthly Normals)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Monthly
Highest mean temperature (°F)	61.5	64.8	69.6	75.8	84.2	89.8	94.2	94.6	90.1	79.7	69.5	59	94.6
Lowest mean temperature (°F)	51.3	56.1	58	60.8	69.6	82	89.1	87.6	80.4	69.2	57.8	50.6	50.6
Precipitation (inches)	0.51	0.36	0.31	0.05	0.03	0.01	0.06	0.32	0.36	0.35	0.17	0.43	2.96

Source: El Centro 2 SSW, Western Regional Climate Center (WRCC) web site.
Note:
°F = degrees Fahrenheit

During winter, the semi-permanent, subtropical high pressure system over the Pacific Ocean moves south, allowing the passage of frontal systems that bring most of the area's annual precipitation, which totals about 3 inches on average. Monthly mean precipitation amounts at El Centro range from 0.51 inch in January to 0.01 inch in June. During summer, migrating storm systems are blocked by the semi-permanent Pacific high, and rain associated with these storms is scarce. Relative humidity levels are generally very low. In the summer, relative humidity averages 30 to 50 percent in the early morning and 10 to 20 percent in the afternoon.

Desert regions are inclined to be windy since little friction is generated between the moving air and the low, sparse vegetation cover. In addition, the rapid daytime heating of the lower layer of air over the desert leads to convective activity. This exchange between lower and upper air tends to accelerate surface winds during the warm part of the day when convection is at a maximum. During the winter months the surface heating is not as intense, and the rapid cooling of the surface layers at night retards this vertical exchange of momentum. As a result, winds are generally calmer in winter, except during the passage of frontal storm systems. During all seasons, the prevailing winds are predominantly from the west or west-southwest.

5.2.1.2 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 NAAQS or CAAQS have been set are often referred to as "criteria" air pollutants. This term is derived from the comprehensive health and damage effects review that culminates in pollutant-specific air quality criteria documents, which precede and form the basis for establishment of NAAQS. California has promulgated standards, the CAAQS, which are generally more stringent than the NAAQS. These standards are reviewed on a prescribed frequency and revised as warranted by the emergence of new data on health and welfare effects of air pollutants. Each NAAQS or CAAQS specifies a concentration and an averaging time over which the concentration is measured. Different averaging times are based on protection against short-term, high-dosage effects versus 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 Imperial County is monitored at a number of permanent air quality monitoring stations operated by the ICAPCD and California Air Resources Board (CARB). The closest monitoring station to the Project Site within Imperial County is El Centro-9th Street Station, located about 14 miles east of the Project Site. This station measures ozone (O_3), PM_{10}, $PM_{2.5}$, NO_2, and CO. The nearest SO_2 and lead monitoring station to the Project Site is the Calexico-Ethel Street Station, located about 19 miles southeast of the Project Site. The other monitoring stations nearest to the Project Site are: Brawley-220 Main Street Station, Calexico-Grant Street Station, and Calexico-East Station, located about 21 miles northeast, 21 miles southeast, and 26.5 miles southeast of the Project Site, respectively. Air quality measurements taken at these stations are presented in Tables 5.2-2 through 5.2-8.

For the air quality effects analysis described in Section 5.2.2.4, Modeling Results – Compliance with Ambient Air Quality Standards, the maximum recorded concentrations from the most recent 4 years (2004 to 2007) at any of the nearest three monitoring stations were reviewed and the most representative data were used to characterize background air quality levels. The air quality monitoring data from the year 2006 are presented in the tables, but the extremely and exceptionally high SO_2 monitoring values recorded during this year at the Calexico-Ethel Street Station and CO 1-hour value at the El Centro-9th Street Station were not used in the air quality effects analysis. Also, several of the particulate matter readings recorded at the Calexico Monitoring Stations were abnormally high. One of the likely reasons for the high readings at these locations is due to long wait times associated with vehicles crossing the United States (U.S.)/Mexico border. Diesel-fired trucks that do not have to meet the stringent Environmental Protection Agency (EPA) environmental standards and idle for long periods of time near the Calexico air quality monitoring stations could cause high localized criteria pollutant levels. The CARB and the ICAPCD have been consulted and it is still unknown why the monitoring values are extraordinarily high, especially on a few specific days during August 2006 at the Calexico-Ethel Street Station.

O_3

On 15 June 2005 the 1-hour federal ozone standard was revoked for all areas except the 8-hour O_3 nonattainment Early Action Compact (EAC) areas. EAC areas are those that do not yet have an effective date for their 8-hour designations pursuant to Section 40 of the Code of Federal Regulations (CFR) 50.9(b). Since there are no EAC areas in California, the 1-hour federal O_3 standard is no longer in effect in any California air basin.

Concentration data for O_3 in parts per million (ppm) that were recorded within the most recent three years for which data are available at the nearest three monitoring stations (El Centro-9th Street, Calexico-Grant Street, and Calexico-Ethel Street Monitoring Station [2004 through 2007]) are summarized in Tables 5.2-2 through 5.2-4. As seen in these tables, the 1-hour O_3 CAAQS of 0.09 ppm has been exceeded several times in each year from 2004 through 2007 at each of the three stations.

The new federal 8-hour average O_3 standard of 0.075 ppm was announced by EPA on 12 March 2008. The new standard will be effective 60 days after publication in the Federal Register and replace the current 0.08 ppm standard. The current 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 federal 8-hour O_3 NAAQS has been exceeded occasionally, especially at the El Centro-9th Street and Calexico-Ethel Street Monitoring Station. As supported by the data in Tables 5.2-2 through 5.2-4, the Project Site is located in an area that is designated nonattainment with respect to both the federal 8-hour and state 1-hour O_3 standards.

The El Centro-9th Street Station is the nearest monitoring station to the Project Site and is not close to the Mexico border. The maximum recorded 1-hour and 8-hour O_3 concentration of 0.129 and 0.101 ppm, respectively, recorded in 2006 at this station were the highest and deemed to be the most representative background concentrations used in the air quality effects analysis.

Table 5.2-2
Concentration Data Summary for Ozone at El Centro-9th Street Station

Year	Highest Concentration for O_3 (ppm)		Estimated Number of Days Exceeding Standards	
	1-Hour	8-Hour	State 1-Hour	State 8-Hour
2007	0.118	0.094	8	23
2006	0.129	0.101	19	39
2005	0.122	0.097	8	49
2004	0.096	0.080	1	22

Source: California Air Resources Board (CARB) – California Air Quality Data web site (http://www.arb.ca.gov/aqd/aqdpage.htm); EPA AirData (http://www.epa.gov/air/data/index.html).
Notes:
EPA strengthened the 8-hour average ozone standard from 0.08 to 0.075 ppm on 12 March 2008. The new standard became effective on 27 May 2008. However, exceedances of the standard from 2004 to 2007 were based on the previous standard of 0.08 ppm.
The state ozone standards are 1-hour average (0.09 ppm) and 8-hour average (0.07 ppm).
Monitoring site address: El Centro-9th Street Station, 150 9th Street, El Centro CA 92243.
EPA = Environmental Protection Agency
O_3 = ozone
ppm = parts per million

Table 5.2-3
Concentration Data Summary for Ozone at Calexico-Grant Street Station

Year	Highest Concentration for O_3 (ppm)		Estimated Number of Days Exceeding Standards	
	1-Hour	8-Hour	State 1-Hour	State 8-Hour
2007	0.101	0.081	3	7
2006	0.099	0.074	1	1
2005	0.120	0.084	7	8
2004	0.105	0.069	1	0

Source: California Air Resources Board (CARB) – California Air Quality Data web site (http://www.arb.ca.gov/aqd/aqdpage.htm); EPA AirData (http://www.epa.gov/air/data/index.html).
Notes:
EPA strengthened the 8-hour average ozone standard from 0.08 to 0.075 ppm on 12 March 2008. The new standard became effective on 27 May 2008. However, exceedances of the standard from 2004 to 2007 were based on the previous standard of 0.08 ppm.
The state ozone standards are 1-hour average (0.09 ppm) and 8-hour average (0.07 ppm).
Monitoring site address: 900 Grant Street, Calexico, CA 92231.
EPA = Environmental Protection Agency
O_3 = ozone
ppm = parts per million

Table 5.2-4
Concentration Data Summary for Ozone at Calexico-Ethel Street Station

Year	Highest Concentration for O_3 (ppm)		Estimated Number of Days Exceeding Standards	
	1-Hour	8-Hour	State 1-Hour	State 8-Hour
2007	0.112	0.094	10	20
2006	0.111	0.087	2	3
2005	0.116	0.093	6	15
2004	0.108	0.077	4	5

Source: California Air Resources Board (CARB) – California Air Quality Data web site (http://www.arb.ca.gov/aqd/aqdpage.htm); EPA AirData (http://www.epa.gov/air/data/index.html).
Notes:
EPA strengthened the 8-hour average ozone standard from 0.08 to 0.075 ppm on 12 March 2008. The new standard became effective on 27 May 2008. However, exceedances of the standard from 2004 to 2007 were based on the previous standard of 0.08 ppm.
The state ozone standards are 1-hour average (0.09 ppm) and 8-hour average (0.07 ppm).
Monitoring site address: 1029 East Belcher Street, Calexico, CA 92231.
EPA = Environmental Protection Agency
O_3 = ozone
ppm = parts per million

Particulates

PM_{10}

Particulates in the air are caused by a combination of windblown fugitive dust (e.g., road dust; particles emitted from combustion sources [primarily carbon particles]; and organic, sulfate, and nitrate aerosols formed in the air from emitted hydrocarbons, SO_x, and NO_x). Respirable particulate matter is referred to as PM_{10}, which has a diameter equal to or less than 10 microns.

PM_{10} 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 previously been in effect.

Tables 5.2-5 through 5.2-7 show the maximum PM_{10} levels recorded at the El Centro-9th Street, Calexico-Grant Street, and Calexico-Ethel Street Monitoring Stations during the period from 2004 through 2007 and the available information on arithmetic annual averages for the same period (the arithmetic annual average is simply the arithmetic mean of all daily observations within a calendar year). PM_{10} is monitored based on differing state and federal protocols in California. The federal standard uses a gravimetric/beta attenuation method for measuring particulate matter, while the state standard uses an inertial separation and gravimetric analysis method. The tables show that the state 24-hour average PM_{10} CAAQS of 50 micrograms per cubic meter ($\mu g/m^3$) was frequently exceeded at the three monitoring stations in the last 4 years. The federal 24-hour average PM_{10} NAAQS of 150 $\mu g/m^3$ was exceeded seven times in 2007 at El Centro-9th Street Station, 16.3 times in 2006 at Calexico-Grant Street Station, and six times in each year from 2004 through 2007 at Calexico-Ethel Street Station, with a maximum recorded 24-hour PM_{10} concentration of 282 $\mu g/m^3$ in 2007. However, since the El Centro-9th Street Station is the nearest monitoring station to the Project Site and is not close to the U.S./Mexico border crossing, the maximum recorded 24-hour PM_{10} concentration of 200 $\mu g/m^3$ in 2007 at this station was used as the highest and most representative background concentration in the air quality effects analysis.

Similar to the maximum recorded 24-hour PM_{10} concentration, the highest annual arithmetic mean for a PM_{10} concentration of 43.3 $\mu g/m^3$ in 2006 at the El Centro-9th Street Station was used to be the highest and most representative background concentration in the air quality effects analysis. As shown by these three tables, the Project Site is in an area designated nonattainment with respect to both federal and state PM_{10} standards.

Table 5.2-5
Concentration Data Summary for Coarse Particulate Matter (PM_{10}) at El Centro-9th Street Station

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		Federal 24-Hour	State 24-Hour
2007	200	196	*	7	*
2006	146	141	43.3	0	120.1
2005	81	85	33.9	0	35.6
2004	135	132	*	*	*

Source: California Air Resources Board -California Air Quality Data web site (http://www.arb.ca.gov/aqd/aqdpage.htm); EPA AirData (http://www.epa.gov/air/data/index.html).
Notes:
*There was insufficient (or no) data available to determine the value.
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 address: El Centro-9th Street Station, 150 9th Street, El Centro CA 92243.
$\mu g/m^3$ = micrograms per cubic meter
PM_{10} = particulate matter less than 10 microns in diameter

Table 5.2-6
Concentration Data Summary for Coarse Particulate Matter (PM_{10}) at Calexico-Grant Street Station

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		Federal 24-Hour	State 24-Hour
2007	149	150	*	*	*
2006	248	261	71.6	16.3	240.7
2005	211	220	*	*	*
2004	183	176	*	*	*

Source: California Air Resources Board – California Air Quality Data web site (http://www.arb.ca.gov/aqd/aqdpage.htm); EPA AirData (http://www.epa.gov/air/data/index.html).
Notes:
*There was insufficient (or no) data available to determine the value.
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 address: 900 Grant Street, Calexico, CA 92231.
$\mu g/m^3$ = micrograms per cubic meter
PM_{10} = particulate matter less than 10 microns in diameter

Table 5.2-7
Concentration Data Summary for Coarse Particulate Matter (PM_{10}) at Calexico-Ethel Street Station

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		Federal 24-Hour	State 24-Hour
2007	282	282	65.5	6.1	219.1
2006	164	158	*	6.6	*
2005	188	195	52.7	6.1	160.2
2004	161	155	60.3	6.1	219.5

Source: California Air Resources Board -California Air Quality Data web site (http://www.arb.ca.gov/aqd/aqdpage.htm); EPA AirData (http://www.epa.gov/air/data/index.html).
Notes:
*There was insufficient (or no) data available to determine the value.
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 address: 1029 East Belcher Street, Calexico, CA 92231.
$\mu g/m^3$ = micrograms per cubic meter
PM_{10} = particulate matter less than 10 microns in diameter

$PM_{2.5}$

Fine particulates result from fuel combustion in motor vehicles and industrial processes, residential and agricultural burning, and atmospheric reactions involving NO_x, 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, EPA established annual and 24-hour NAAQS for $PM_{2.5}$ for the first time. The most recent revision to the original standard regulating the 3-year average of the 98th percentile of 24-hour $PM_{2.5}$ concentrations (35 $\mu g/m^3$) became effective on 17 December 2006.

The $PM_{2.5}$ data presented in Tables 5.2-8 through 5.2-10 for the El Centro-9th Street, Calexico-Ethel Street, and Brawley-220 Main Street Stations show that the federal 24-hour average NAAQS of 35 $\mu g/m^3$ was exceeded several times in each year from 2004 to 2007 at these three stations. The highest 24-hour $PM_{2.5}$ concentration of 74.2 $\mu g/m^3$ was measured during 2004 at the El Centro-9th Street Station. No separate state standard exists for the 24-hour averaging time.

The annual average $PM_{2.5}$ data are also presented in these tables. The methods for measuring the annual arithmetic mean for $PM_{2.5}$ differ between federal and state standards. The state standard uses gravimetric or beta attenuation, while the federal standard is based on inertial separation and gravimetric analysis. The maximum annual arithmetic mean concentration recorded was 23.2 $\mu g/m^3$ in 2007 at the Calexico-Ethel Street Station, which is above both the federal annual $PM_{2.5}$ NAAQS of 15 $\mu g/m^3$ and the California $PM_{2.5}$ ambient air quality standard of 12 $\mu g/m^3$. However, since the El Centro-9th Street Station is the nearest monitoring station to the Project Site and is not close to the Mexico border, the maximum recorded annual arithmetic mean $PM_{2.5}$ concentration of 9.7 $\mu g/m^3$ in 2004 at this station was used as the highest and most representative background concentration in the air quality effects analysis. The Project Site is in an area designated unclassified with respect to both the federal and state $PM_{2.5}$ standards.

Table 5.2-8
Concentration Data Summary for Fine Particulate Matter ($PM_{2.5}$)
at El Centro-9th Street Station

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	Federal	State	Federal
2007	30.5	8.5	*	0
2006	33.8	8.8	*	0
2005	57.9	9.4	*	0
2004	74.2	9.7	*	3.8

Source: California Air Resources Board-California Air Quality Data web site (http://www.arb.ca.gov/aqd/aqdpage.htm); EPA AirData (http://www.epa.gov/air/data/index.html).
Notes:
*There was insufficient (or no) data available to determine the value.
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 address: El Centro-9th Street Station, 150 9th Street, El Centro CA 92243.
$\mu g/m^3$ = micrograms per cubic meter
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter

Table 5.2-9
Concentration Data Summary for Fine Particulate Matter ($PM_{2.5}$)
at Calexico-Ethel Street Station

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	Federal	State	Federal
2007	52.7	*	23.2	*
2006	68.8	12.5	17.3	3.2
2005	67.6	*	15.5	*
2004	48.5	11.8	16.1	0

Source: California Air Resources Board-California Air Quality Data web site (http://www.arb.ca.gov/aqd/aqdpage.htm); EPA AirData (http://www.epa.gov/air/data/index.html).
Notes:
*There was insufficient (or no) data available to determine the value.
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 address: 1029 East Belcher Street, Calexico, CA 92231.
$\mu g/m^3$ = micrograms per cubic meter
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter

Table 5.2-10
Concentration Data Summary for Fine Particulate Matter ($PM_{2.5}$)
at Brawley-220 Main Street Station

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	Federal	State	Federal
2007	19.5	*	*	*
2006	30.4	*	*	*
2005	37.8	*	*	*
2004	42.3	*	*	*

Source: California Air Resources Board-California Air Quality Data web site (http://www.arb.ca.gov/aqd/aqdpage.htm); EPA AirData (http://www.epa.gov/air/data/index.html).
Notes:
*There was insufficient (or no) data available to determine the value.
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 address: 220 Main Street, Brawley, CA 92227.
$\mu g/m^3$ = micrograms per cubic meter
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter

CO

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 in some areas. 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 El Centro-9th Street, Calexico-Ethel Street, and Calexico-East Monitoring Stations are summarized in Tables 5.2-11 through 5.2-13. The data in these tables indicate that maximum 1-hour average CO levels comply with the NAAQS and CAAQS of 20.0 ppm. The maximum 1-hour CO concentration was 14.3 ppm in 2006 at the El Centro-9th Street Station. Since the Calexico-Ethel Street and the Calexico-East Monitoring Stations are both close to the U.S./Mexico border crossing, and the maximum recorded value at El Centro 9th Street (14.3 ppm) appears to be anomalous (compared with the values recorded for years 2004, 2005, and 2007), the next highest 1-hour concentration of 4.2 ppm recorded in 2005 at the El Centro-9th Street Station was used as the highest and most representative background concentration in the air quality effects analysis. These tables also show that maximum recorded 8-hour average CO levels comply with the NAAQS and CAAQS of 9.0 ppm most of the time except in 2004 and 2006 at the Calexico-Ethel Street Station. Similar to the selection of maximum 1-hour CO concentration, the maximum 8-hour CO concentration recorded at the El Centro 9th Street Station was 2.2 ppm in 2005. As shown by these two tables, the Project Site is in an area designated unclassified/attainment with respect to both federal and state CO standards.

Table 5.2-11
Concentration Data Summary for Carbon Monoxide at El Centro-9th Street Station

Year	Highest Concentration for CO (ppm)		Number of Days Exceeding Standards			
	1-Hour	8-Hour	Federal 1-Hour	Federal 8-Hour	State 1-Hour	State 8-Hour
2007	2.5	1.7	0	0	0	0
2006	14.3	2.6	0	0	0	0
2005	4.2	2.2	0	0	0	0
2004	2.0	1.2	0	0	0	0

Source: EPA AirData (http://www.epa.gov/air/data/index.html); EPA AirData (http://www.epa.gov/air/data/index.html).
Notes:
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 address: El Centro-9th Street Station, 150 9th Street, El Centro CA 92243.
CO = carbon monoxide
ppm = parts per million

Table 5.2-12
Concentration Data Summary for Carbon Monoxide at Calexico-Ethel Street Station

Year	Highest Concentration for CO (ppm)		Number of Days Exceeding Standards			
	1-Hour	8-Hour	Federal 1-Hour	Federal 8-Hour	State 1-Hour	State 8-Hour
2007	10.4	7.5	0	0	0	0
2006	12.4	9.8	0	1	0	1
2005	12.4	9.0	0	0	0	0
2004	12.5	10.3	0	1	0	1

Source: EPA AirData (http://www.epa.gov/air/data/index.html); EPA AirData (http://www.epa.gov/air/data/index.html).
Notes:
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 address: 1029 East Belcher Street, Calexico, CA 92231.
CO = carbon monoxide
ppm = parts per million

Table 5.2-13
Concentration Data Summary for Carbon Monoxide at Calexico-East Station

Year	Highest Concentration for CO (ppm)		Number of Days Exceeding Standards			
	1-Hour	8-Hour	Federal 1-Hour	Federal 8-Hour	State 1-Hour	State 8-Hour
2007	6.9	4.5	0	0	0	0
2006	7.9	5.8	0	0	0	0
2005	10.3	7.8	0	0	0	0
2004	12.6	7.4	0	0	0	0

Source: EPA AirData (http://www.epa.gov/air/data/index.html); EPA AirData (http://www.epa.gov/air/data/index.html).
Notes:
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 address: 1699 Carr Road, Calexico, CA 92231.
CO = carbon monoxide
ppm = parts per million

NO_2

NO_x emissions are primarily generated from the combustion of fuels; they include nitric oxide (NO) and NO_2. Because NO 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 is also important because of this pollutant's role in the atmospheric formation of O_3, the principal component of smog. It also can provoke lung irritation and damage.

The CARB approved staff recommendations to amend the NO_2 standard on 22 February 2007. On 19 February 2008, the Office of Administrative Law approved amendments to the regulations for the CAAQS for NO_2. The new standards became effective on 20 March 2008. The new 1-hour standard of 0.18 ppm is not to be exceeded, and the new annual average standard is 0.030 ppm.

Recorded NO_2 concentration monitoring data for the El Centro-9th Street, Calexico-Ethel Street, and Calexico-East Stations are summarized in Tables 5.2-14 through 5.2-16. As supported by these tables, the ICAPCD has been in attainment of NO_2 for many years.

Maximum annual average (arithmetic mean) NO_2 levels comply with both the NAAQS of 0.053 ppm and the new CAAQS of 0.030 ppm at all three of the stations. The maximum annual average concentration was 0.015 ppm in 2004 and 2005 at the Calexico-Ethel Street Station. Since the El Centro-9th Street Station is the nearest monitoring station to the Project Site and is not close to the U.S./Mexico border crossing, the maximum recorded annual average NO_2 concentration of 0.013 ppm in 2004 at this station was used as the highest and most representative background concentration in the air quality effects analysis.

The data in these tables also show that maximum 1-hour NO_2 levels consistently complied with the new CAAQS of 0.18 ppm in the last 4 years. Similar to the selection of recorded annual average NO_2 concentration, the maximum 1-hour NO_2 concentration was 0.071 ppm in 2007 at the El Centro-9th Street Station.

Table 5.2-14
Concentration Data Summary for Nitrogen Dioxide at El Centro-9th Street Station

Year	Highest 1-Hour Concentration for NO_2 (ppm)	Annual Average for NO_2 (ppm)	Estimated Number of Days Exceeding Standards (days)	
			Federal	State
2007	0.071	0.011	0	0
2006	0.066	0.011	0	0
2005	0.065	0.011	0	0
2004	0.067	0.013	0	0

Source: California Air Resources Board-California Air Quality Data web site (http://www.arb.ca.gov/aqd/aqdpage.htm); EPA AirData (http://www.epa.gov/air/data/index.html).
Notes:
The federal NO_2 standard is the annual average (0.053 ppm).
The state NO_2 standard is 1-hour average (0.18 ppm) and annual average (0.030 ppm).
Monitoring site address: El Centro-9th Street Station, 150 9th Street, El Centro CA 92243.
NO_2 = nitrogen dioxide
ppm = parts per million

Table 5.2-15
Concentration Data Summary for Nitrogen Dioxide at Calexico-Ethel Street Station

Year	Highest 1-Hour Concentration for NO_2 (ppm)	Annual Average for NO_2 (ppm)	Estimated Number of Days Exceeding Standards (days)	
			Federal	State
2007	0.107	0.014	0	0
2006	0.101	0.014	0	0
2005	0.131	0.015	0	0
2004	0.108	0.015	0	0

Source: California Air Resources Board -California Air Quality Data web site (http://www.arb.ca.gov/aqd/aqdpage.htm); EPA AirData (http://www.epa.gov/air/data/index.html).
Notes:
The federal NO_2 standard is annual average (0.053 ppm).
The state NO_2 standard is 1-hour average (0.18 ppm) and annual average (0.030 ppm).
Monitoring site address: 1029 East Belcher Street, Calexico, CA 92231.
NO_2 = nitrogen dioxide
ppm = parts per million

Table 5.2-16
Concentration Data Summary for Nitrogen Dioxide at Calexico-East Station

Year	Highest 1-Hour Concentration for NO_2 (ppm)	Annual Average for NO_2 (ppm)	Estimated Number of Days Exceeding Standards (days)	
			Federal	State
2007	0.112	0.010	0	0
2006	0.094	0.012	0	0
2005	0.114	0.012	0	0
2004	0.072	0.012	0	0

Source: California Air Resources Board -California Air Quality Data web site (http://www.arb.ca.gov/aqd/aqdpage.htm); EPA AirData (http://www.epa.gov/air/data/index.html).
Notes:
The federal NO_2 standard is annual average (0.053 ppm).
The state NO_2 standard is 1-hour average (0.18 ppm) and annual average (0.030 ppm).
Monitoring site address: 1699 Carr Road, Calexico, CA 92231.
NO_2 = nitrogen dioxide
ppm = parts per million

SO_2

SO_2 is produced when any fuel containing sulfur 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 may 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 Table 5.2-17, Concentration Data Summary for Sulfur Dioxide at Calexico-Ethel Street Station, for the Calexico-Ethel Street Station. The El Centro-9th Street Station did not monitor for SO_2. ICAPCD is in attainment for all applicable state and federal ambient standards for SO_2.

The SO_2 data in Table 5.2-17, Concentration Data Summary for Sulfur Dioxide at Calexico-Ethel Street Station, demonstrates that neither the 24-hour average CAAQS of 0.04 ppm nor the NAAQS of 0.14 ppm has been exceeded in the Project vicinity between 2004 and 2007. The maximum 24-hour SO_2 monitored concentration of 0.038 ppm was measured at the Calexico-Ethel Street Station in 2006. The recorded annual average (arithmetic mean) SO_2 concentrations at the monitoring station are also presented in Table 5.2-17, and in all cases are well below the NAAQS of 0.03 ppm. The maximum 1-hour average SO_2 levels in the last 3 years was 0.192 ppm in 2006 and was compliant with the CAAQS of 0.25 ppm. However, as described in the Section 5.2.1.2, Existing Air Quality, the 2006 SO_2 monitoring values are exceptionally high and are not used to represent background air quality in this air quality effects analysis. Instead, the maximum recorded 1-hour, 3-hour, 24-hour, and annual average SO_2 concentrations of 0.014, 0.010, 0.004, and 0.001 ppm that were recorded respectively in 2007 at this station were used to be the most representative background concentration for the air quality effects analysis.

Table 5.2-17
Concentration Data Summary for Sulfur Dioxide at Calexico-Ethel Street Station

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
2007	0.014	0.010	0.004	0.001	0	0	0	0	0
2006	0.192	0.166	0.041	0.001	0	0	0	0	0
2005	0.001	0.001	0.002	0.000	0	0	0	0	0
2004	0.003	0.003	0.003	0.000	0	0	0	0	0

Source: EPA AirData (http://www.epa.gov/air/data/index.html); EPA AirData (http://www.epa.gov/air/data/index.html).
Notes:
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 address: 1029 Belcher Street, Calexico CA 92231.
ppm = parts per million
SO_2 = sulfur dioxide

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 at the nearest lead monitoring station, which is located at the Calexico-Ethel Street Station, are presented in Table 5.2-18, Summary of Recent Lead Concentration Data at Calexico-Ethel Station. The data in this table supports the attainment status of the ICAPCD District for lead.

Table 5.2-18
Summary of Recent Lead Concentration Data at Calexico-Ethel Street Station

Year	Highest 24-Hour Concentration for Lead ($\mu g/m^3$)	Estimated Number of Days Exceeding Federal and State Standards (days)
2007	0.10	0
2006	0.09	0
2005	0.07	0
2004	0.04	0

Source: EPA AirData (http://www.epa.gov/air/data/index.html); EPA AirData (http://www.epa.gov/air/data/index.html).
Notes:
The federal lead standard is 1.5 $\mu g/m^3$ on a quarterly average basis.
The state lead standard is 1.5 $\mu g/m^3$ on a 30 days average basis.
Monitoring site address: 1029 Belcher Street, Calexico CA 92231.
$\mu g/m^3$ = micrograms per cubic meter

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 ICAPCD is in attainment with the state standard for sulfates; 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 ICAPCD is in attainment for hydrogen sulfide.

5.2.2 Environmental Consequences

This section describes the analyses conducted to assess the potential air quality effects of the Project. Effects due to the Project would be considered significant if, when combined with background ambient concentrations, they would exceed an ambient air quality standard. These standards are discussed in Section 5.2.5, Compliance with LORS. Emissions estimates for both construction and operation of the 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.

5.2.2.1 Project Construction Emissions

The primary emission sources during construction of the Project would include exhaust from heavy construction equipment and vehicles and fugitive dust generated in areas disturbed by grading, excavating, and erection of Project structures. The projected construction schedule has a total duration of 40 months for full buildout of 750 megawatts depending on the availability of transmission upgrades by San Diego Gas & Electric and the build rate of SunCatchers. Different areas within the Project Site and the construction laydown areas would be disturbed at different times over this period. Estimated land disturbance for major construction activities is summarized in Section 3.0, Project Description and Location. For purposes of this analysis, the assumed Project construction area is 6,500 acres for the Project Site and 25 acres for the staging area within the 100-acre laydown area located east of Dunaway Road.

Fugitive dust emissions from the construction of the Solar Two Project will result from:

- site grading/excavation activities at the construction site,
- installation of new transmission lines and waterlines,
- installation of SunCatcher foundations,
- construction of power plant facilities, roads, and substation,
- on-site travel on unpaved surfaces, and
- off-site travel of worker vehicles and trucks on paved roads.

Fuel combustion emissions during construction will result from:

- exhaust from the off-road construction equipments, including diesel construction equipment used for site grading, excavation, and construction of on-site structures, and water trucks used to control construction dust emissions,
- exhaust from on-road construction vehicles, including pickup trucks and diesel trucks used to transport workers and materials around the construction site, and from diesel trucks used to deliver concrete, equipment, and construction supplies to the construction site, and
- exhaust from vehicles used by workers to commute to the construction site.

Construction equipment and vehicle exhaust emissions were estimated using equipment lists and construction scheduling information provided by the Project design-engineering firm (see Table 5.2-19, Estimated Construction Equipment Usage Schedule).

Table 5.2-19
Estimated Construction Equipment Usage Schedule

Construction Equipment Description	HP	D	G	Month After Construction Start																																											
				1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**
4-Wheeler	15		X	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aerial lift	120	X		6	6	7	7	7	7	7	7	7	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Air compressor	50	X		1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Asphalt paver	120	X			3	2	1	1	1	1	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Backhoe	120	X		5	11	9	9	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	7	7	7	7	7	7	6	6	6	6	6	6	6	6	0	0	0	0	0	0
Compactor	120	X		4	10	10	8	8	6	6	6	5	5	5	5	7	7	7	7	7	7	7	4	4	3	3	3	3	3	3	1	1	1	1	1	1	1	1	1	1	1	1	1	0
Concrete pump	250	X		1	1	3	3	3	2	1	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crane	250	X		3	3	7	7	7	9	8	8	8	8	8	8	8	8	8	7	7	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Dozer	250	X		2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Drilling rig	250	X		1	2	6	6	6	8	8	8	8	8	8	8	8	8	5	5	5	5	5	5	5	5	5	5	5	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dump truck	250	X		3	10	10	5	5	4	4	4	3	3	3	3	6	6	6	6	4	4	4	2	2	2	2	2	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Flatbed truck	250	X		9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	6	6	6	6	6	6	6	6	0	0	0	0	0	0
Fork lift	50	X		5	5	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Generator	50	X		1	1	2	2	2	5	5	6	6	6	6	6	3	3	3	2	2	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grader	175	X		2	7	7	5	5	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	1	1	1	1	1	1	1	1	1	1	1	1	1	0
Light tower	50	X		1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Loader	250	X		2	7	7	7	7	7	7	7	7	5	5	5	7	7	7	6	4	4	4	2	2	2	2	2	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maxi sneeker (trencher)	50	X		0	2	3	3	3	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	0	0	0	0	0	0
Pickup truck	150		X	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Skid steer (Bobcat)	50	X		0	0	0	0	2	4	4	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	0	0	0	0	0	0
Telehandler	120	X		0	0	0	0	2	6	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Water truck	250	X		5	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	4	4	3	3	3	3	3	3	1	1	1	1	1	1	1	1	1	1	1	1	1	0
Welding machine	50	X		1	1	3	5	5	5	5	5	5	5	2	2	2	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals				**57**	**95**	**112**	**104**	**107**	**117**	**113**	**112**	**111**	**110**	**107**	**107**	**113**	**114**	**111**	**105**	**100**	**95**	**95**	**78**	**77**	**75**	**75**	**75**	**75**	**75**	**75**	**53**	**53**	**53**	**53**	**53**	**53**	**53**	**53**	**30**	**30**	**30**	**30**	**27**

Source: SES Solar Two, LLC, 2008.
Notes:
D = diesel
HP = horsepower
G = gas

Mass emissions of all criteria pollutants from diesel-fueled construction equipment and vehicles were estimated using equipment-specific OFFROAD emissions factors published by the South Coast Air Quality Management District (SCAQMD). Diesel equipment emissions were calculated by means of an Excel Workbook (presented in Appendix V, Air Quality Data, and were represented for modeling purposes as point sources. Generic stack parameters (exhaust temperatures and flow rates) for diesel internal combustion engines were obtained from the *Risk Management Guidance for the Permitting of New Stationary Source Diesel-Fueled Engine* (CARB 2000). Fugitive dust emissions resulting from on-site soil disturbances were estimated using the *SCAQMD California Environmental Quality Act (CEQA) Air Quality 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 the Project Site and construction area activities was assumed to be achieved for these activities by frequent watering. A dust control efficiency of 92.5 percent was assumed for equipment and vehicle operations on paved roads. Emissions of fugitive dust (PM_{10} and $PM_{2.5}$) were represented as area sources for purposes of the construction effect modeling discussed later in this section. Emissions from on-road delivery trucks and worker commute trips were estimated using trip generation information presented in Section 3.0, Project Description and Location, and emission factors provided by SCAQMD for on-road vehicles from the EMFAC2007 model.

Assumptions used in calculating Project construction emissions included a 40-month construction period; 5 construction days per week; and an 8-hour workday (22 construction days per month). The list of fueled equipment needed during each month of the construction effort 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. Detailed spreadsheets are provided in Appendix V, Air Quality Data, which show the calculation of emissions from all Project construction equipment and activities, along with the data and assumptions used in these calculations. Construction workers were assumed to commute to the Project Site from locations within a 20-mile radius.

The short-term maximum combustion and fugitive dust emissions were calculated using the equipment listed in Table 5.2-19, Estimated Construction Equipment Usage Schedule, for Month 6 of the construction schedule, which is anticipated to have the heaviest equipment usage and earthmoving activities of any month. Based on the equipment usage and earthmoving schedules, emissions during Months 3 through 14 are expected to be the highest of any consecutive 12-month period during the overall 40-month construction effort.

Table 5.2-20, Estimated Daily Maximum Construction Emissions of Criteria Pollutants (lbs/day), and Table 5.2-21, Estimated Maximum Annual Construction Emissions of Criteria Pollutants (tons/year), present the estimated maximum daily and annual emissions of air pollutants due to Project construction, respectively, and the contributions from specific activities.

5.2.2.2 Operational Emissions

Air pollutant emission sources associated with thermal solar electric generation are much smaller than for conventional power plants. Operational stationary sources of emissions for the Project will be limited to one emergency diesel fire water pump engine and one backup diesel generator. The fire water pump engine and backup generator engine will be rated at approximately 68 horsepower and 335 horsepower, respectively, and will each be tested 15 minutes per week (13 hours per year) to ensure their operability in the event of an emergency. Estimated hourly and annual emissions and stack parameters for the emergency diesel fire water pump engines and backup diesel generators are provided in Table 5.2-20, Estimated Daily Maximum Construction Emissions of Criteria Pollutants (lbs/day), and Table 5.2-21, Estimated Maximum Annual Construction Emissions of Criteria Pollutants (lbs/day), respectively.

Table 5.2-20
Estimated Daily Maximum Construction Emissions of Criteria Pollutants (lbs/day)

Activity	PM_{10}	$PM_{2.5}$	CO	ROC	NO_x	SO_x
On-Site Construction Emissions						
On-Site Combustion Emissions						
Transmission Line Construction	3.26	3.00	24.40	8.01	74.32	0.08
Water Line Installation	3.63	3.34	29.51	10.97	64.99	0.07
Solar Catcher Foundations	8.95	8.23	74.16	26.84	192.57	0.23
Site Grading	3.99	3.68	25.53	7.38	70.04	0.07
Facilities Building	5.29	4.87	43.33	14.47	98.05	0.10
Road Construction	5.72	5.26	36.68	10.98	95.87	0.09
Substation Construction	3.31	3.05	27.09	9.73	64.48	0.07
Laydown Area West Construction	1.07	0.99	7.70	2.47	11.24	0.01
Laydown Area East Construction	1.07	0.99	7.70	2.47	11.24	0.01
Subtotal of On-Site Combustion Emissions (lbs)	**36.31**	**33.40**	**276.10**	**93.32**	**682.79**	**0.74**
On-Site Fugitive Dust Emissions						
Transmission Line Construction	3.74	0.79				
Water Line Installation	9.71	2.13				
Solar Catcher Foundations	4.22	0.90				
Site Grading	31.44	6.60				
Facilities Building	0.75	0.16				
Road Construction	17.25	3.66				
Substation Construction	1.69	0.36				
Laydown Area West Construction	0.63	0.13				
Laydown Area East Construction	0.63	0.13				
Subtotal of On-Site Fugitive Dust Emissions (lbs)	**70.06**	**14.86**				
Subtotal of On-Site Emissions (lbs)	**106.36**	**48.26**	**276.10**	**93.32**	**682.79**	**0.74**
Off-Site On-Highway Emissions						
Off-Site Combustion Emissions						
All Vehicle Trips – Commuter Vehicles	0.63	0.11	100.51	10.84	10.67	0.07
All Vehicle Trips – Heavy Vehicle	4.95	4.18	106.18	15.11	98.62	0.17
Subtotal of Off-Site Combustion Emissions (lbs)	**5.58**	**4.28**	**206.69**	**25.95**	**109.29**	**0.24**

Table 5.2-20
Estimated Daily Maximum Construction Emissions of Criteria Pollutants (lbs/day)

Activity	PM_{10}	$PM_{2.5}$	CO	ROC	NO_x	SO_x
Off-Site Paved Road Fugitive Dust Emissions						
All Vehicle Trips – Commuter Vehicles	50.18	8.48				
All Vehicle Trips – Heavy Vehicle	386.21	65.27				
Subtotal of Off-Site Fugitive Dust Emissions (lbs)	**436.38**	**73.75**				
Subtotal of Off-Site Emissions (lbs)	**441.96**	**78.03**	**206.69**	**25.95**	**109.29**	**0.24**
Total Maximum Daily Emissions (lbs)	**548.33**	**126.30**	**482.79**	**119.28**	**792.07**	**0.98**

Source: See Appendix V, Air Quality Data.
Notes:
Differences in totals attributed to rounding.
CO = carbon monoxide
lbs = pounds
lb/day = pounds per day
NO_x = nitrogen oxides
PM_{10} = particulate matter less than 10 microns in diameter
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter
ROC = reactive organic compounds
SO_x = sulfur oxides

Table 5.2-21
Estimated Maximum Annual Construction Emissions of Criteria Pollutants (tons/year)

Activity	PM_{10}	$PM_{2.5}$	CO	ROC	NO_x	SO_x
On-Site Construction Emissions						
On-Site Combustion Emissions						
Transmission Line Construction	0.18	0.16	1.34	0.44	4.09	0.00
Water Line Installation	0.20	0.18	1.62	0.60	3.57	0.00
Solar Catcher Foundations	0.98	0.91	8.16	2.95	21.18	0.03
Site Grading	0.53	0.49	3.37	0.97	9.24	0.01
Facilities Building	0.41	0.37	3.34	1.11	7.55	0.01
Road Construction	0.31	0.29	2.02	0.60	5.27	0.01
Substation Construction	0.22	0.20	1.79	0.64	4.26	0.00
Laydown Area West Construction	0.14	0.13	1.02	0.33	1.48	0.00
Laydown Area East Construction	0.14	0.13	1.02	0.33	1.48	0.00
Subtotal of On-Site Combustion Emissions (tpy)	**3.11**	**2.87**	**23.67**	**7.98**	**58.13**	**0.06**
On-Site Fugitive Dust Emissions						
Transmission Line Construction	0.21	0.04				
Water Line Installation	0.53	0.12				
Solar Catcher Foundations	0.46	0.10				
Site Grading	4.20	0.93				
Facilities Building	0.06	0.01				
Road Construction	0.95	0.21				
Substation Construction	0.11	0.02				
Laydown Area West Construction	0.08	0.02				
Laydown Area East Construction	0.08	0.02				
Subtotal of On-Site Fugitive Dust Emissions (tpy)	**6.68**	**1.47**				
Subtotal of On-Site Emissions (tpy)	**9.80**	**4.33**	**23.67**	**7.98**	**58.13**	**0.06**

Table 5.2-21
Estimated Maximum Annual Construction Emissions of Criteria Pollutants (tons/year)

Activity	PM_{10}	$PM_{2.5}$	CO	ROC	NO_x	SO_x
Off-Site On-Highway Emissions						
Off-Site Combustion Emissions						
All Vehicle Trips – Commuter Vehicles	0.08	0.01	13.27	1.43	1.41	0.01
All Vehicle Trips – Heavy Vehicle	0.65	0.55	14.02	1.99	13.02	0.02
Subtotal of Off-Site Combustion Emissions (tpy)	**0.74**	**0.57**	**27.28**	**3.43**	**14.43**	**0.03**
Off-Site Paved Road Fugitive Dust Emissions						
All Vehicle Trips – Commuter Vehicles	6.62	1.12				
All Vehicle Trips – Heavy Vehicle	50.98	8.62				
Subtotal of Off-Site Fugitive Dust Emissions (tpy)	**57.60**	**9.73**				
Subtotal of Off-Site Emissions (tpy)	**58.34**	**10.30**	**27.28**	**3.43**	**14.43**	**0.03**
Total Maximum Annual Emissions (tpy)	**68.14**	**14.63**	**50.95**	**11.41**	**72.56**	**0.10**

Source: See Appendix V, Air Quality Data.
Notes:
Differences in totals attributed to rounding.
PM_{10} = particulate matter less than 10 microns in diameter
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter
ROC = reactive organic compounds
CO = carbon monoxide
NO_x = nitrogen oxides
SO_x = sulfur oxides
tpy = tons per year

Emission rates shown in Table 5.2-22, Fire Water Pump Engine Emission Rates and Stack Parameters, and Table 5.2-23, Backup Diesel Generators Emission Rates and Stack Parameters, are based on vendor-supplied emission factors. The exclusive fuel for both engines will be ultra-low sulfur diesel containing a maximum of 15 ppm sulfur. Detailed emissions calculations for the emergency diesel fire water pump engines and backup diesel generators are presented in Appendix V, Air Quality Data.

Another category of emission sources on the Project Site during Project operations is vehicles that will be used for a variety of purposes, including:

- tanker trucks for mirror washing,
- other maintenance trucks,
- staff and security trucks,
- fork lifts,
- staff cars,
- visitor vehicles,
- delivery trucks, and
- transport tractor-trailers.

Table 5.2-22
Fire Water Pump Engine Emission Rates and Stack Parameters

Pollutant	Emissions (lb/hr)	Emissions (lb/yr)
NO_x	0.112	1.46
CO	0.014	0.19
VOC	0.007	0.10
SO_x	0.005	0.06
PM_{10}	0.002	0.03

Source: URS Corporation, 2008.
Notes:
Stack parameters and emissions data provided by project design engineer.
Source Parameters:
Rated capacity: 68 horsepower
Testing duration: 15 minutes per week
Expected annual non-emergency use: 13 hours per year
Stack height: 15.75 feet above ground level
Stack diameter: 5 inches
Stack exhaust flow rate at full firing: 1,129 ACFM
Stack exhaust temperature at full firing: 871ºF

ACFM = actual cubic feet per minute
CO = carbon monoxide
lb/hr = pounds per hour
lb/yr = pounds per year
m/s = meters per second
NO_x = nitrogen oxide
PM_{10} = particulate matter less than 10 microns in diameter
SO_x = sulfur oxide
VOC = volatile organic compounds

Table 5.2-23
Backup Diesel Generators Emission Rates and Stack Parameters

Pollutant	Emissions (lb/hr)	Emissions (lb/yr)
NO_x	1.05	13.62
CO	0.07	0.94
VOC	0.01	0.17
SO_x	0.02	0.29
PM_{10}	0.01	0.14

Source: URS Corporation, 2008.
Notes:
Stack parameters and emissions data provided by project design engineer.
Source Parameters:
Rated capacity 335 horsepower
Testing duration 15 minutes per week
Expected annual non-emergency use: 13 hours per year
Stack height: 15.75 feet above ground level
Stack diameter: 5 inches
Stack exhaust flow rate at full firing: 1,129 ACFM
Stack exhaust temperature at full firing: 871ºF

ACFM = actual cubic feet per minute
CO = carbon monoxide
lb/hr = pounds per hour
lb/yr = pounds per year
NO_x = nitrogen oxide
PM_{10} = particulate matter less than 10 microns in diameter
SO_x = sulfur oxide
VOC = volatile organic compounds
ºF = degrees Fahrenheit

The assumed operational Project vehicle fleet and the estimated pollutant emissions from these combined vehicle operations on the site are summarized in Table 5.2-24, On-Site Vehicle Usage During Solar Two Project Operations, and Table 5.2-25, Pollutant Emissions Due to On-Site Vehicle Usage During Operations, respectively. Supporting detailed information used as the basis for these emissions estimates is provided in Appendix V, Air Quality Data.

Table 5.2-24
On-Site Vehicle Usage During Solar Two Project Operations

Description	Activity	Make/Model, Fuel	Quantity	Frequency
Tanker truck	Mirror washing	20-ton truck, diesel	35	Continuous
Line replaceable unit maintenance truck with boom	Field servicing and maintenance	5-ton truck, diesel	20	Continuous
Staff and security truck	Site inspections and security	3/4-ton truck, gasoline	5	Continuous
Rubber-wheeled forklift with telescoping boom	SunCatcher power conversion unit and mirror maintenance	Caterpillar, telehandler, diesel	2	Continuous
Forklift	Warehousing of supplies	5-ton, propane	2	Continuous
Telescoping man lift	Facility maintenance and SunCatcher power conversion unit and mirror maintenance	Propane	7	Continuous
Staff cars	Community to work	Cars, gasoline	100	Daily
Visitor cars	Sales, deliveries, and services	Cars, gasoline	8	Daily
Delivery trucks	Hydrogen delivery	20-ton, diesel	2	Weekly
	Operations and maintenance supplies	5-ton cargo, diesel	1	Weekly
	Waste management	20-ton, diesel	1	Weekly
	Hazardous waste	20-ton, diesel	1	Weekly
Transport tractor trailers	Spare parts, building supplies, and temporary rental equipment	40-foot, diesel	2	Weekly

Source: SES Solar Two, LLC, 2008.

Table 5.2-25
Pollutant Emissions Due to Vehicle Usage During Operations

Pollutant	Daily Emissions (pounds)			Annual Emissions (tons)		
	On-Site	Off-Site	Total	On-Site	Off-Site	Total
NO_x	203.69	45.5	**249.19**	37.61	4.74	**42.35**
CO	105.28	501.62	**606.90**	19.33	69.98	**89.31**
VOC	47.44	28.06	**75.50**	8.76	3.86	**12.62**
SO_x	0.20	0.05	**0.25**	0.04	0.01	**0.04**
PM_{10}	296.07	544.13	**840.20**	54.12	66.10	**120.22**
$PM_{2.5}$	70.70	115.79	**186.49**	12.92	21.06	**33.98**
CO_2 equivalents	20,948	4,250	**25,198**	3,864	410	**4,279**

Source: See Appendix V, Air Quality Data.
Notes:
Fugitive dust components of on-site PM_{10} and $PM_{2.5}$ emissions reflect watering of paved and unpaved road surfaces.
CO = carbon monoxide
CO_2 = carbon dioxide
NO_x = nitrogen oxides
PM_{10} = particulate matter less than 10 microns in diameter
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter
SO_x = sulfur oxides
VOC = volatile organic compounds

The Project includes only two operational stationary emission sources, an emergency diesel fire water pump engine and an emergency backup diesel generator. The scheduled operation for both engines will be limited to 15 minutes per week and 13 hours per year for testing purposes. Thus, for evaluation of the Project's annual effects on air quality, the worst case Project emissions scenario for purposes of the air dispersion modeling described in Section 5.2.2.3, Air Quality Effects Analysis, includes one concurrent 15-minute test of the two engines in the same hour for averaging times of up to 24 hours and 13 hours per year of both engines.

Greenhouse Gas Emissions

In 2006, the California Assembly passed a law (AB32) directing the CARB to develop regulations to achieve the goal of reducing statewide greenhouse gas emissions to 1990 levels by 2020. Potential greenhouse gas emissions from the Project were calculated using the California Climate Action Registry power/utility protocol (Version 1.0, April 2005). The estimated annual greenhouse gas emissions from the diesel generator and diesel fire water pump are presented in Table 5.2-26, Maximum Potential Greenhouse Gas Emissions from the Backup Diesel Generator and Diesel Fire Water Pump Engine from the Project. The estimated maximum potential sulfur hexafluoride (SF_6) leakage emissions from circuit breakers and other transmissions system equipment on the Project Site are presented in Table 5.2-27, Estimated Maximum Potential SF_6 Leakage Emissions from Proposed Circuit Breakers and Other Transmissions System Equipment on the Project Site. Additional calculation details are provided in Appendix V, Air Quality Data.

Table 5.2-26
Maximum Potential Greenhouse Gas Emissions from the Backup Diesel Generator and Diesel Fire Water Pump Engine from the Project

Emission Rate (metric tons/year)		
One Backup Diesel Generator	**One Diesel Fire Water Pump Engine**	**Total CO_2 Equivalent**
0.81	0.16	0.98

Source: See Appendix V, Air Quality Data.
Note:
CO_2 = carbon dioxide

Table 5.2-27
Estimated Maximum Potential SF_6 Leakage Emissions from Proposed Circuit Breakers and Other Transmissions System Equipment on the Project Site

Breaker	Quantity	Typical Make	Typical Model	SF_6 lbs/ Breaker	Leakage Rate (percent)	Leakage lbs/yr (Per Breaker)	Leakage lbs/yr (All Breakers)	CO_2e Emissions (metric tons/yr)
230 kV main breaker (2,000 A)	2	GE-Hitachi HVB	HP series	240	1	2.4	4.8	52.04
230 kV transformer breaker (2,000 A)	5	GE-Hitachi HVB	HP series	240	1	2.4	12	130.09
34.5 kV capacitor breaker (1,200 A)	10	GE-Hitachi HVB	HS series	31	1	0.31	3.1	33.61
34.5 kV solar group breaker (1,200 A)	15	GE-Hitachi HVB	HS series	31	1	0.31	4.65	50.41
48.3 kV capacitor switcher	15	Southern States	CapSwitcher	7	0.50	0.035	0.525	5.69
							CO_2e emissions (metric tons/year)	**271.83**

Source: SES Solar Two, LLC, 2008.
Notes:
A = ampere
CO_2e = carbon monoxide equivalent
kV = kilovolt
lbs = pounds
yr = year

5.2.2.3 Air Quality Effects Analysis

The purpose of the air quality effects analysis is to evaluate whether criteria pollutant emissions resulting from the Project, would cause or contribute significantly to a violation of a CAAQS or NAAQS. Mathematical models designed to simulate the atmospheric transport and dispersion of airborne pollutants were used to quantify the maximum expected effects of Project emissions for comparison with applicable regulatory criteria. Potential effects of toxic air contaminant emissions from the Project were evaluated in Section 5.16, Public Health and Safety.

Separate criteria pollutant modeling analyses were conducted to address the air quality effects of emissions from Project construction activities and Project operations because these activities would occur at different times. Effects 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 effects from stationary sources during operations would be associated with diesel combustion in the emergency fire water pump engine and backup diesel generator.

Construction Model and Model Option Selections

The effects of Project construction on off-site criteria pollutant concentrations were evaluated using the American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD) (Version 07026). 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 effects of NO_2 concentrations, the ozone-limiting method (OLM) option of the model was used to take into account the role of ambient O_3 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 (OLM). The input data to the AERMOD-OLM model includes representative hourly O_3 monitoring data for the same years corresponding to the meteorological input record. These simulations used the O_3 data from the ICAPCD El Centro 9th Street Monitoring Station for the years 1991 through 1995.

To evaluate whether urban or rural dispersion parameters should be used in the model simulations, an analysis of land use adjacent to the Project Site was conducted in accordance with Section 8.2.8 of the *Guideline on Air Quality Models* (EPA 2003) and Auer (1978), EPA AERMOD Implementation Guide (2005), and its Addendum (2006). Based on the Auer land use classification procedure, 100 percent of the area within a 1.86-mile (3-kilometer) radius of the Project Site is appropriately classified as rural. Thus, according to the EPA AERMOD implementation guide, the AERMOD rural option was selected. Seasonal values for micrometeorological parameters (albedo, Bowen ratio, surface roughness) appropriate for the land use characteristics of the Project area were selected for processing the meteorological input data set for the AERMOD model.

Section 5.2.2.2, Operational Emissions, describes the development of Project construction emissions estimates over the planned 40-month construction period. 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 maximum short-term and annual activity levels. Emissions from worker commuter trips and heavy duty trucks delivering equipment and materials to and from the Project Site during specific construction activities were also included (see Appendix V, Air Quality Data).

Worst case modeling was conducted for short-term averaging times assuming operation of all construction equipment and fugitive dust generation from Month 6 (see Section 5.2.2.1, Project Construction Emissions). Annual emissions were modeled for Months 3-14 of the construction schedule after a determination that this consecutive 12-month period will have a higher level of construction activity than any other over the full 40 months of construction.

For purposes of estimating emissions for modeling, construction activities were assumed to occur during an 8-hour work day. All emissions were modeled as occurring between the hours of 0800 to 1700. Calculation of annual emissions was based on a summation over all construction activities for the consecutive 12-month period that would produce the highest emissions of targeted pollutants (Months 3 through 14 of the construction schedule). Supporting modeling files may be found on the DVD provided with this Application for Certification (AFC).

Operations Model and Model Option Selections

The effects of operational emissions of criteria pollutants were evaluated using the screening level dispersion model SCREEN3. SCREEN3 is an EPA-approved model that is appropriate for evaluating effects from one emission source or a few closely located emission sources that can be reasonably represented as a single source. The only stationary sources of air pollutant emissions during normal Project operations will be the weekly testing of the diesel emergency fire water pump and emergency generator engines.

The SCREEN3 model was run with the full meteorology option that examines a range of stability classes and wind speeds. Building downwash was taken into account using the dimensions of the largest structure in the vicinity of the engines, the maintenance building (44 feet high, by 180 feet wide by 250 feet long). Because of the flatness of the site terrain in the site area and the low engine stack heights, the simple terrain option in SCREEN3 was used.

The SCREEN3 model was run with a unit emission rate (1 gram per second) for the source to calculate the χ/Q "unit" ground level 1-hour concentration in ($\mu g/m^3$)/(g/s). The 1-hour χ/Q concentration was converted to 3-hour, 8-hour, 24-hour, and annual concentrations by multiplying it by 0.9, 0.7, 0.4, and 0.08, respectively, per the *Screening Procedures for Estimating the Air Quality Impact of Stationary Sources, Revised* (EPA 1992). This χ/Q concentration was then multiplied by the combined emission rates from the two engines in g/s for each criteria pollutant and appropriate averaging time to estimate the corresponding maximum ground level concentrations for comparison with regulatory thresholds. Supporting modeling files may be found on the DVD provided with this AFC. The procedure provided in the *Screening Procedure* document referenced above for determining the appropriate stack parameters for merged multiple stack sources was used to determine that stack dimensions and exhaust properties for the emergency generator engine driver should be used to model the combined emissions from the two emergency diesel engines.

Meteorological Data

The AERMOD modeling analyses to evaluate the potential effects of Project construction used 5 years of hourly meteorological data collected at the nearest long-term meteorological station to the Project Site (i.e., the Imperial County Airport). The Imperial County Airport is located approximately 13 miles east of the Project Site. Hourly meteorological data from 1991 through 1995 were selected as the 5 consecutive years with the highest data capture currently available for this station (greater than 90 percent for all years).

The proximity and terrain similarities between the Project Site and the Imperial County Airport Station led to the conclusion that the meteorological data are suitable for use in this air quality assessment of emission sources at the Solar Two Project Site. Other meteorological stations were examined and determined to be less representative of conditions in the Project study area.

As discussed in Section 5.2.1, Affected Environment, the topography of the Salton Sea – Imperial Valley area is a wide, relatively flat valley with terrain elevations below sea level. The Chocolate Mountains provide the terrain boundaries of the valley to the north, east, and southeast and a number of mountain ranges bound the valley on the west side. The Imperial Valley is approximately 13 miles across at the northern edge of the Salton Sea and expands to more than 54 miles wide along the southern border with Mexico. The Project Site is located in the western portion of the valley approximately 45 to 50 miles south and southwest of the Chocolate Mountains and 25 miles south-southwest of the Salton Sea. The Imperial County Airport is located in the southern central portion of the valley, approximately 19 miles south of the Salton Sea.

The other significant terrain features surrounding the Imperial County Airport and the Project Site are the Chocolate Mountains, approximately 30 miles northeast of the airport, and the Sand Hills, approximately 25 miles to the east of the airport. The highest point in the Chocolate Mountains is just below 3,000 feet. The highest point in the Sand Hills is just below 600 feet. The Santa Rosa Mountains, Fish Creek Mountains, and Coyote Mountains form the western terrain boundary of the Imperial Valley. The highest points in these mountains are more than 4,800 feet, more than 2,400 feet, and more than 2,300 feet, respectively. These terrain features are located approximately 44 miles to the northwest, 24 miles to the west-northwest, and 24 miles to the west, respectively, of the airport. These terrain features are located approximately 50 miles to the north-northwest, 15 miles to the north-northwest, and 7 miles to the west, respectively, of the Project Site.

The terrain immediately surrounding the Imperial County Airport and the Project Site can be categorized as flat, or gradually sloping, desert and irrigated farm lands, with little inhabited lands outside the cities and towns of the area. Thus, the near-field land use is the same and the far-field significant terrain features are very similar. Additionally, there are no significant terrain features in the area between the Imperial County Airport and Solar Two Project that would cause differences in wind or temperature conditions in these areas. Therefore, the 5 years of meteorological data selected from the Imperial County Airport were determined to be representative of the Project.

The next closest NWS Stations to the Project Site are at the Daggett/Barstow Airport and San Diego Lindberg Airport. Both of these NWS Stations are 100 miles or more away (155 miles for Daggett, 110 miles for San Diego) and neither has climate or terrain similar to the conditions at the Project Site. Therefore, these two sites do not have representative meteorological conditions acceptable for use in the permit modeling for the Project.

Data from the Imperial County Airport were recently used to support modeling for the proposed Niland Gas Turbine Plant and El Centro Unit 3 Repower Project Applications to CEC. These Project Sites are located about 38 miles northwest and 18 miles east of the Project Site, respectively. The 5 years of meteorological data selected from the Imperial County Airport are representative of conditions at the Project Site, and are thus appropriate for use in the effects analysis modeling presented in this Application.

There are only two long-term upper air stations for the entire State of California, one station for all of Arizona, and two stations for all of Nevada. The California stations are in Oakland and San Diego, the Arizona station is Tucson, and the Nevada stations are Winnemucca and Desert Rock (near Nellis Air Force Base). The closest upper air station to the Project Site is San Diego, about 100 miles to the west of El Centro, however, this location is subject to a pronounced marine influence that would not be at all representative of the inland desert conditions of the Project Site. The nearest inland upper air stations are at Desert Rock and Tucson. The Desert Rock Station is located approximately 300 miles north of the Project Site. The Tucson Station is located approximately 300 miles to the east but at approximately the same latitude as the Project study area. When the upper air wind patterns are zonal, or parallel to lines of latitude, the conditions at the Tucson Station are more representative of conditions at El Centro than those at Desert Rock. Therefore, use of the Tucson upper air data set is most appropriate for modeling at the Solar Two Project Site.

The *USEPA AERMOD Implementation Guide, January 2008*, discusses a newly developed tool called AERSURFACE that may be used to establish realistic and reproducible surface characteristics values. Therefore, the AERSURFACE program was used to determine surface characteristics for input into the AERMET preprocessor program for this Project. AERSURFACE uses United States Geological Survey (USGS) National Land Cover Data 1992 archives to determine the albedo, Bowen ratio, and surface roughness length representative of the surface meteorological station.

The recommended 1 kilometer (km) radius around the meteorological station was used to calculate surface roughness values from the USGS land use data files (AERSURFACE User's Guide 2008). AERSURFACE subsequently applies an inverse geometric mean to calculate surface roughness. AERSURFACE uses a 10 km x 10 km land use domain with the meteorological tower as the center point to compute the most representative albedo and Bowen ratio values. The albedo is based on an unweighted arithmetic mean while the Bowen ratio uses an unweighted geometric mean.

For the AERSURFACE input, one sector was used because the surrounding land use type to the Project Site does not significantly vary by sector for many miles in all directions. The latitude and longitude of the Project Site are approximately Easting 606,671 E (X) and Northing 3,624,470 (Y) (North American Datum of 1927 Universal Transverse Mercator coordinates in meters). The surface meteorological tower at Imperial is at an airport, does not receive continuous snow cover in the winter, and is in an arid region. The surface moisture input was set to average for Bowen ratio calculations. The default months assigned to each season were used. Finally, seasonal output was obtained for all surface characteristics, as presented in Table 5.2-28, AERMET Land Use Characteristics.

Table 5.2-28
AERMET Land Use Characteristics

Land Use Characteristic	Sector	Range	Spring	Summer	Fall	Winter
Albedo (α)	1	0° to 360°	0.2	0.2	0.2	0.2
Bowen Ratio (β)	1	0° to 360°	2.99	3.98	5.98	5.98
Surface Roughness (z_o) (meters)	1	0° to 360°	0.05	0.05	0.05	0.05

Source: EPA, 2004a.
Note:
° = degrees

An annual wind rose based on the five years of on-site meteorological data was provided in Figure 5.2-2, Annual Wind Rose for Imperial County Airport. Seasonal wind roses can be found in Appendix V, Air Quality Data. Winds blow predominantly from the west, although the directional pattern is much more variable and often times easterly during the summer.

Receptor Locations

Based on extensive experience modeling power plant construction phase effects, maximum concentrations for all pollutants due to construction activities are expected to occur within the first 100 meters from the Project boundary. Accordingly, the receptor grids used in the AERMOD modeling analysis to evaluate construction effects were as follows:

- 50-meter spacing along the fence line and extending from the fence line out to 200 meters beyond the property line, and
- 500-meter spacing from fence line to approximately 1 km beyond the property line.

Figure 5.2-3, Construction Model Receptor Grid, shows the placement of receptor points for the construction modeling. Terrain heights at receptor grid points were determined from USGS digital elevation model files.

In the simple terrain analysis used to evaluate Project operational air quality effects, SCREEN3 calculates effects at automatically generated distances out to 10 kilometers.

5.2.2.4 Modeling Results – Compliance with Ambient Air Quality Standards

Air dispersion modeling was performed according to the methodology described in Section 5.2.2.3, Air Quality Effects Analysis, to evaluate the maximum increase in ground-level pollutant concentrations resulting from Project stationary source emissions, and to compare the maximum predicted effects , including conservative background pollutant levels, with applicable short-term and long-term CAAQS and NAAQS. The effects from construction activities and Project operations were analyzed separately because they would occur during different time periods. The 5-year record of hourly meteorological data was used in the AERMOD modeling to evaluate construction effects.

In evaluating construction effects, the AERMOD model was used to predict the increases in criteria pollutant concentrations at all receptor concentrations due to Project emissions only. For Project operational emissions, SCREEN3 was also used to evaluate effects due to Project emissions only. The maximum modeled incremental increases predicted by both models for each pollutant and averaging time were added to the maximum background concentrations recorded at the most representative monitoring stations during the most recent 4 years (i.e., 2004 through 2007). These background concentrations are presented and discussed in Section 5.2.1.1, Climate and Meteorology. The resulting total pollutant concentrations were then compared with the most stringent CAAQS or NAAQS.

Construction Effects

Section 5.2.2.1, Project Construction Emissions, describes how the construction equipment schedule was used to estimate worst case emission (Month 6) conditions for the purpose of analyzing peak short-term effects to local air quality. Annual effects were modeled with all emissions that would occur during Months 3 through 14. Some notes regarding the modeling results for specific pollutants are provided below.

As reflected in the construction modeling results presented in Table 5.2-29, Maximum Modeled Criteria Pollutant Effects Due to Solar Two Project Construction Emissions, PM_{10} and $PM_{2.5}$ concentrations above the California 24-hour standards for these pollutants have been recorded on multiple occasions at Imperial 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, agricultural burning or tilling activities or other soil disturbances. 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 concentrations due to Project construction emissions which, when added to conservative background values from the nearest ICAPCD Monitoring Stations, are below the California standards for both averaging times. Predicted maximum effects for CO and SO_2 are also less than the most stringent ambient standards.

Table 5.2-29
Maximum Modeled Criteria Pollutant Effects Due to Solar Two Project Construction Emissions

Pollutant	Averaging Period	Maximum Modeled Effects ($\mu g/m^3$)	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 Effects							
CO	1 hour	203.88	4,830	5,033.88	23,000	605,822	3,626,051
	8 hour	58.04	2,444	2,502.44	10,000	605,726	3,626,050
NO_2	1 hour[2]	91.91	133.7	225.61	339	605,794	3,627,084
	Annual[2]	1.83	24.7	26.53	57	605,677	3,626,049
$PM_{2.5}$	24 hour[3]	2.10	74.2	76.30	35	605,677	3,626,049
	Annual[3]	0.18	9.7	9.88	12	605,726	3,626,050
PM_{10}	24 hour[3]	5.45	200	205.45	50	605,568	3,627,240
	Annual[3]	0.33	43.3	43.63	20	605,726	3,626,050
SO_2	1 hour	0.37	36.7	37.07	655	605,843	3,626,035
	3 hour	0.16	26	26.16	1,300	605,774	3,626,050
	24 hour	0.03	10.5	10.53	105	605,774	3,626,050
	Annual	0.003	2.7	2.70	80	605,726	3,626,050

Source: EPA, 2004a.
Notes:
[1]Background represents the maximum values measured during 2004 through 2007 at the most representative air quality monitoring stations, as described in Section 5.2.1.2, Existing Air Quality.
[2] Results for NO_2 during construction used an ozone limiting method with ambient ozone data collected at the El Centro 9th Street Monitoring Station for the years 2004 through 2007.
[3] $PM_{2.5}$ 24-hour and all PM_{10} background levels exceed state standards.

$\mu g/m^3$ = micrograms per cubic meter
AAQS = ambient air quality standard
CO = carbon monoxide
NO_2 = nitrogen dioxide
$PM_{2.5}$ = particulate matter less than or equal to 2.5 microns diameter
PM_{10} = particulate matter less than or equal to 10 microns in diameter
SO_2 = sulfur dioxide
UTM = Universal Transverse Mercator

Operational Effects

As described previously, the estimated emissions used in the SCREEN3 model for Project operations were based on the assumption of weekly testing of the emergency fire water pump and emergency generator engines. For purposes of the operational effects modeling, emissions from both sources were assumed to be released from a single stack with the dimensions and exhaust gas characteristics of the dominant source (emergency generator engine) per EPA guidance (EPA 1992). The location selected for the merged source was a point halfway between the actual locations of the fire water pump and emergency generator engine stacks. The 1-hour and annual emissions used for each pollutant are quantified in Table 5.2-22, Fire Water Pump Engine Emission Rates and Stack Parameters, and Table 5.2-23, Backup Diesel Generators Emission Rates and Stack Parameters. Peak concentrations for multiple-hour averaging times

are conservatively estimated from the maximum 1-hour concentration predicted from SCREEN3 using scaling factors approved by EPA. The maximum 1-hour χ/Q concentration was predicted from the simple terrain analysis, thus this value was used as the basis for calculating the concentrations for all pollutants and averaging time. The maximum predicted operational effects of the Project are presented in Table 5.2-30, Emergency Diesel Engines SCREEN3 Modeling Results. Supporting calculations can be found in Appendix V, Air Quality Data. The table shows that the modeled effects due to the Project emissions, in combination with conservative background concentrations, would not cause a violation of any CAAQS or NAAQS and would not significantly contribute to the existing violations of the federal and state PM_{10} and $PM_{2.5}$ standards.

In addition to the emergency diesel engines, emissions will also result during operations of the Solar Two Project from intermittent mobile sources to provide routine site maintenance and security and to deliver materials and visitors. Emissions from these sources are quantified in Table 5.2-30, Emergency Diesel Engines SCREEN3 Modeling Results.

Table 5.2-30
Emergency Diesel Engines SCREEN3 Modeling Results

Pollutant	Averaging Period	Combined Emission Rate (g/s)	Maximum Predicted Concentration ($\mu g/m^3$)	Background Concentration[1] ($\mu g/m^3$)	Total Concentration ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)	CAAQS ($\mu g/m^3$)
NO_2	1-hour[2]	1.46E-01	119.312	133.7	253.0	N/A	339
	Annual[2]	2.17E-04	0.014	24.7	24.7	100	57
SO_2	1-hour	3.41E-03	2.781	36.7	39.5	N/A	655
	3-hour	1.14E-03	0.834	26.0	26.8	1,300	NA
	24-hour	1.42E-04	0.046	10.5	10.5	365	105
	Annual	5.06E-06	0.000	2.7	2.7	80	N/A
CO	1-hour	1.09E-02	8.876	4,830.0	4,838.9	40,000	23,000
	8-hour	1.36E-03	0.777	2,444.4	2,445.2	10,000	10,000
$PM_{2.5}$	24-hour[3,4]	7.01E-05	0.023	74.2	74.2	35	NA
	Annual[3]	2.50E-06	0.000	9.7	9.7	15	12
PM_{10}	24-hour	7.01E-05	0.023	200.0	200.0	150	50
	Annual	2.50E-06	0.000	43.3	43.3	50	20

Source: EPA, 1992.

Notes:

[1]Background represents the maximum values measured during 2004 through 2007 at the most representative air quality monitoring stations, as described in Section 5.2.1.2, Existing Air Quality.

[2]In February 2007, the CARB approved new, more stringent CAAQS for NO_2. The new standards, which became effective on 20 March 2008, are 339 $\mu g/m^3$ (1-hour) and 57 $\mu g/m^3$ (annual).

[3]Assumes all PM_{10} from Project sources is $PM_{2.5}$.

[4]$PM_{2.5}$ 24-hour and all PM_{10} background levels exceed both federal and state standards.

$\mu g/m^3$ = micrograms per cubic meter
CAAQS = California National Ambient Air Quality Standards
CARB = California Air Resources Board
CO = carbon dioxide
g/s = grams per second
N/A = not applicable
NAAQS = National Ambient Air Quality Standards
NO_2 = nitrogen dioxide
$PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter
PM_{10} = particulate matter less than or equal to 10 microns in diameter
SO_2 = sulfur dioxide

5.2.3 Cumulative Effects

CEC requirements specify that an analysis must be conducted to determine the cumulative effects of the Project and other projects within a 6-mile radius that have received construction permits but are not yet operational, or that are currently in the permitting process or expected to be in the near future. There are no other such new or planned sources of criteria pollutant emissions within 6 miles of the Solar Two Project Site; thus, no additional cumulative analysis will be conducted.

5.2.4 Mitigation Measures

5.2.4.1 Construction Emissions Mitigation

AIR-1

The following mitigation measures are proposed to control exhaust emissions from the diesel heavy equipment used during construction of the Solar Two Project:

- a requirement to shut down equipment when idling for more than minimum periods,
- regular preventive maintenance to prevent equipment engine emission increases due to inefficient fuel combustion,
- use of low sulfur and low aromatic fuel meeting California standards for motor vehicle diesel fuel, and
- use of low-emitting gas and diesel engines meeting state and federal emissions standards (Tiers I, II, and III) for construction equipment, including, but not limited to catalytic converter systems and particulate filter systems.

AIR-2

The following mitigation measures are proposed to control fugitive dust emissions during construction of the Project.

- Use either water application, chemical dust suppressant application, or other suppression technique to control dust emissions from on-site unpaved road travel and unpaved parking areas.
- Use vacuum-sweep and/or water-flush paved road surfaces to remove buildup of loose material to control dust emissions from travel on the paved access road (including adjacent public streets affected by construction activities) and paved parking areas.
- Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least 2 feet of freeboard.
- Limit traffic speeds on all unpaved site areas to 5 miles per hour.

- Install sandbags or other erosion control measures to prevent silt runoff to roadways.
- Replant vegetation in disturbed areas as quickly as possible.
- Use wheel washers or wash off tires of all trucks exiting construction site.
- Mitigate fugitive dust emissions from wind erosion of areas disturbed from construction activities (including storage piles) by application of either water, chemical dust suppressant, or other suppression technique.

5.2.4.2 Operational Emissions Mitigation: Best Available Control Technology Analysis

In accordance with the requirements of 40 CFR parts 60, 85 et al. and regulations pursuant to California Code of Regulations Title 13 and Title 17, the Project will be required to use best available control technology (BACT) to minimize emissions from the proposed emergency diesel generator and fire pump engines. There are no other emission sources for the operational Project for which BACT requirements are applicable. Table 5.2-31, Summary of Proposed Best Available Control Technology, presents the proposed BACT emission levels for the emergency diesel engine, based on the assessment presented below.

Table 5.2-31
Summary of Proposed Best Available Control Technology

Pollutant	Control Technology	Emission Limit
Diesel Generator Set (335 horsepower)		
NO_x	EPA Tier II	4.27 g/bhp-hr
CO	EPA Tier II	0.33 g/bhp-hr
ROC	EPA Tier II	0.32 g/bhp-hr
SO_2	EPA Tier II	Diesel fuel with sulfur content no greater than 0.0015 percent by weight
PM_{10}	EPA Tier II	0.14 g/bhp-hr
Diesel Fire Water Pump Engine (68 horsepower)		
NO_x	EPA Tier II	4.27 g/bhp-hr
CO	EPA Tier II	0.33 g/bhp-hr
ROC	EPA Tier II	0.32 g/bhp-hr
SO_2	EPA Tier II	Diesel fuel with sulfur content no greater than 0.0015 percent by weight
PM_{10}	EPA Tier II	0.14 g/bhp-hr

Source: EPA, 2004b.
Notes:
CO = carbon monoxide
EPA = Environmental Protection Agency
g/bhp-hr = grams per brake horsepower hour
NO_x = nitrogen oxides
PM_{10} = particulate matter less than or equal to 10 microns in diameter
ROC = reactive organic compounds
SO_2 = sulfur dioxide

40 CFR Part 89 and California Code of Regulations Title 13 and Title 17 require certified EPA Tier III emergency internal combustion engines, but engines compliant with Tier III standards are currently commercially unavailable. A search of the EPA and CARB BACT determination clearinghouse was made and recent BACT determinations for internal combustion engines are presented in Table 5.2-32, Summary of Recent California Best Available Control Technology Determinations for Diesel Internal Combustion Engines. The equipment proposed for the Solar Two Project satisfies the emission requirements of recent BACT determinations for similar equipment in several different regulatory jurisdictions within California.

Table 5.2-32
Summary of Recent California Best Available Control Technology Determinations for Diesel Internal Combustion Engines

Name	Location	Application Date	Rating (hp)	Control Technology	Emission Limit (g/bhp-hr)			
					VOC	NO_x	CO	PM_{10}
Caithness Blythe II, LLC – Blythe Energy Project II	Riverside, CA	08/2006	303	Engine design	NA	11.2	1.0	0.15
East Los Angeles College	Monterey Park, CA	12/2003	160	Engine design	0.09	3.9	0.45	0.22
Los Angeles County	Downey, CA	12/2003	160	Engine design	0.12	4.2	0.44	0.14
Los Angeles County Probation Facility	Los Angeles, CA	8/2002	240	Engine design	N/A	4.2	0.44	0.14
Johnson Power Systems	Los Angeles, CA	8/2002	764	Engine design	0.03	6.19	0.37	0.04

Source: SCAQMD web site, 2007.
Notes:
Emissions corrected to 3 percent O_2.
CO = carbon monoxide
g/bhp-hr = grams per brake horsepower – hour
hp = horsepower
N/A = data not available
NO_x = nitrogen oxides
PM_{10} = particulate matter less than or equal to 10 microns in diameter
VOC = volatile organic compounds

5.2.5 Compliance with LORS

The applicable LORS related to the potential air quality effects from the Solar Two Project are described below. These LORS are administered (either independently or cooperatively) by the ICAPCD, EPA Region IX, the CEC, and the CARB.

5.2.5.1 Federal

The federal Clean Air Act (CAA) of 1970, 42 United States Code 7401 *et seq*., as amended in 1977 and 1990, is the basic federal statute governing air pollution and its control. The provisions of the CAA that are potentially relevant to this Project are listed below and their applicability is discussed in the following sections:

- Air Quality Control Regions,
- National Ambient Air Quality Standards,
- Prevention of Significant Deterioration Requirements,
- New Source Review Requirements,
- New Source Performance Standards,
- Maximum Achievable Control Technology Standards,
- Federally Mandated Operating Permits, and
- Risk Management Plan.

Applicable requirements of the State of California and the local ICAPCD are discussed in Section 5.2.5.2, State, and Section 5.2.5.3, Local – ICAPCD Requirements, respectively, 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 federal CAA established Air Quality Control Regions. This is a method of dividing the country into regional air basins. The Project Site is located in the Salton Sea Intrastate Air Quality Control Region (40 CFR Part 81.167).

NAAQS

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 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 required actions by 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 $\mu g/m^3$) became effective on 17 December 2006. The State of California has adopted CAAQS that are in some cases more stringent than the federal NAAQS. The state and federal Ambient Air Quality Standard (AAQS) relevant to the Project are summarized in Table 5.2-33, National and California Ambient Air Quality Standards.

The EPA, CARB, and the local air pollution control districts (APCDs) 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 AAQSs 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 Project vicinity is designated a state nonattainment area for O_3 and PM_{10} based on air quality monitoring data showing exceedances of the state standards. Table 5.2-34, Attainment Status for Imperial County with Respect to Federal and California Ambient Air Quality Standards, presents the attainment status of the ICAPCD with respect to both federal and state ambient standards.

Table 5.2-33
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[6]	Same as Primary Standard	0.09 ppm (180 µg/m^3)
	8-hour	0.075 ppm (147 µg/m^3)[7]		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)[8]	Annual average	0.053 ppm (100 µg/m^3)	Same as Primary Standard	0.03 ppm (57 µg/m^3)
	1-hour	-		0.18 ppm (339 µg/m^3)
Sulfur oxides (SO_2)	Annual average	0.030 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[9]		20 µg/m^3
Fine particulate matter ($PM_{2.5}$)[10]	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 (1000 to 1800, 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.
Vinyl chloride[11]	24-hour			0.01 ppm (26 µg/m^3)

Source: EPA-NAAQS (http://www.epa.gov/air/criteria.html); CARB-CAAQS (http://www.arb.ca.gov/aqs/aaqs2.pdf).

Notes:

- = no standard corresponding to indicated pollutant and averaging time
µg/m^3 = micrograms per cubic meter
mg/m^3 = milligram per cubic meter
ppm = parts per million
CAAQS = California Ambient Air Quality Standards
CARB = California Air Resources Board
EAC = early action compact
NAAQS = National Ambient Air Quality Standards
EPA = Environmental Protection Agency

[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 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. CAAQS 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 on 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] On June 15, 2005, the 1-hour ozone standard (0.12 ppm) was revoked for all areas except the 8-hour ozone nonattainment EAC Areas. The State of California currently does not have any EAC areas.

[7] EPA strengthened the new 8-hour average ozone standard from 0.08 ppm to 0.075 ppm on 12 March 2008. The new standard became effective on 27 May 2008.

[8] On 19 February 2008, the California Office of Administrative Law approved amendments to the CAAQS for NO_2. The new standards become effective on 20 March 2008.

[9] Due to a lack of evidence linking health problems to long-term exposure to coarse particle pollution, EPA revoked the annual PM_{10} standard in 2006 (effective 17 December 2006).

[10] 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 17 December 2006).

[11] CARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

Table 5.2-34
Attainment Status for Imperial County with Respect to Federal and California Ambient Air Quality Standards

Pollutant	Federal Attainment Status	State Attainment Status
O_3	Nonattainment	Nonattainment
CO	Unclassified/Attainment	Attainment
NO_2	Unclassified/Attainment	Attainment
SO_2	Attainment	Attainment
$PM_{2.5}$	Unclassified/Attainment	Unclassified
PM_{10}	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
O_3 = ozone
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter
PM_{10} = particulate matter less than 10 microns in diameter
SO_2 = sulfur dioxide

As mentioned above, both EPA and CARB are involved with air quality management in the Salton Sea Air Basin, along with ICAPCD. The area of responsibility for each of these agencies is described below.

EPA has ultimate responsibility for ensuring, pursuant to the CAAA, that all areas of the U.S. meet, or are making progress toward meeting, the federal NAAQS. The State of California falls under the jurisdiction of EPA Region IX, which is headquartered in San Francisco. EPA requires that all states submit state implementation plans (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 EPA.

Regional or local air quality management districts (or air districts), such as ICAPCD, are responsible for preparation of plans for achieving 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 jurisdictional boundaries. The air district also prepares an air quality management plan 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 air quality management plan is submitted to CARB, which then integrates the plans 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, the federal Prevention of Significant Deterioration (PSD) program has been established to protect against deterioration of air quality in those areas that already meet NAAQS. 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 effects analysis, and analysis of air quality-related values (i.e., effects on soils, visibility, and vegetation). The Solar Two Project operational emissions of all pollutants would be well below the PSD thresholds. Thus, the Project would not trigger PSD requirements.

New Source Review Requirements

The federal CAA, 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). ICAPCD is responsible for NNSR rule development and enforcement for sources in the Salton Sea Air Basin. The ICAPCD NNSR rules are contained in Regulation II, Rules 207. The rules require that BACT must be applied to any new or modified emissions unit with a potential to emit equal to or greater than the specific levels for different pollutants. 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 emission reduction credits. Third, an ambient air quality effects analysis must be conducted to confirm that the Project does not cause or contribute to a violation of a federal or state AAQS. Finally, the Project 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. The Solar Two Project will not produce sufficient pollutant emissions to trigger these requirements.

New Source Performance Standards

New source performance standards (NSPS) have been established by 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. This Project will have no sources that are regulated by the NSPS.

Maximum Achievable Control Technology Standards

The CAAA of 1990, under revisions to Section 112, require a Project to list and promulgate national emission standards for hazardous air pollutants (SHAPs) to control, reduce, or otherwise limit the emissions of HAPs from major categories and area sources. As these standards are promulgated, they are published in 40 CFR 63. The Solar Two Project will not be a major source of HAPs; thus, this requirement does not apply.

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 (RMP), including an off-site-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. The Project will not store or handle hazardous materials in quantities sufficient to trigger RMP requirements and thus will not be required to develop a RMP.

5.2.5.2 State

The CARB was created by the Mulford-Carrell Air Resources Act in 1968. The primary responsibilities of the CARB include the following: (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 CAAQS; (4) to review the operations of the local APCDs; and (5) to review and coordinate the SIP for achieving NAAQS.

California Clean Air Act

In 1989, California established CAAQS, 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 CAAQS 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 evaluates the corresponding health effects. These agencies prepare a risk assessment report to determine whether the substance poses a significant health risk and should be identified as a toxic air contaminant. This program includes the 189 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 Project, since the Project would not exceed the Title V threshold of 10 tons per year of any single HAP, or 25 tons per year of a combination of HAPs.

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 sources of 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 5.16, Public Health and Safety, indicates that air toxics effects from the Project would be insignificant and thus these regulations do not apply to the Solar Two Project.

ATC and Permit to Operate/DOC Process

Under Regulation II, Rule 201, ICAPCD administers the air quality regulatory program for the construction, alteration, replacement, and operation of new emission sources within its jurisdiction. Specifically, this rule governs the requirements for issuance of air permits (i.e., ATC and Permit to Operate [PTO]). This permitting process allows the ICAPCD 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 ATC allows for the construction of the air pollution source and remains in effect until the PTO application is granted, denied, or canceled. Once the Project commences operations and demonstrates compliance with the ATC, ICAPCD will issue a PTO. The PTO specifies conditions that the air pollution source must comply with all air quality rules, regulations, and standards. The Solar Two Project has only two sources, the diesel emergency generator engine and diesel fire water pump engine, which will require permits from ICAPCD before their installation at the Project Site.

Power Plant Siting Requirements

Under the California Environmental Quality Act (CEQA), the CEC has been charged with assessing the environmental effects of each new power plant and considering the implementation of feasible mitigation measures to prevent potential significant effects. 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 project complies with all federal, state, and local air quality rules, regulations, standards, guidelines, and ordinances that govern the construction and operation of the Project. A project must demonstrate that facility emissions will be appropriately controlled to mitigate significant effects from the Project and that it will not jeopardize attainment and maintenance of the state and federal AAQS. Cumulative effects, effects due to pollutant interaction, and effects from non-criteria pollutants must also be considered.

Consistency with State Requirement

State law invests local APCDs and air quality management districts with the responsibility of regulating emissions from stationary sources. As discussed previously in this section, the Project will come under the local jurisdiction of the ICAPCD. Compliance with ICAPCD rules and regulations will ensure compliance with state air quality requirements.

5.2.5.3 Local – ICAPCD Requirements

Local districts have principal responsibility for developing plans for meeting the NAAQS and CAAQS; developing control measures for non-vehicular sources of air pollution necessary to achieve and maintain both state and federal air quality standards; implementing permit programs established for the construction, modification, and operation of sources of air pollution; enforcing air pollution statutes, regulations, and prohibitory rules governing non-vehicular sources; and developing programs to reduce emissions from indirect sources.

Rules and Regulations

The paragraphs below outline the ICAPCD rules and regulations that apply to the Project.

Regulation II

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

Rule 201 – Permits Required: A project shall not construct or modify any nonexempt equipment that emits, eliminates, reduces, or controls pollution without first obtaining the ATC from the Air Pollution Control Officer (APCO). The ATC serves as a temporary PTO for a limited period until ICAPCD verifies that the Project has been constructed in accordance with the permit application. Once this verification is completed a PTO will be issued by the APCO. An ATC and PTO will be required for the Project. The Applicant will need to obtain an ATC permit before installation of the Project.

Rule 207 – New and Modified Stationary Source Review: This rule outlines the emission standards, the offset requirements and conditions, the required demonstrations that the new source or modification will not cause or contribute to violations of the AAQSs, procedures for power plants under the CEC process, methods for calculating Project emissions, and required air quality analysis procedures. Compliance with the specific provisions of this rule is discussed below.

Rule 207.C.1 BACT: An Applicant must apply BACT to any new or modified emissions unit that has a potential to emit 25 pounds per day or more of any nonattainment pollutant or its precursors. For emergency standby equipment, only those emissions that occur during routine operation for equipment maintenance purposes are required to be considered for the purpose of determining whether BACT is required. Emissions of any criteria pollutant of the Project will be well below the BACT threshold so it will not trigger BACT requirement. However, as described in Section 5.2.4.2, Operational Emissions Mitigation: Best Available Control Technology Analysis, the proposed emergency diesel engines will meet Tier 2 emission standard, which are equivalent to BACT for this equipment

Rule 207.C.2 Offsets: Rule 207C.2 requires that offsets be provided for a new or modified stationary source with a daily potential to emit equal to or exceeding the thresholds of 137 pounds per day for reactive organic compounds, NO_x, SO_x, PM_{10}, or CO. Emissions of any criteria pollutant of the Project will be well below the offsets threshold so it will not trigger offsets requirement.

Rule 207.D.9 Power Plants: This section applies to all power plants proposed to be constructed in the APCD and for which a Notice of Intention or AFC has been accepted by the CEC. It describes the actions to be taken by ICAPCD to provide information to CEC and CARB to ensure that the Project will conform to the ICAPCD's rules and regulations. After the Application has been submitted to CEC and other responsible agencies, including ICAPCD, the local air district is required to conduct a DOC review. This determination consists of a review identical to that which would be performed if an Application for an ATC had been received for the power plant. If the information contained in the AFC does not meet the requirements of this regulation, then the APCO, within 20 calendar days of receipt of the AFC, must so inform the CEC, and the AFC will be considered incomplete and returned to the Applicant for re-submittal. After determining that the Project can be built without causing any significant adverse effects, the CEC turns permitting of the power plant over to ICAPCD, which proceeds with the PTO processes, as with any new source.

Rule 207.F Ambient Air Quality Standards: In no case may emissions from a new or modified emission unit, cause or make worse the violation of an AAQS. The APCO may require an Applicant to use an air quality model to estimate the effects of a new or modified emissions unit. Air quality models used for this purpose must be consistent with the requirements contained in the most recent edition of EPA Guidelines on Air Quality Models, OAQPS 1.2-080 (November 2005), unless the APCO finds that such model is inappropriate for use. After making such a finding, the APCO may designate an alternate model only after allowing for public comment and only with the concurrence of CARB and EPA. All modeling costs associated with the siting of a new or modified emissions unit shall be borne by the Applicant.

An air quality modeling analysis has been conducted to demonstrate that the Project will not cause a violation of any air quality standard or contribute significantly to any existing violation.

Rule 209, Implementation Plans: This rule allows that an ATC for a new stationary source or modification, subject to Rule 207, may be granted only if all APCD regulations contained in the SIP are being carried out in accordance with that plan.

Rule 216, Construction of Major Stationary Sources that Emit HAPs: This rule requires all owners and operators of stationary sources that emit HAPs to install BACT for toxic best available control technology (T-BACT) to any constructed or reconstructed major source. All T-BACT determinations shall be controlled to a level that the APCO has determined to be, at a minimum, no less stringent than new source maximum achievable control technology as required by the federal CAA.

Regulation III – Fees

Rules 301 and 302, Permit Fees and Fee Schedules: This rule and the fee schedules in Rule 302 establish the filing and permit review fees for specific types of new sources, as well as annual renewal fees and penalty fees for existing sources. The Applicant will submit the required fees with the application for the diesel emergency generator and fire water pump engines, in compliance with this rule.

Rule 309, Air Toxics "Hot Spots" Information and Assessment: This rule requires annual fees for facilities subject to the Air Toxic "Hot Spots" Information and Assessment Act. The Solar Two Project will not be a major source of HAPs, and therefore, Rule 309 does not apply.

Regulation IV – Prohibitions

Rule 400, Fuel Burning Equipment - Oxides of Nitrogen: This rule limits the emission levels of NO_x from any source to no more than 140 pounds per hour of NO_x, calculated as NO_2. The Project's maximum hourly NO_x emissions will be well below this level.

Rule 401, Opacity of Emissions: This rule applies to the opacity of discharges from any single source. Emissions from the sources of the Project will be below threshold opacity levels described in this rule.

Rule 403, General Limitations on the Discharge of Air Contaminants: This rule applies to the discharge of air contaminants, combustion contaminants, and particulate matter into the atmosphere. The relevant limit for the Project is expressed in Rule 403.B.4, which states that combustion contaminants (meaning particulate matter) from new or existing stationary electrical utility generating units, excepting emergency standby generators, in concentrations at the point of discharge of 0.01 grains per dry standard cubic foot of exhaust gas, calculated to 3 percent O_2 for boilers, and 15 percent O_2 for all gas turbines. The Project has one new backup diesel generator, which is exempted from this rule.

Rule 407, Nuisances: This rule states that there shall be no discharge of such quantities of any pollutant or material which could cause injury, detriment, nuisance or annoyance to any considerable number of persons or to the public or which endanger the comfort, repose, health or safety of any such persons or the public or which cause or have a natural tendency to cause injury or damage to business or property. No such nuisance is expected with the operation of the proposed fuel fire water pump driver or emergency generator utilizing diesel fuels.

Regulation XI

Rule 1101, NSPS: All new stationary sources of air pollution shall comply with the standards, criteria and requirements. The Solar Two Project will have no sources that are subject to any NSPS, and thus this rule does not apply.

Table 5.2-35, Summary of Applicable LORS – Air Quality, summarizes applicable LORS pertaining to the Project's air pollutant emissions and air quality effects.

Table 5.2-35
Summary of Applicable LORS – Air Quality

LORS	Requirements	Conformance Section	Administering Agency
Federal Jurisdiction			
CAA 171-193, 42 USC 7501 *et seq*. (New Source Review)	Requires NSR facility permitting for construction or modification of stationary sources. NSR applies to pollutants for which ambient concentrations are higher than NAAQS.	Section 5.2.5.1	ICAPCD, with EPA Region IX oversight
State Jurisdiction			
H&SC 4430-44384; title 17 of the California Code of Regulations (17 CCR 9330-93347 [Toxic "Hot Spots" Act])	Requires preparation and biennial updating of facility emission inventory of hazardous substances; health risk assessments.	Sections 5.2.5.2 and 5.16	ICAPCD, with CARB oversight
H&SC 41700 (Nuisance)	Provides that no person shall discharge form any source quantities of air contaminants or material which cause injury, detriment, nuisance, or annoyance to considerable number of persons or to the public witch endanger the comfort, repose, health or safety or which can cause injury or damage to business or property.	Sections 5.2.5.2 and 5.16	ICAPCD, with CARB oversight
California Public Resources Code 25523(a); 20 CCR 1752, 2300-2309 and Division 2, Chapter 5, Article 1, Appendix B, Part (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.	Section 5.2.5.2	CEC
Local Jurisdiction			
ICAPCD Rule 201 Permits Required	Requires an Authority to Construct before construction of an emission source occurs. Prohibits operation of any equipment that emits or controls air pollutants without first obtaining a permit to operate.	Section 5.2.5.3	ICAPCD, with CARB and EPA Region IX oversight
ICAPCD Rule 207 New and Modified Stationary Source Review	Specifies BACT/Offsets technology and requirements for a new emissions unit that has potential to emit any affect pollutants.	Section 5.2.5.3	ICAPCD
ICAPCD Rule 209 Implementation Plans	Allows that an ATC for a new stationary source or modification, subject to Rule 207, may be granted only if all APCD regulations contained in the SIP are being carried out in accordance with that plan.	Section 5.2.5.3	ICAPCD, with CARB and EPA Region IX oversight
ICAPCD Rule 216 Construction of Major Stationary Sources that Emit HAPs	Requires all owners and operators of stationary sources that emit HAPs to install BACT for toxic best available control technology (T-BACT) to any constructed or reconstructed major source.	Section 5.2.5.3	ICAPCD
ICAPCD Rules 301/302, Permit Fees and Fee Schedules	Identifies fees and schedules that are applicable to permit modifications, new facilities, and permitted emissions.	Section 5.2.5.3	ICAPCD
ICAPCD Rule 309, Air Toxics "Hot Spots" Information and Assessment	Requires annual fees for facilities subject to the Air Toxic "Hot Spots" information and Assessment Act.	Section 5.2.5.3	ICAPCD

Table 5.2-35
Summary of Applicable LORS – Air Quality

LORS	Requirements	Conformance Section	Administering Agency
ICAPCD Rule 400, Fuel Burning Equipment - Oxides of Nitrogen	Limits the emission levels of oxides of nitrogen from any source to no more than 140 lbs/hr of NO_x, calculated as NO_2.	Section 5.2.5.3	ICAPCD
ICAPCD Rule 401, Opacity of Emissions	Applies to the opacity of discharges from any single source.	Section 5.2.5.3	ICAPCD
ICAPCD Rule 403, General Limitations on the Discharge of Air Contaminants	Applies to the discharge of air contaminants, combustion contaminants, and particulate matter into the atmosphere.	Section 5.2.5.3	ICAPCD
ICAPCD Rule 407, Nuisances	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.	Sections 5.2.5.3 and 5.16	ICAPCD
ICAPCD Rule 1101, New Source Performance Standards	Specifies that all new stationary sources of air pollution will comply with the standards, criteria, and requirements in NSPS.	Section 5.2.5.3	ICAPCD

Source: URS Corporation, 2008.

ACT = Authority to Construct
AFC = Application for Certification
APCD = Air Pollution Control District
BACT = Best Available Control Technology
CARB = California Air Resources Board
CCR = California Code of Regulations
CEC = California Energy Commission
EPA =- Environmental Protection Agency
H&SC = Health and Safety Code
HAPS = Hazardous Air Pollutants
ICAPCD = Imperial County Air Pollution Control District
NAAQS = National Ambient Air Quality Standards
NO_2 = nitrogen dioxide
NO_x = nitrogen oxides
NSPS = New Source Performance Standards
NSR = new source review
T-BACT = Toxic Best Available Control Technology
USC = United States Code

5.2.5.4 Agencies and Agency Contacts

Agency contacts regarding this air quality assessment of the Project are shown in Table 5.2-36, Agency Contact List.

Table 5.2-36
Agency Contact List

	Agency	Contact	Address	Telephone
1	Air Quality – California Energy Commission	Mr. Kevin Golden, Air Quality Engineer	1519 Ninth Street Sacramento, CA 95814	916-654-4287
2	Imperial County Air Pollution Control District	Mr. Reyes Romero, Deputy Air Pollution Control Officer	150 South 9th Street El Centro, CA 92243-2801	760-482-4606

Source: URS Corporation, 2008.

5.2.5.5 Permits Required and Permitting Schedule

Under Regulation II, ICAPCD regulates the construction, alteration, replacement, and operation of new sources of air pollutants by issuance of ATC and PTO (see Table 5.2-37, Applicable Permits). For power plants under the siting jurisdiction of the CEC, the ICAPCD issues a DOC in lieu of an ATC. The DOC is incorporated into the CEC license. When the Project commences operation and demonstrates compliance with the DOC, ICAPCD 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 DOC requirements. The final PTO should be issued within 6 months after receipt of a complete application.

Table 5.2-37
Applicable Permits

Responsible Agency	Permit/Approval	Schedule
Imperial County Air Pollution Control District	Authority to Construct/Permit to Operate	Application to be filed concurrent with Application for Certification filing. 180-day application review period will be requested.

Source: URS Corporation, 2008.

5.2.6 References

American Meteorological Society. Journal of Applied Meteorology, 17(5): 636-643. "Correlation of Land Use and Cover with Meteorological Anomalies," August Auer Jr., May 1978.

CARB (California Air Resource Board). (ADAM) Ambient Air Quality Data Summaries website (http://www.arb.ca.gov/adam/welcome.html).

_____. 2000. Risk Management Guidance for the Permitting of New Stationary Source Diesel-Fueled Engines.

_____. 2007a. EMFAC2007 version 2.30. Calculating emission inventories for vehicles in California - User's Guide.

_____. 2007b. OFFROAD2007. Quick Reference Guide and User's Guide (http://www.arb.ca.gov/msei/offroad/offroad.htm).

California Climate Action Registry, General Reporting Protocol, Version 3.0, April 2008.

California Climate Action Registry, Power/Utility Reporting Protocol Version 1.0, April 2005.

EPA (Environmental Protection Agency). 1992. Screening Procedures for Estimating the Air Quality Impact of Stationary Sources, Revised, EPA-454/R-92-019, October 1992.

_____. 1995. AP 42, Fifth Edition, Compilation of Air Pollutant Emission Factors, January.

_____. 2000. Meteorological Monitoring Guidance for Regulatory Modeling Applications, EPA-454/R-99-005, February.

_____. 2003. Guideline on Air Quality Models.

_____. 2004a. User's Guide for the AMS/EPA Regulatory Model-AERMOD. September.

_____. 2004b. http://www.epa.gov/nonroad-diesel/regulations.htm#tier2

_____. 2004c. User's Guide for the AERMOD Meteorological Preprocessor (AERMET)," 4-46–4-51. November.

_____. 2005. AERMOD Implementation Guide. September.

_____. 2006. Addendum to User's Guide for the AMS/EPA Regulatory Model-AERMOD. December.

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

_____. 2008. AERSURFACE User's Guide. EPA-454/B-08-001, January.

SES Solar Two, LLC. 2008. *Project Description and Plan of Development.*

SCAQMD (South Coast Air Quality Management District). 1993. CEQA Air Quality Handbook, April.

_____. 2006. Final - Methodology to Calculate PM_{10} and $PM_{2.5}$ Significance Thresholds, Appendix A - Updated CEIDARS Table, October,

URS Corporation. 2008. Field work, observations, research and modeling.

Western Regional Climate Center Weather Station (WRCC), California Climate Data Archive. 2008. http://www.calclim.dri.edu/scaall.html.

Adequacy Issue:	Adequate		Inadequate		DATA ADEQUACY WORKSHEET	Revision No.	0	Date	
Technical Area:	**Air Quality**			Project:	Solar Two Project		Technical Staff:		
Project Manager:				Docket:			Technical Senior:		

Siting Regulations	**Information**	**AFC Section Number**	**Adequate Yes Or No**	**Information Required To Make AFC Conform With Regulations**
Appendix B (g) (1)	...provide a discussion of the existing site conditions, the expected direct, indirect and cumulative impacts due to the construction, operation and maintenance of the project, the measures proposed to mitigate adverse environmental impacts of the project, the effectiveness of the proposed measures, and any monitoring plans proposed to verify the effectiveness of the mitigation.	Section 5.2.1 Section 5.2.2.1 Section 5.2.2.2 Section 5.2.2.3 Section 5.2.2.4 Section 5.2.4		
Appendix B (g) (8) (A)	The information necessary for the air pollution control district where the project is located to complete a Determination of Compliance.	Section 5.2.1		
Appendix B (g) (8) (B)	The heating value and chemical characteristics of the proposed fuels, the stack height and diameter, the exhaust velocity and temperature, the heat rate and the expected capacity factor of the proposed facility.	Section 5.2.2.2 Table 5.2-12 Table 5.2-14 Appendix V, Air Quality Data		
Appendix B (g) (8) (C)	A description of the control technologies proposed to limit the emission of criteria pollutants.	Section 5.2.4.2		
Appendix B (g) (8) (D)	A description of the cooling system, the estimated cooling tower drift rate, the rate of water flow through the cooling tower, and the maximum concentrations of total dissolved solids.	N/A		
Appendix B (g) (8) (E)	The emission rates of criteria pollutants and greenhouse gases (CO_2, CH_4, $N2_O$, and SF_6) from the stack, cooling towers, fuels and materials handling processes, delivery and storage systems, and from all on-site secondary emission sources.	Section 5.2.2.2 Table 5.2-12 Table 5.2-13 Table 5.2-14 Table 5.2-17 Appendix V, Air Quality Data		

Adequacy Issue:	Adequate		Inadequate		DATA ADEQUACY WORKSHEET	Revision No.	0	Date	
Technical Area:	**Air Quality**			Project:	Solar Two Project		Technical Staff:		
Project Manager:				Docket:			Technical Senior:		

Siting Regulations	Information	AFC Section Number	Adequate Yes Or No	Information Required To Make AFC Conform With Regulations
Appendix B (g) (8) (F)(i)	A description of typical operational modes, and start-up and shutdown modes for the proposed project, including the estimated frequency of occurrence and duration of each mode, and estimated emission rate for each criteria pollutant during each mode.	Section 5.2.2.2 Table 5.2-12 Table 5.2-14 Appendix V, Air Quality Data		
Appendix B (g) (8) (F)(ii)	A description of the project's planned initial commissioning phase, which is the phase between the first firing of emissions sources and the commercial operations date, including the types and durations of equipment tests, criteria pollutant emissions, and monitoring techniques to be used during such tests.	N/A		
Appendix B (g) (8) (G)	The ambient concentrations of all criteria pollutants for the previous three years as measured at the three Air Resources Board certified monitoring stations located closest to the project site, and an analysis of whether this data is representative of conditions at the project site. The applicant may substitute an explanation as to why information from one, two, or all stations is either not available or unnecessary.	Section 5.2.1		
Appendix B (g) (8) (H)	One year of meteorological data collected from either the Federal Aviation Administration Class 1 station nearest to the project or from the project site, or meteorological data approved by the California Air Resources Board or the local air pollution control district.	Section 5.2.1 Modeling DVD		

Adequacy Issue:	Adequate		Inadequate		DATA ADEQUACY WORKSHEET	Revision No.	0	Date	
Technical Area:	**Air Quality**			Project:	Solar Two Project		Technical Staff:		
Project Manager:				Docket:			Technical Senior:		

Siting Regulations	Information	AFC Section Number	Adequate Yes Or No	Information Required To Make AFC Conform With Regulations
Appendix B (g) (8) (H) (i)	If the data is collected from the project site, the applicant shall demonstrate compliance with the requirements of the Environmental Protection Agency document entitled "On-Site Meteorological Program Guidance for Regulatory Modeling Applications" (EPA - 450/4-87-013 (August 1995)), which is incorporated by reference in its entirety.	N/A		
Appendix B (g) (8) (H) (ii)	The data shall include quarterly wind tables and wind roses, ambient temperatures, relative humidity, stability and mixing heights, upper atmospheric air data, and an analysis of whether this data is representative of conditions at the project site.	Section 5.2.1 Modeling DVD		
Appendix B (g) (8) (I)	An evaluation of the project's direct and cumulative air quality impacts, consisting of the following:	Section 5.2.2 Section 5.2.3 Modeling DVD		
Appendix B (g) (8) (I) (i)	A screening level air quality modeling analysis, or a more detailed modeling analysis if so desired by the applicant, of the direct criteria pollutant impacts of project construction activities on ambient air quality conditions, including fugitive dust (PM_{10}) emissions from grading, excavation and site disturbance, as well as the combustion emissions [nitrogen oxides (NO_x), sulfur dioxide (SO_2), carbon monoxide (CO), and particulate matter less than 10 microns in diameter (PM_{10}) and particulate matter less than 2.5 microns in diameter (PM2.5)] from construction-related equipment;	Section 5.2.2 Modeling DVD		

Adequacy Issue:	Adequate		Inadequate		DATA ADEQUACY WORKSHEET	Revision No.	0	Date	
Technical Area:	**Air Quality**			Project:	Solar Two Project		Technical Staff:		
Project Manager:				Docket:			Technical Senior:		

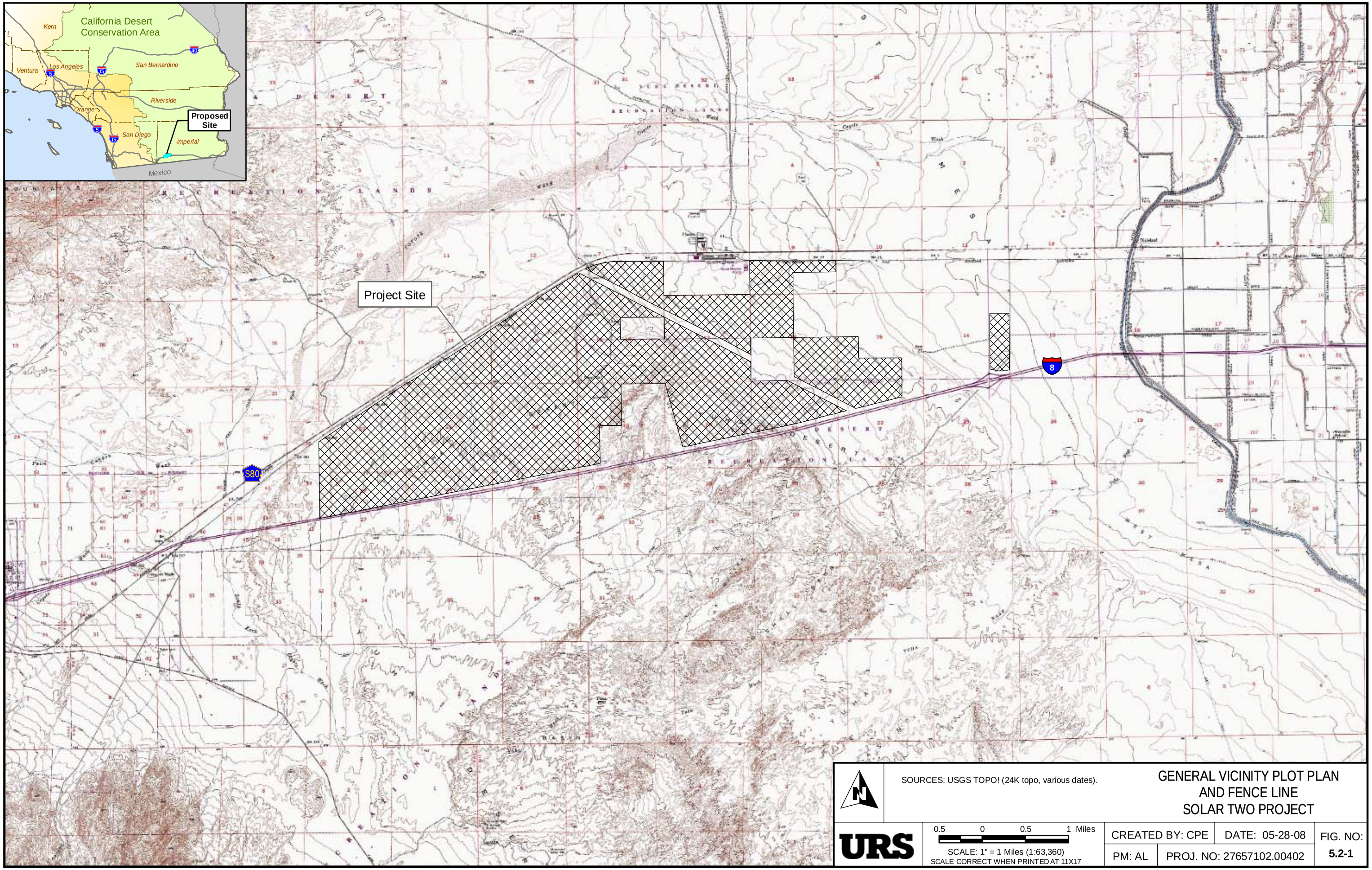
Siting Regulations	**Information**	**AFC Section Number**	**Adequate Yes Or No**	**Information Required To Make AFC Conform With Regulations**
Appendix B (g) (8) (I) (ii)	A screening level air quality modeling analysis, or a more detailed modeling analysis if so desired by the applicant, of the direct criteria pollutant (NO_x, SO_2, CO, $PM_{10,}$ and $PM_{2.5}$) impacts on ambient air quality conditions of the project during typical (normal) operation, and during shutdown and startup modes of operation. Identify and include in the modeling of each operating mode the estimated maximum emissions rates and the assumed meteorological conditions;	Section 5.2.2 Modeling DVD		
Appendix B (g) (8) (I) (iii)	A protocol for a cumulative air quality modeling impacts analysis of the project's typical operating mode in combination with other stationary emissions sources within a six mile radius which have received construction permits but are not yet operational, or are in the permitting process. The cumulative inert pollutant impact analysis should assess whether estimated emissions concentrations will cause or contribute to a violation of any ambient air quality standard; and	Section 5.2.3		
Appendix B (g) (8) (I) (iv)	An air dispersion modeling analysis of the impacts of the initial commissioning phase emissions on state and federal ambient air quality standards for NOx, SO_2, CO, PM_{10}, and $PM_{2.5}$.	N/A		
Appendix B (g) (8) (J)	If an emission offset strategy is proposed to mitigate the project's impacts under subsection (g)(1), provide the following information:	N/A		

Adequacy Issue:	Adequate		Inadequate		DATA ADEQUACY WORKSHEET	Revision No.	0	Date	
Technical Area:	**Air Quality**			Project:	Solar Two Project		Technical Staff:		
Project Manager:				Docket:			Technical Senior:		

Siting Regulations	**Information**	**AFC Section Number**	**Adequate Yes Or No**	**Information Required To Make AFC Conform With Regulations**
Appendix B (g) (8) (J) (i)	The quantity of offsets or emission reductions that are needed to satisfy air permitting requirements of local permitting agencies (such as the air district), state and federal oversight air agencies, and the California Energy Commission. Identify by criteria air pollutant, and if appropriate, greenhouse gas; and	N/A		
Appendix B (g) (8) (J) (ii)	Potential offset sources, including location, and quantity of emission reductions;	N/A		
Appendix B (g) (8) (K)	A detailed description of the mitigation, if any, which an applicant may propose, for all projects impacts from criteria pollutants that currently exceed state or federal ambient air quality standards, but are not subject to offset requirements under the district's new source review rule.	Section 5.2.4		
Appendix B (i) (1) (A)	Tables which identify laws, regulations, ordinances, standards, adopted local, regional, state, and federal land use plans, leases, and permits applicable to the proposed project, and a discussion of the applicability of, and conformance with each. The table or matrix shall explicitly reference pages in the application wherein conformance, with each law or standard during both construction and operation of the facility is discussed; and	Section 5.2.5 Table 5.2-24		

Adequacy Issue:	Adequate		Inadequate		DATA ADEQUACY WORKSHEET	Revision No.	0	Date	
Technical Area:	**Air Quality**			Project:	Solar Two Project		Technical Staff:		
Project Manager:				Docket:			Technical Senior:		

Siting Regulations	**Information**	**AFC Section Number**	**Adequate Yes Or No**	**Information Required To Make AFC Conform With Regulations**
Appendix B (i) (1) (B)	Tables which identify each agency with jurisdiction to issue applicable permits, leases, and approvals or to enforce identified laws, regulations, standards, and adopted local, regional, state and federal land use plans, and agencies which would have permit approval or enforcement authority, but for the exclusive authority of the commission to certify sites and related facilities.	Section 5.2.5 Table 5.2-24 Table 5.2-25		
Appendix B (i) (2)	The name, title, phone number, address (required), and email address (if known), of an official who was contacted within each agency, and also provide the name of the official who will serve as a contact person for Commission staff.	Section 5.2.5 Table 5.2-25		
Appendix B (i) (3)	A schedule indicating when permits outside the authority of the commission will be obtained and the steps the applicant has taken or plans to take to obtain such permits.	Section 5.2.5.5 Table 5.2-26		



SOURCES: USGS TOPO! (24K topo, various dates).

GENERAL VICINITY PLOT PLAN
AND FENCE LINE
SOLAR TWO PROJECT

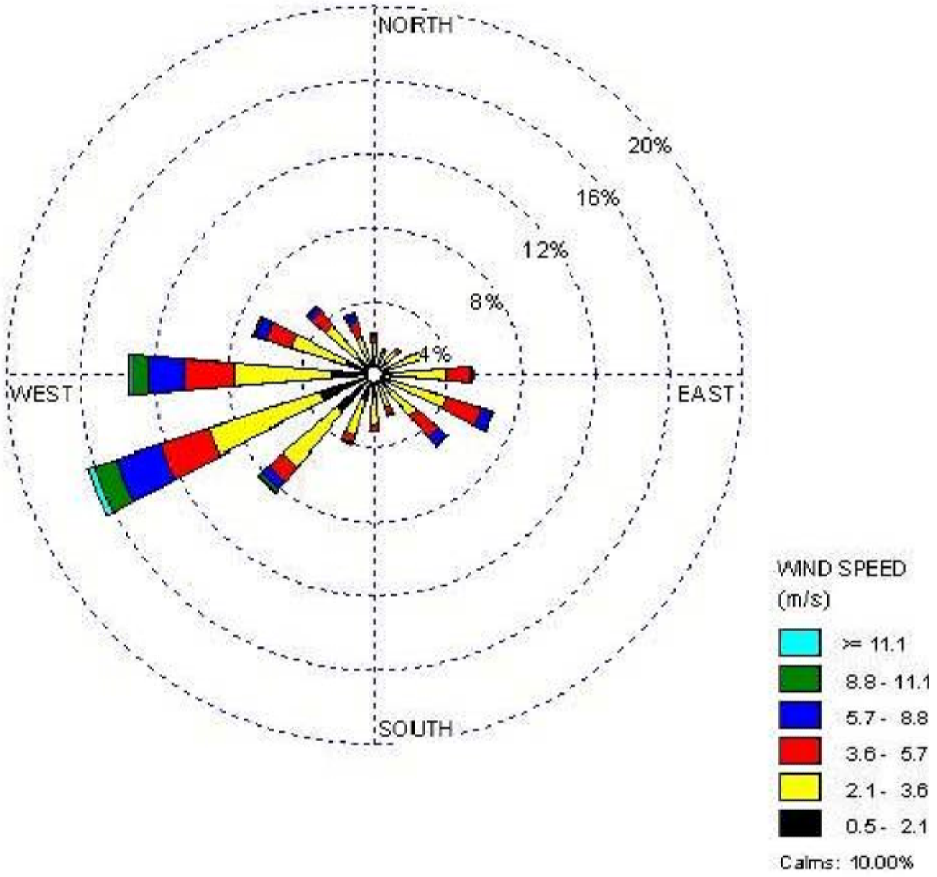
URS

0.5 0 0.5 1 Miles

SCALE: 1" = 1 Miles (1:63,360)
SCALE CORRECT WHEN PRINTED AT 11X17

CREATED BY: CPE	DATE: 05-28-08	FIG. NO:
PM: AL	PROJ. NO: 27657102.00402	5.2-1

Path: G:\gis\projects\1577\22238980\mxd\air_general_vicinity.mxd, 05/28/08,



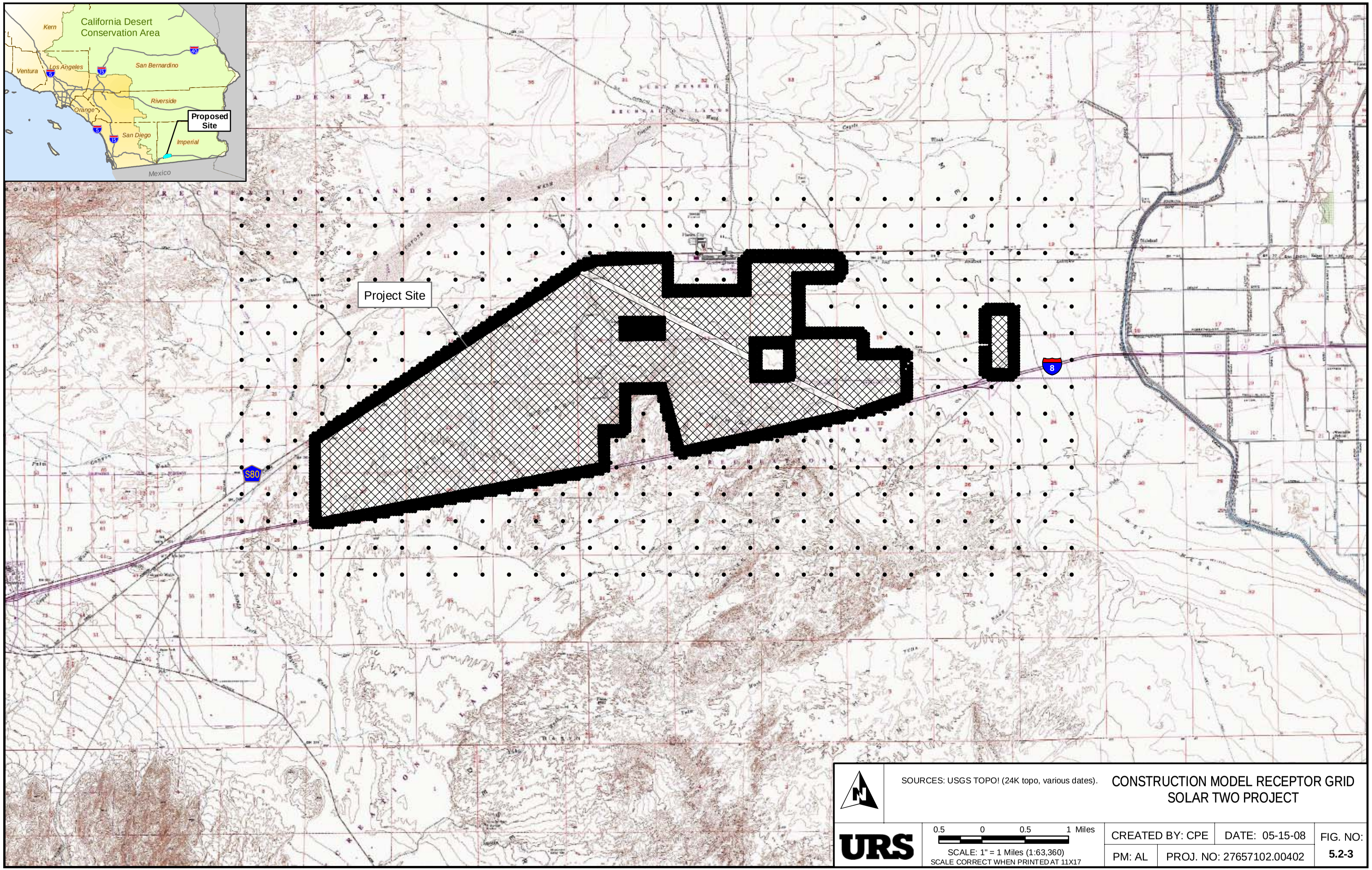
Annual wind rose for Imperial County Airport
Data taken from 1991-1995 all months.

Displays wind speed, direction (blowing from)

Annual wind rose for 1991-1995

	ANNUAL WIND ROSE FOR IMPERIAL COUNTY AIRPORT SOLAR TWO PROJECT		
URS	CREATED BY: SW	DATE: 05-15-08	FIG. NO:
	PM: AL	PROJ. NO: 27657102.00402	**5.2-2**

Path: G:\gis\projects\1577\22238980\mxd\air_graphic_windrose.mxd, 06/02/08,



SOURCES: USGS TOPO! (24K topo, various dates).

CONSTRUCTION MODEL RECEPTOR GRID
SOLAR TWO PROJECT

URS

0.5 0 0.5 1 Miles

SCALE: 1" = 1 Miles (1:63,360)
SCALE CORRECT WHEN PRINTED AT 11X17

CREATED BY: CPE	DATE: 05-15-08	FIG. NO:
PM: AL	PROJ. NO: 27657102.00402	5.2-3

Path: G:\gis\projects\1577\22238980\mxd\air_construction_model_receptor.mxd, 05/15/08,