5.2 AIR QUALITY

This section describes an analysis of the potential air quality impacts of the 200-megawatt (MW) Bullard Energy Center (BEC), which will be located in the City of Fresno in north-central Fresno County, in the San Joaquin Valley. The analysis has been conducted according to California Energy Commission (CEC) power plant siting requirements, and also addresses San Joaquin Valley Unified Air Pollution Control District (SJVAPCD) permitting requirements for Determination of Compliance/Authority to Construct (DOC/ATC). The details of the air quality assessment of the project are contained in the following subsections:

- Section 5.2.1, Affected Environment, describes the local environment surrounding the BEC, including 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 ambient concentration measurements for criteria air pollutants are summarized.
- Section 5.2.2, Environmental Consequences, evaluates the maximum potential air quality impacts due to the project's emissions of oxides of nitrogen (NO_x), carbon monoxide (CO), sulfur oxides (SO_x), volatile organic compounds (VOCs), particulate matter less than 10 microns in diameter (PM_{10}), and particulate matter less than 2.5 microns in diameter ($PM_{2.5}$). Emission estimates for these pollutants are presented for the construction phase of the project, as well as operation of the installed equipment over a full range of operating modes, including commissioning, startups and shutdowns, maintenance activities, and normal operation with operable pollution control systems. The modeling analysis conducted for nitrogen dioxide (NO_2), CO, sulfur dioxide (SO_2), and PM_{10} is presented; the results show that the project will not cause or significantly contribute to exceedances of the California Ambient Air Quality Standards (CAAQS) or National Ambient Air Quality Standards (NAAQS).
- Section 5.2.3, Cumulative Impacts Analysis, addresses the cumulative impacts of the project emissions with other potential new sources of air pollution in the area around the BEC.
- Section 5.2.4, Mitigation Measures – Emissions Offsets, describes the project emission offsets strategy, including emission reduction credits (ERCs) that are proposed to offset project sources.
- Section 5.2.5, LORS, describes applicable laws, ordinances, regulations, and standards pertaining to air quality aspects of the project. This section also provides an analysis of best available control technology (BACT) for natural gas-fired turbines, and explains how the use of water injection with selective catalytic reduction (SCR) with ammonia (NH_3) injection satisfies the SJVAPCD NO_x requirements for BACT for the turbines, and how the use of an oxidation catalyst meets the corresponding CO BACT requirements.
- Section 5.2.6, Involved Agencies and Agency Contacts, lists the agency personnel contacted during preparation of the air quality assessment.
- Section 5.2.7, Permits and Permitting Schedule, lists the air quality permits required for the project and provides a permit schedule.
- Section 5.2.8, References, lists the references used to conduct the air quality assessment.

Some air quality data are presented in other sections of this Application, including an evaluation of toxic air pollutants (see Section 5.16, Public Health) and information relating to the fuel characteristics, heat rate, and startup and operating limits (see Section 3.0, Facility Description and Location).

5.2.1 Affected Environment

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

The BEC plant site will be located on a industrial 12.3-acre parcel in the City of Fresno, Fresno County within the incorporated limits of the City of Fresno at 5829 North Golden State Boulevard about 10.5 miles (17 kilometers) northwest of the Fresno Air Terminal (see Figure 5.2-1, Topography within a 6- and 10-Mile Radius of the Project Site). The project site is approximately 9.5 miles (15 kilometers) from complex terrain (i.e., with elevation exceeding proposed stack heights) and is surrounded by undeveloped and industrial land. The nearest residential area is approximately 250 yards to the east and southeast of the property.

5.2.1.1 Meteorology and Climate

Fresno County is classified as having a mild climate characterized by low precipitation, warm summers, mild winters, and temperature inversions. It is separated from the coastal regions by the Diablo and Coastal mountain ranges to the northwest, southwest, west (approximately 40 to 50 miles [64-80 kilometers] away). 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 Ocean. 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 San Joaquin Valley also have a major influence on climate, serving as a meteorological boundary that effectively removes moisture from the marine air flowing from the Pacific. An annual wind rose representing data collected during the years 1987 to 1991 is presented in Figure 5.2-2, Windrose for all Months 1987-1991 Fresno-Yosemite International Airport. Quarterly wind roses for the project area are provided in Appendix I, Air Quality Data.

The generally flat terrain of the valley floor in the San Joaquin Valley area and the strong temperature differentials created by intense solar heating produce moderate winds and deep thermal convection currents. Subsiding air, protective mountains, and distance from the ocean all combine to limit precipitation. The valley area experiences surface inversions in the early morning hours frequently during the year, causing air stagnation. These inversions are usually broken by noon due to solar heating.

Temperature and precipitation means and extremes from the nearest long-term National Climactic Data Center (NCDC) station in Fresno over a 50-year period (1948-2005) are presented in Table 5.2-1, Average Temperatures and Precipitation at Fresno-Yosemite International Airport (1948-2005). This National Weather Service station at the Fresno Yosemite International Airport is located approximately 9.5 miles (15 kilometers) to the southeast of the BEC at latitude 36°47' North, longitude 119°43' West. The hottest month, July, has an average maximum temperature of 98.1 degrees Fahrenheit (°F) and an average minimum temperature of 65.4°F. The coldest month, December, has an average maximum temperature of 54.6°F, and an average minimum temperature of 37.2°F.

TABLE 5.2-1
AVERAGE TEMPERATURES AND PRECIPITATION
AT FRESNO-YOSEMITE INTERNATIONAL AIRPORT (1948-2005)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average max temperature (°F)	54.4	61.5	66.9	74.6	83.4	91.6	98.1	96.2	90.5	79.8	65.2	54.6	76.4
Average min temperature (°F)	37.6	40.6	43.7	47.8	54.1	60.2	65.4	63.7	59.3	50.9	42.2	37.2	50.2
Precipitation (inches)	2.13	1.88	1.94	1.00	0.37	0.15	0.01	0.01	0.17	0.53	1.17	1.58	10.94

Source: Western Regional Climate Center.
Notes:
°F = degrees Fahrenheit
max = maximum
min = minimum

During winter and early spring, 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 11 inches on average. Monthly mean precipitation amounts at Fresno range from 2.13 inches in January to 0.01 inch in July and August. 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 moderate. In the summer, relative humidity averages 60 to 70 percent in the early morning and about 25 percent in the afternoon. In winter, relative humidity averages 90 percent in the early morning and 40 to 70 percent in the afternoon.

During the winter months the surface heating is not as intense, and the rapid cooling of the surface layers at night retards this exchange of momentum between vertical atmospheric layers. As a result, winds are generally calmer in winter, except during the passage of frontal storm systems. During all seasons, the prevailing wind direction is predominantly from the northwest.

5.2.1.2 Existing Air Quality

All ambient air quality data presented in this section were published by the California Air Resources Board (CARB) on the Aerometric Data Analysis and Management System (ADAM) Web site and/or by U.S. Environmental Protection Agency (USEPA) on the Aerometric Information Retrieval System (AIRS) data Web site. Ambient air concentrations of ozone (O_3), NO_2, SO_2, CO, PM_{10}, and $PM_{2.5}$ and airborne lead (Pb) are recorded at monitoring stations

throughout Fresno and Madera counties. The region surrounding the project site is a mix of light commercial and agricultural environments with a minimal population on the far western edge of the City of Fresno. Most monitoring stations in the region, in general, only record measurements for one or two criteria pollutants, except for those stations located in urban areas. The monitoring stations were generally positioned to represent area-wide ambient conditions rather than the localized impacts of any particular facility or area. In rural areas of Fresno County, pollutant concentrations are not expected to vary significantly from one location to the next since the emission sources are few and widely distributed. However, concentrations of pollutants emitted by industrial and vehicular sources are generally higher in the most populated areas of the City of Fresno than in the rest of the county.

Ambient concentrations of O_3 and NO_2 are recorded at the Madera Pump Yard monitoring station located at Road 29 1/2 just north of Avenue 8 in Madera County, approximately 7 miles (11 kilometers) northwest of the project site. The Madera Pump Yard station is the closest station with a long-term record of O_3 and NO_2 pollutants. The Fresno First Street station is the second closest station with a long-term record of all the other criteria pollutants, except SO_2. Fresno First Street monitoring station is located at 3425 North First Street, approximately 7.5 miles (12 kilometers) southeast of the project site. The Fresno Freemont School station is the closest station that monitors ambient SO_2. To the extent that monitoring data from the Fresno stations have been used here to characterize conditions at the project site, this practice would almost certainly overestimate existing pollutant levels at BEC because of the much lower population and level of development of this area compared to the monitoring stations in urban locations. In addition, the project is generally upwind of the Fresno monitoring locations.

Ozone (O_3)

O_3 is an end product of complex reactions between VOC and NO_x in the presence of ultraviolet radiation. VOC and NO_x emissions from vehicles and stationary sources, combined with daytime wind flow patterns, mountain barriers, temperature inversions, and intense sunlight, generally result in the highest O_3 concentrations. For purposes of both state and federal air quality planning, the entire San Joaquin Valley air basin is classified as a nonattainment area with respect to both state and national ambient standards for O_3.

Table 5.2-2, Ozone Levels at Madera Pump Yard Station (ppm), shows the measured O_3 levels at the Madera Pump Yard Station in Madera County during the past 5 years. The 1-hour O_3 NAAQS of 0.12 parts per million (ppm) has been exceeded at the Madera Pump Yard Station only twice in the past five years with the maximum concentration of 0.141 ppm recorded in 2002. The more stringent state O_3 CAAQS of 0.09 ppm was exceeded numerous times in each of the past five years, including 21 times in 2002.

TABLE 5.2-2
OZONE LEVELS AT MADERA PUMP YARD STATION (ppm)

Madera Pump Yard Station, Madera County	2001	2002	2003	2004	2005
Maximum 1-hour average	0.115	0.141	0.120	0.097	0.095
Number of days exceeding California 1-hour standard (0.09 ppm)	15	21	15	3	1
Number of days exceeding National 1-hour standard (0.12 ppm)	0	2	0	0	0
Maximum 8-hour average	0.093	0.110	0.102	0.084	0.081
Number of days exceeding National 8-hour standard (0.08 ppm) [1]	13	18	14	0	0

Sources: CARB ADAM Web site (www.arb.ca.gov/adam/welcome.html).
USEPA AIRS Web site (www.epa.gov/air/data/index.html).

Notes:

[1]Number of days with an 8-hour average exceeding federal standard concentration of 0.08 ppm. The regulatory standard is to maintain 0.08 ppm as a 3-year average of the fourth-highest daily maximum. Therefore, number of days exceeding standard concentration is not the number of violations of the standard for the year.

ppm = parts per million

The federal 8-hour O_3 NAAQS requires that the 3-year average of the fourth-highest values for individual years be maintained at or below 0.08 ppm. Therefore, the number of days in each year with maximum 8-hour concentrations above the standard concentration in Table 5.2-2, Ozone Levels at Madera Pump Yard Station (ppm), does not equate to the number of violations. However, the highest 3-year (2001-2003) average of the fourth-highest 8-hour concentrations at the Madera Pump Yard Station was 0.093 ppm, which is also above the allowable standard of 0.08 ppm.

O_3 data completeness at Madera Pump Yard Station was 91 percent for 2001, 96 percent for 2002 and 2003, and 97 percent for 2004 and 2005.

Nitrogen Dioxide (NO_2)

NO_2 is formed primarily from reactions in the atmosphere between nitric oxide (NO) and oxygen (O_2) or O3. NO_2 is formed during high-temperature combustion processes, when the nitrogen and O_2 in the combustion air combine. Although NO is much less harmful than NO_2, it can be converted to NO_2 in the atmosphere within a matter of hours, or even minutes, under certain conditions. The control of NO and NO_2 emissions is also important because of the role of both compounds in the atmospheric formation of O_3.

Historical data presented in Table 5.2-3, Nitrogen Dioxide Levels at Madera Pump Yard Station in Madera County and at Fresno First Street Station in Fresno County (ppm), show NO_2 levels at the Madera Pump Yard Station for the years 2001 through 2005. This station is the closest monitoring location to the project site for NO_2 concentrations, but undoubtedly experiences much lower NO_2 concentrations than the project site, which has higher exposure to more concentrated emission sources. Accordingly, data for the more urban Fresno County site at Fresno First Street Station, about 7.5 miles (12 kilometers) southeast from BEC, are also displayed in Table 5.2-3.

TABLE 5.2-3
NITROGEN DIOXIDE LEVELS AT MADERA PUMP YARD STATION IN MADERA COUNTY AND AT FRESNO FIRST STREET STATION IN FRESNO COUNTY (ppm)

Madera Pump Yard Station, Madera County	2001	2002	2003	2004	2005
Maximum 1-hour average	0.060	0.058	0.054	0.053	0.057
Annual average	0.011	0.012	0.010	0.010	0.010
Days over state standard (0.25 ppm, 1-hour)	0	0	0	0	0
Fresno First Street Station, Fresno County					
Maximum 1-hour average	0.090	0.088	0.090	0.077	0.084
Annual average	0.021	0.020	0.019	0.017	0.017
Days over state standard (0.25 ppm, 1-hour)	0	0	0	0	0

Sources: CARB ADAM Web site (www.arb.ca.gov/adam/welcome.html).
USEPA AIRS Web site (www.epa.gov/air/data/index.html).
Notes:
ppm = parts per million

For purposes of both state and federal air quality planning, the San Joaquin Valley air basin is in attainment with regard to NO_2. During the past five years, there have been no violations of the CAAQS 1-hour standard (0.25 ppm) at either the Madera Pump Yard or Fresno First Street station. The highest 1-hour concentrations recorded at the stations during the past five years were 0.060 ppm and 0.090 ppm, respectively, both in 2001. The table also shows that there were no violations of the annual NAAQS (0.053 ppm) at either station during this period. Since ambient NO_2 concentrations are generally highest in the immediate vicinity of large fuel-burning sources, the concentrations at Fresno First Street monitoring station almost certainly would overestimate actual concentrations in the rural project site area. Thus, for purposes of the air impact assessment described later in this section, the Madera Pump Yard NO_2 data were used to estimate background concentrations at the BEC site.

NO_2 data completeness for each year was 96 percent for 2001, 99 percent for 2002, 89 percent for 2004, and 98 percent for 2003 and 2005.

Carbon Monoxide (CO)

CO is a product of incomplete combustion, and is emitted principally from automobiles and other mobile sources of pollution, although it is also a product of combustion from stationary sources (both industrial and residential) burning fossil fuels. Peak CO levels occur typically during winter months due to a combination of higher emission rates and stagnant weather conditions. The Fresno urbanized area, although previously a nonattainment area for CO, was re-designated to attainment in 1998.

Table 5.2-4, Carbon Monoxide Levels at Fresno First Street (ppm), shows the available data on maximum 1-hour and 8-hour average CO levels recorded at the Fresno First Street station during the period from 2001 to 2005. As indicated by this table, the maximum 1-hour average CO levels comply with the NAAQS and CAAQS (30.0 ppm and 20.0 ppm, respectively) and the maximum 8-hour values comply with the NAAQS and CAAQS of 9.0 ppm. The highest individual 1-hour and 8-hour CO concentrations at this location since 2001 have been 6.7 ppm and 4.6 ppm, respectively, both in 2001. Since ambient CO concentrations are generally highest

in the immediate vicinity of large fuel-burning sources, the concentrations at Fresno First Street monitoring station almost certainly provide a conservative overestimate of actual concentrations in the rural project site area. No recent CO monitoring data are available for comparable rural areas of Fresno County or the adjacent counties.

TABLE 5.2-4
CARBON MONOXIDE LEVELS AT FRESNO FIRST STREET (ppm)

Fresno First Street Station, Fresno County	2001	2002	2003	2004	2005
Maximum 1-hour average	6.7	6.1	4.9	3.9	4.1
Maximum 8-hour average	4.64	4.51	3.56	2.85	2.95
Days over the 8-hour California standard (9 ppm)	0	0	0	0	0
Days over the 8-hour federal standard (9 ppm)	0	0	0	0	0

Sources: CARB ADAM Web site (www.arb.ca.gov/adam/welcome.html).
USEPA AIRS Web site (www.epa.gov/air/data/index.html).
Notes:
ppm = parts per million

Data completeness for CO concentrations at the Fresno First Street station was 98 percent for 2001, 99 percent for 2002, 96 percent for 2003 and 2004, and 97 percent for 2005.

Sulfur Dioxide (SO_2)

SO_2 is produced by the combustion of any sulfur-containing fuel. It is also emitted by chemical plants that treat or refine sulfur or sulfur-containing chemicals. Natural gas contains nearly negligible sulfur, while fuel oils may contain much larger amounts. Because of the complexity of the chemical reactions that convert SO_2 to other compounds (such as sulfates), peak concentrations of SO_2 occur at different times of the year in different parts of California, depending on local fuel characteristics, weather, and topography. The San Joaquin Valley air basin is considered to be in attainment for SO_2 for purposes of state and federal air quality planning.

Background SO_2 data are provided in Table 5.2-5, Sulfur Dioxide Levels at Fresno Fremont School (ppm). SO_2 data have only been recorded in the San Joaquin Valley air basin for one of the past nine years (2003), a practice that is justified by the low levels that have been recorded for this pollutant when measurements have been made. The maximum SO_2 levels for 2003 did not exceed any state or federal standards. Since ambient SO_2 concentrations are generally highest in the immediate vicinity of large fuel-burning sources, the concentrations at Fresno Fremont School monitoring station almost certainly provide a conservative overestimate of actual concentrations in the project site area.

TABLE 5.2-5
SULFUR DIOXIDE LEVELS AT FRESNO FREMONT SCHOOL (ppm)

Fresno Fremont School Station, Fresno County	2001	2002	2003	2004	2005
Highest 1-hour average	NA	NA	0.009	NA	NA
Highest 3-hour average	NA	NA	0.006	NA	NA
Highest 24-hour average	NA	NA	0.004	NA	NA
Annual average	NA	NA	0.002	NA	NA
Days over 1-hour state standard (0.25 ppm)	0	0	0	0	0
Days over 24-hour state standard (0.04 ppm)	0	0	0	0	0
Days over 3-hour federal standard (0.5 ppm)	0	0	0	0	0
Days over 24-hour federal standard (0.14 ppm)	0	0	0	0	0
Days over the annual federal standard (0.03 ppm)	0	0	0	0	0

Sources: CARB ADAM Web site (www.arb.ca.gov/adam/welcome.html).
USEPA AIRS Web site (www.epa.gov/air/data/index.html).
Notes:
NA = not recorded
ppm = parts per million

SO_2 data completeness at Fresno Fremont School Station was 47 percent for 2003. Measurements for this pollutant were not recorded in 2001, 2002, 2004, and 2005.

Particulate Matter (PM_{10})

Particulates in the air are caused by a combination of windblown fugitive dust; particles emitted from combustion sources (usually carbon particles); and organic, sulfate, and nitrate aerosols formed by atmospheric chemical reactions involving emitted hydrocarbons, SO_x, and NO_x. In 1984, CARB adopted standards for PM_{10}, and phased out the total suspended particulate (TSP) standards that had previously been in effect. PM_{10} standards were substituted for TSP standards because PM_{10} corresponds to the size range of respirable particulates related to human health effects. In 1987, USEPA also replaced national TSP standards with PM_{10} standards. The San Joaquin Valley air basin is a designated nonattainment area with respect to both federal and state PM_{10} standards.

Table 5.2-6, Particulate Matter (PM_{10}) Levels at Fresno First Street ($\mu g/m^3$), shows the maximum PM_{10} levels recorded at the Fresno First Street monitoring station during the period from 2001 through 2005 and the arithmetic annual averages for the same period. (The arithmetic annual average is simply the arithmetic mean of the daily observations.) PM_{10} is monitored according to different protocols for evaluating compliance with the state and federal standards for this pollutant. Specifically, California uses a gravimetric or beta attenuation method, while compliance with federal standards is evaluated based on an inertial separation and gravimetric analysis. This accounts for the slightly differing 24-hour concentrations listed in Table 5.2-6 that represent data obtained by means of the state and federal samplers.

TABLE 5.2-6
PARTICULATE MATTER (PM_{10}) LEVELS AT FRESNO FIRST STREET ($\mu g/m^3$)

Fresno First Street Station, Fresno County	2001	2002	2003	2004	2005
Maximum 24-hour average (federal testing samplers)	193	96	74	54	106
Maximum 24-hour average (state testing samplers)	204	100	74	58	109
Annual arithmetic mean	43	39	35	31	33
Estimated number of days exceeding federal standard	1	0	0	0	0
Estimated number of days exceeding California standard	16	15	13	5	10

Sources: CARB ADAM Web site (www.arb.ca.gov/adam/welcome.html).
USEPA AIRS Web site (www.epa.gov/air/data/index.html).
Notes:
$\mu g/_m{}^3$ = micrograms per cubic meter
PM_{10} = particulate matter less than 10 microns in diameter

At the Fresno First Street station, the maximum 24-hour PM_{10} levels exceed the CAAQS state standard of 50 micrograms per cubic meter ($\mu g/m^3$) many times per year. The maximum daily concentration was 204 $\mu g/m^3$ (state samplers) in 2001. The maximum annual arithmetic mean concentration recorded at Fresno First Street was 43 $\mu g/m^3$ in 2001, which is below the federal standard of 50 $\mu g/m^3$ but above the state standard of 30 $\mu g/m^3$. Because of the low population density and low level of industrial development in the project area, the project site is likely exposed to lower vehicular and industrial emissions and lower ambient PM_{10} concentrations than the Fresno First Street and other urban monitoring stations in the county. However, local particulate levels could be influenced by high wind conditions, agricultural tillage, and burning that may be less evident in the data of the more urban monitoring stations.

Concentration data completeness for PM_{10} at the Fresno First Street station was 96 percent for 2001, 97 percent for 2002, 99 percent for 2003, 100 percent for 2004, and 96 percent for 2005.

Fine Particulates ($PM_{2.5}$)

The $PM_{2.5}$ data in Table 5.2-7, Particulate Matter ($PM_{2.5}$) Levels at Fresno First Street ($\mu g/m^3$), show that the national 24-hour average NAAQS of 65 $\mu g/m^3$ has been exceeded in three of the past five years. The maximum recorded 24-hour average value was 110.0 $\mu g/m^3$ in 2001. The annual $PM_{2.5}$ data are also presented in this table. The maximum recorded annual arithmetic mean was 21.6 $\mu g/m^3$ which is above both the national standard of 15 $\mu g/m^3$ and the California standard of 12 $\mu g/m^3$.

TABLE 5.2-7
PARTICULATE MATTER ($PM_{2.5}$) LEVELS AT FRESNO FIRST STREET ($\mu g/m^3$)

Fresno First Street Station, Fresno County	2000	2001	2002	2003	2004
Maximum 24-hour average (federal only)	110	84	63	71	53
Annual arithmetic mean	19.8	21.6	17.7	16.4	16.9
Estimated number of days Exceeding Federal Standard	10	13	0	2	0

Sources: CARB ADAM Web site (www.arb.ca.gov/adam/welcome.html)
USEPA AIRS Web site (www.epa.gov/air/data/index.html)
Notes:
$\mu g/_m{}^3$ = micrograms per cubic meter $PM_{2.5}$ = particulate matter less than 2.5 emissions microns in diameter

Airborne Lead (Pb)

Pb pollution has historically been emitted predominantly from the combustion of fuels. However, legislation in the early 1970s required the gradual reduction of Pb content of gasoline. Coupled with the introduction of unleaded gasoline in 1975, Pb levels have been dramatically reduced throughout the U.S., and violations of the ambient standards for this pollutant have been virtually eliminated.

Table 5.2-8, Lead Levels at Fresno First Street (µg/m^3), shows the recorded 24-hour and quarterly Pb concentration averages at the Fresno First Street station for the years 1999 through 2003. Both state and federal standards limit long-term average Pb concentrations to 1.5 µg/m^3, although NAAQS pertains to a quarterly average, while CAAQS applies to a 30-day average.

The maximum recorded 24-hour level was 0.02 µg/m^3 in each year from 1999 through 2002. The maximum quarterly average at the Fresno First Street station was 0.01 µg/m^3 in each of the 5 years. Both maxima are far below the state and federal standards for Pb. In addition, Pb concentrations measured in the City of Fresno are almost certainly higher than at the project site.

TABLE 5.2-8
LEAD LEVELS AT FRESNO FIRST STREET (µg/m^3)

Fresno First Street Station, Fresno County	1999	2000	2001	2002	2003
Maximum 24-hour average	0.02	0.02	0.02	0.02	0.01
Maximum quarterly average	0.005	0.01	0.01	0.01	0.01

Sources: CARB ADAM Web site (www.arb.ca.gov/adam/welcome.html).
USEPA AIRS Web site (www.epa.gov/air/data/index.html).

Notes:
µg/m^3 = micrograms per cubic meter

Particulate Sulfates

Sulfate compounds found in the lower atmosphere consist of both 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 San Joaquin Valley air basin 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 San Joaquin Valley air basin remains unclassified for both pollutants.

5.2.2 Environmental Consequences

This section evaluates the potential air quality impacts of the project. Project impacts would be considered significant if the pollutant concentrations resulting from the project, when combined

with background concentrations, exceed an ambient air quality standard. However, project emissions of nonattainment pollutants and their precursors will be offset to ensure that the project will result in a net air quality benefit. Emissions estimates for all aspects of both construction and operation of the project are presented. Dispersion model selection and the selection of model input data are also described (i.e., emissions scenarios and release parameters, building wake effects, meteorological data, and receptor locations) and analysis results are presented. Documentation that the project will comply with applicable local, state, and federal air quality regulatory requirements is provided.

5.2.2.1 Construction Emissions

The primary emission sources during construction will include exhaust from heavy construction equipment and vehicles and fugitive dust generated in areas disturbed by grading, excavating, and erection of facility structures. Construction activities are associated with four areas of development: a 12.3-acre site where the new turbines will be located; a 9.2-acre laydown area that will be used as a parking area during the construction phase; a 2.3-acre area northwest of the site where the natural gas pipeline will be connected; and a 1.8-acre site southeast of the site where the water and sewer lines will be connected. Although emission estimates include all areas of development, the construction schedule calls for the project site to be disturbed during various construction phases.

The URBEMIS2002 (Version 8.7) emissions model developed by CARB was used to estimate emissions from construction activities. Use of this model for estimation of construction emissions was specifically recommended by staff of the SJVAPCD (SJVAPCD 2006). All model input/output (I/O) files are included in Appendix I, Air Quality Data. Based on information provided by the project design-engineering firm, construction emissions calculations were made for an expected 13-month construction period with an 8-hour workday and a 5-day workweek. For purposes of the URBEMIS2002 calculations, construction activities will occur in two phases: (1) site grading, and (2) building of facility structures. Asphalt paving is included in the building phase. Site grading activities would occur over the first two months and no building or asphalt activities were assumed to occur during this time. The phase estimated emissions from the building of the facility, with no part of the building or site grading phases expected to overlap. The simulations that provided the highest daily emission rates were used in the modeling analysis.

Additionally, separate model runs were performed for the extension of the sewer line to the southeast and the natural gas line extended to the west. These runs each assumed that construction activities would only last two months, and used a smaller equipment fleet than that used for the construction of the main site.

Combustion emissions were estimated using a construction schedule, and a list of equipment needed during each month of the construction effort, as provided by the project design engineering firm (see Appendix I, Air Quality Data). Based on this list, maximum short-term emissions for the site grading phase are expected to occur in Month 1 of the project construction schedule. Maximum emissions from the building of the facility structures are expected to occur in Month 6. The expected equipment usage was input into URBEMIS2002 to estimate emissions. Fugitive dust emissions resulting from on-site soil disturbances were estimated from the total acreage disturbed (24 acres [this is larger than the actual 21.5 acre combined plant site

and construction laydown area]) and an estimated maximum daily disturbance (5 acres per day). A dust control efficiency of 68 percent was assumed to be achieved for these activities by frequent watering when required. In addition, mitigation measures (e.g., covering exposed dirt piles, quickly replacing ground cover, and adding soil stabilizers) were included to reduce fugitive dust emissions. Emissions from on-road delivery truck and worker commute trips were estimated using default emission factors provided by EMFAC2002, with inputs representing heavy industrial land use in a rural area within the San Joaquin Valley.

Table 5.2-9, Daily Maximum Mitigated Criteria Pollutant Construction Emissions Site Grading Phase (pounds/day), and Table 5.2-10, Daily Maximum Mitigated Criteria Pollutant Construction Emissions Building and Asphalt Paving Phase (pounds/day), present the mitigated maximum daily emissions for each phase as estimated by URBEMIS2002. Table 5.2-11, Total Project Construction Emissions of Criteria Pollutants (tons), presents the total mitigated emissions of air pollutants for each phase over the full 13-month construction project (2 months for site grading, 0.5 month for asphalt, 11 months for building).

TABLE 5.2-9
DAILY MAXIMUM MITIGATED CRITERIA POLLUTANT CONSTRUCTION EMISSIONS SITE GRADING PHASE (POUNDS/DAY)

Activity	VOC	CO	NO_x	PM_{10}	SO_x
Fugitive dust	-	-	-	7.46	-
Off-road diesel	3.78	31.17	126.50	0.55	Neg
Worker trips	0.29	6.60	0.36	0.03	Neg
Total maximum daily emissions	**4.07**	**37.77**	**126.86**	**8.04**	**0.00**

Notes:
- = not applicable
Neg = negligible
CO = carbon monoxide
NO_x = oxide(s) of nitrogen
PM_{10} = particulate matter less than 10 microns in diameter
VOC = volatile organic compounds
SO_x = sulfur oxide(s)

TABLE 5.2-10
DAILY MAXIMUM MITIGATED CRITERIA POLLUTANT CONSTRUCTION EMISSIONS BUILDING AND ASPHALT PAVING PHASE (POUNDS/DAY)

Activity	VOC	CO	NO_x	PM_{10}	SO_x
Building construction off-road diesel	3.19	26.55	104.34	0.42	Neg
Building construction worker trips	1.34	17.16	0.81	0.23	Neg
Asphalt off-road gas	0.43	-	-	-	Neg
Asphalt off-road diesel	0.76	6.46	23.82	0.09	Neg
Asphalt on-road diesel	0.01	0.03	0.70	0.00	Neg
Asphalt worker trips	0.03	0.32	0.01	0.00	Neg
Total maximum daily emissions	**5.76**	**50.52**	**129.68**	**0.74**	**0.0**

TABLE 5.2-10
DAILY MAXIMUM MITIGATED CRITERIA POLLUTANT CONSTRUCTION EMISSIONS BUILDING AND ASPHALT PAVING PHASE (POUNDS/DAY)

Activity	VOC	CO	NO_x	PM_{10}	SO_x
Off-site on-highway emissions					
Passenger vehicle - combustion emissions	2.5	23.2	2.3	0.1	0.02
Delivery truck - combustion emissions	6.2	58.8	17.2	0.3	0.02
Passenger vehicle - paved road dust	-	-	-	0.6	-
Delivery truck - paved road dust	-	-	-	6.1	-
Subtotal of off-site emissions (lb)	**8.7**	**82**	**19.5**	**7.1**	**0.04**

Notes:
- = not applicable
Neg = negligible
CO = carbon monoxide
lb = pound(s)
NO_x = oxide(s) of nitrogen
PM_{10} = particulate matter less than 10 microns in diameter
VOC = volatile organic compounds
SO_x = sulfur oxide(s)

TABLE 5.2-11
TOTAL PROJECT CONSTRUCTION EMISSIONS OF CRITERIA POLLUTANTS (TONS)

Activities	VOC	CO	NO_x	PM_{10}	SO_x
Total site grading phase[1]	0.09	0.83	2.79	0.17	0.00
Total building phase[2]	5.79	48.17	30.60	1.40	0.00
Total project construction emissions (tons)	5.88	49.0	33.39	1.57	0.00

Notes:
[1] Site grading totals are for only 2 months of activity. (Pounds per day x 22 days/month x 2 months / 2,000 lb/ton)
[2] Building total is for 11 months, and includes asphalt. (Pounds per day x 22 days/month x 11 months / 2,000 lb/ton)
CO = carbon monoxide
NO_x = oxide(s) of nitrogen
PM_{10} = particulate matter less than 10 microns in diameter
VOC = volatile organic compounds
SO_x = sulfur oxide(s)

5.2.2.2 Operational Emissions

The most important emission sources of the project will be the two simple-cycle combustion turbine generators (CTG) exclusively burning natural gas fuel. Annual operational emissions from each of the two project CTGs were estimated by summing the emissions corresponding to normal operating conditions and turbine startup/shutdown conditions. Estimated annual emissions of air pollutants for each turbine have been calculated based on 5,000 hours of normal operation, which includes up to 365 startup and shutdown events for each CTG.

The criteria pollutant emission rates provided by the turbine vendor for three different load conditions (50, 75, and 100 percent) are presented in Table 5.2-12, 1-Hour Operating Emission Rates for CTG Operating Load Scenarios. These three scenarios represent the expected normal operating range of these turbines at the project facility.

In addition to the two CTGs, the project will include one 160-horsepower (hp) emergency diesel firewater pump engine. The diesel fire pump driver will be tested one hour per week (52 hours per year) to ensure its operability in the event of an emergency. The project will also include a three-cell mechanical draft evaporative cooling tower. There are no other operational emissions sources at the project site.

The scenarios presented in Table 5.2-12, 1-Hour Operating Emission Rates for CTG Operating Load Scenarios, are Cases 100 through 109 from top to bottom (Case 100 is 100 percent load, cooler off at 114°F ambient temperature; Case 101 is 100 percent load, cooler on at 114°F; Case 102 is 75 percent load, cooler off at 63°F, and so on).

The expected emissions and durations associated with individual turbine startup and shutdown events are summarized in Table 5.2-13, Criteria Pollutant Emissions for Each CTG During Startup and Shutdown. Based on vendor information, each turbine startup is expected to take 10 minutes, followed by a 20-minute SCR warmup period; each turbine shutdown will be completed in 10.5 minutes. Because hours that include startup and shutdown events may have higher NO_x, CO, and VOC emissions than the normal operating condition with functioning SCR and CO catalyst, they were incorporated into the worst-case short- and long-term turbine emissions estimates in the model simulations pertaining to these pollutants (see Section 5.2.2.3, Air Dispersion Modeling).

TABLE 5.2-12
1-HOUR OPERATING EMISSION RATES FOR CTG OPERATING LOAD SCENARIOS

Load	Exhaust Flow (acfm)	Exit Velocity (m/s)	Exit Temp (°F)	NO_x Normal (lb/hr)	NO_x Uncontrolled (lb/hr)	CO Normal (lb/hr)	CO Uncontrolled (lb/hr)	SO_2 Normal (lb/hr)	SO_2 Uncontrolled (lb/hr)	VOC Normal (lb/hr)	VOC Uncontrolled (lb/hr)	PM_{10} Normal (lb/hr)	PM_{10} Uncontrolled (lb/hr)
100%													
114°F (cooler off)	816,088	28.96	817	7.20	80.6	10.46	183.1	1.14	1.14	2.0	3.0	6.0	6.0
114°F (cooler on)	854,672	30.33	801	7.63	85.4	11.23	196.6	1.2	1.2	2.67	3.2	6.0	6.0
63°F (cooler off)	888,554	31.53	787	8.03	89.9	11.81	206.6	1.27	1.27	2.2	3.3	6.0	6.0
17°F (cooler off)	873,723	31.01	741	7.79	87.2	11.45	200.4	1.23	1.23	2.43	5.1	6.0	6.0
75%													
114°F (cooler off)	721,939	25.62	800	6.12	68.5	8.86	155.1	0.99	0.99	1.80	2.7	6.0	6.0
63°F (cooler off)	746,033	26.48	766	6.32	70.8	9.22	161.4	1.03	1.03	1.93	2.9	6.0	6.0
17°F (cooler off)	737,502	26.17	746	6.19	69.3	9.02	157.9	1.01	1.01	2.05	4.3	6.0	6.0
50%													
114°F (cooler off)	578,809	20.54	804	4.49	50.3	6.47	113.3	0.75	0.75	1.1	1.1	6.0	6.0
63°F (cooler off)	598,001	21.22	783	4.57	51.2	6.81	119.1	0.78	0.78	0.92	1.1	6.0	6.0
17°F (cooler off)	591,948	21.01	765	4.61	51.6	6.63	116.1	0.77	0.77	1.53	2.3	6.0	6.0

Notes:
Maintenance rates are uncontrolled emission rates.
ºF = degrees Fahrenheit
% = percent
acfm = actual cubic feet per minute
CO = carbon monoxide
CTG = combustion turbine generator
lb/hr = pounds per hour
m/s = meters per second
NO_x = oxide(s) of nitrogen
PM_{10} = particulate matter less than 10 microns in diameter
VOC = volatile organic compounds
SO_2 = sulfur dioxide

TABLE 5.2-13
CRITERIA POLLUTANT EMISSIONS FOR EACH CTG DURING STARTUP AND SHUTDOWN

	Startup/Warmup 10 minutes/20 minutes		Shutdown 10.5 minutes
Pollutant	**Startup Total lb per Event**	**Warmup Total lb per Event**	**Total lb per Event**
NO_x	5.0	17.2	6.0
CO	14.0	39.3	47.0
VOC	3.0	0.8	3.0
SO_2	0.04	0.24	0.05
PM_{10}	1.0	2.0	1.05

Notes:
CO = carbon monoxide
CTG = combustion turbine generator
lb = pounds
NO_x = oxide(s) of nitrogen
PM_{10} = particulate matter less than 10 microns in diameter
VOC = volatile organic compounds
SO_2 = sulfur dioxide

Table 5.2-14, Criteria Pollutant Sources and Emission Totals for the Worst-Case Plant-Wide Emissions Scenarios Corresponding to all Averaging Times, shows the equipment operations and pollutant emissions used to develop the worst-case emissions scenarios for each averaging time and pollutant combination addressed in the AAQS. Notes on the selection of these scenarios and the resulting emission calculations are provided below.

SO_2 emission rates were calculated assuming that 100 percent conversion of the fuel sulfur to SO_2. The maximum gas turbine SO_2 emission rates for the 1-hour, 3-hour, and 24-hour averaging periods were conservatively calculated assuming a fuel sulfur concentration of 0.50 grains per 100 standard cubic feet of natural gas. The annual time period assumed a fuel sulfur concentration of 0.32 grains per 100 standard cubic feet of natural gas. Diesel fuel sulfur content of 15 ppm was used for the diesel firewater pump engine emission calculations.

TABLE 5.2-14
CRITERIA POLLUTANT SOURCES AND EMISSION TOTALS FOR THE WORST-CASE PLANT-WIDE EMISSIONS SCENARIOS CORRESPONDING TO ALL AVERAGING TIMES

Averaging Time	Operating Equipment	Pollutant	Sources: Turbines 1&2	Sources: Diesel Fire Pump	Sources: Cooling Tower
			Emissions in lbs – Entire Period		
1-hour	Two turbines operating at highest commissioning rate, except for SO_2 which uses normal operating load for all.	NO_x	374	1.38	-
		CO	619.5	0.23	-
		SO_2	2.54	0.0023	-
3-hour	All turbines operating at normal operating loads.	SO_2	7.62	0.0023	-
8-hour	All turbines operating 8 hours at highest commissioning rates.	CO	4,956	0.23	-
24-hour	For PM_{10}, turbines operate with 3 startups, 3 shutdowns, and remaining time at normal operating load, plus cooling tower and 1 hour of fire pump. For SO_2, turbines operate at normal operating load.	PM_{10}	288	0.05	0.4224
		SO_2	60.96	0.0023	-
Annual	Turbines operate for 5,000 total hours which include 365 startups, 365 shutdowns and 4,754 hour at normal operating loads. Cooling Tower operates 5,000 hours and fire pump operates 52 hours (1 hour per week).	NO_x	96,898.6	71.54	-
		PM_{10}	60,000	2.75	88.1
		SO_2	7,963.8	0.12	-

Notes:
CO = carbon monoxide
lbs = pounds
NO_x = oxide(s) of nitrogen
PM_{10} = particulate matter less than 10 microns in diameter
SO_2 = sulfur dioxide

Worst-case 1-hour NO_x and CO emission rates for the two turbines correspond to commissioning operations (i.e., operation without the benefit of SCR and CO catalyst emissions controls). Short-term (1-hour, 3-hour) turbine SO_2 emission rates are the same for normal operations because SO_2 is solely a function of fuel consumption rate and is unaffected by the post-combustion controls. CO is the only criteria pollutant with an AAQS for the 8-hour averaging time. The maximum 8-hour emission scenario used for modeling consists of both turbines at the highest commissioning emission rate.

The scenario selected to represent a conservative maximum potential 24-hour average emission rate for PM assumes three startups and three shutdowns for both turbines, with the remainder of the day in normal full-load operating mode. The scenario selected to represent a conservative maximum potential 24-hour average emission rate for SO_2 assumes a normal full-load operating mode.

Annual emissions of all pollutants were calculated for each turbine assuming total operations of 5,000 hours, including 365 startups and shutdowns. Estimated maximum annual emissions for the project are presented in Table 5.2-15, Annual BEC Operational Emissions of Criteria Pollutants.

TABLE 5.2-15
ANNUAL BEC OPERATIONAL EMISSIONS OF CRITERIA POLLUTANTS

Pollutant	Emissions (tons/year)[1,2]
SO_2	3.98
NO_x	48.49
VOC	15.17
PM_{10}[3]	30.05
CO	92.74
Pb	Negligible[4]

Notes:
1 Includes emissions from two turbines, cooling tower, and 52 hours per year testing of the emergency diesel fire pump driver.
2 Turbine emissions based on 365 startups and shutdowns and 4,754 hours of normal full-load operations for each turbine.
3 PM_{10} emissions include both filterable (front-half) and condensable (back-half) particulates.
4 Lead emissions are 'non-detect' from AP-42 for natural gas-fired combustion turbines, and the diesel fire pump will operate no more than 52 hours per year.
CO = carbon monoxide
NO_x = oxide(s) of nitrogen
Pb = lead
PM_{10} = particulate matter less than 10 microns in diameter
VOC = volatile organic compounds
SO_2 = sulfur dioxide

Turbine Commissioning

The commissioning of the General Electric (GE) model LMS100 natural gas turbines will entail several relatively short periods of operation prior to and during installation and testing of the SCR and CO catalyst systems. During these test periods, emissions of NO_x and CO will be higher than the normal operating emissions scenarios previously discussed because these controls will be either partially or completely inoperative.

Turbine commissioning activities can be broken down into six separate test periods as described below. The first four tests occur prior to SCR system and oxidation catalyst installation, when the combustor is being tuned (mapping). For this testing phase, NO_x emissions will be higher because the NO_x emissions control system will not be functioning and because the combustor burners will not be tuned for optimum performance. The next test occurs when the combustor has been tuned but the SCR and oxidation catalyst installation is not complete, and other parts of the turbine operating system are being checked out. Because the control system installation will not be complete, NO_x and CO emissions would again be higher than for normal operations. The final test occurs with the SCR and oxidation catalysts fully operational; however, the potential for elevated NO_x and CO emissions remains during parts of this test as well.

Commissioning activities and expected emissions are discussed in more detail below. At the conclusion of the commissioning period, operational emissions rates will be at the controlled rates discussed previously in this section. The required continuous emissions monitoring system (CEMS) for NO_x and CO will be operable during the commissioning period to document actual emissions during this period.

Based on information provided by GE, the six specific commissioning tests for each LMS100 turbine are likely to include:

- First Fire (operate unit at synchronous idle and perform a system check – 28 hours)
- Controlled Break-in (synchronize unit to the electrical grid and operate the unit at 5 percent load to test the voltage regulator – 20 hours)
- Dynamic automatic voltage regulation (AVR) and Water Injection (operate unit at several points over entire load range for dynamic commissioning of the voltage regulator and commissioning of the NO_x water injection system – 24 hours)
- Base Load AVR (base load AVR commissioning of the unit – 16 hours)
- SCR Commissioning (unit operation to adjust SCR control – 24 hours)
- Full Load Testing (operate the unit at full load for performance and emission tests – 24 hours)

During the commissioning tests, the worst-case NO_x and CO emission rates for each turbine are expected to be 187.0 pounds (lb)/hour and 309.75 lb/hour, respectively. Actual test durations will vary, but total commissioning emissions for each turbine are not expected to exceed totals based on these worst-case hourly rates over 136 hours of testing for each turbine (i.e., 18,819 lb of NO_x and 23,022 lb of CO). In all likelihood, the commissioning of individual turbines will take place sequentially, but in order to represent a true worst-case emission scenario, dispersion modeling for the 1-hour and 8-hour averaging periods assumed continuous emissions of NO_x and CO at the highest rates predicted to occur throughout the entire commissioning effort.

Appendix I, Air Quality Data, presents supporting technical information and calculation spreadsheets used to develop emissions data for the various scenarios of the operational project.

5.2.2.3 Air Dispersion Modeling

The purpose of the air dispersion modeling analysis is to demonstrate that criteria air pollutant emissions from the project would not cause or contribute significantly to a violation of a state or national ambient air quality standard. Potential impacts of noncriteria pollutant emissions from the project are evaluated in Section 5.16, Public Health. The criteria pollutant modeling addresses emissions from both construction activities and the facility operations that will occur after construction. Impacts from construction activities include fugitive dust from grading and excavating disturbed areas and emissions associated with exhaust combustion products from diesel- and gasoline-fueled construction equipment. The impacts from operations are associated with natural gas combustion in the two turbines, as well as diesel fuel combustion during tests of the emergency fire pump engine and particulate emissions contained in drift from the cooling tower. A fumigation modeling analysis was also performed to predict maximum ground-level

concentrations from facility operations under specialized meteorological conditions that may produce short-term elevated ground-level pollutant concentrations.

Separate modeling analyses were performed for the construction and operational emissions associated with the project because these activities would occur during different time periods. The air quality modeling methodology used for the project was previously described in a modeling protocol submitted to CEC and SJVAPCD (URS 2006). See Appendix I, Air Quality Data, for a copy of the protocol. The modeling approaches used to assess various aspects of the project's potential impacts to air quality are discussed below.

Model and Model Option Selections

The modeling was conducted using USEPA Industrial Source Complex model (ISC3) with Building Profile Input Program (BPIP) Prime (Version 04269) to evaluate maximum potential air quality impacts from the project's construction and operational emissions (USEPA 1995a). Staff of SJVAPCD were consulted regarding model selection and stated that ISC3 is acceptable for evaluating the air quality impacts of this project (SJVAPCD 2006). ISC3 has the ability to assess dispersion of emission plumes from multiple point, area or volume sources in flat, simple, and complex terrain, and to utilize sequential hourly meteorological input data. The short-term version of the model was used for modeling concentrations of pollutants having short-term (i.e., 1-, 3-, 8-, and 24-hour) ambient standards. Modeling for pollutants governed by annual AAQS (i.e., NO_2, SO_2, and PM_{10}), modeling was conducted using ISC3 with the PERIOD option to predict annual average impacts. The ISC3 model was run with the following additional user input specifications:

- Final plume rise
- Stack-tip downwash
- Buoyancy-induced dispersion
- Calms processing
- Default wind profile exponents
- Default vertical potential temperature gradients
- Rural dispersion coefficients

Review of aerial photographs and U.S. Geological Survey (USGS) topographic maps indicate that the area surrounding the project out to a distance of 3 kilometers is approximately 56 percent rural; therefore, rural dispersion coefficients were used in the modeling analyses for this project. An Auer Land Use map is presented as Figure 5.2-3, Auer Land Use Classification within 3 Kilometers of BEC.

Building Wake Effects

The effect of building wakes (i.e., downwash) on the stack plumes was evaluated for the turbines and emergency diesel firewater pump emissions (downwash is not applicable to area and volume sources; e.g., construction emissions) in accordance with USEPA guidance (USEPA 1985). Data on the buildings within the project site that could potentially cause plume downwash effects for

the project stacks were determined for different wind directions using the USEPA BPIP-Prime (Version 98086) (USEPA 1995b). Fourteen structures and two water tanks were identified in the project layout to be included in the downwash analysis, including the following:

- Raw-water tank
- Demineralized water tank
- Turbine variable bleed valve silencer stack 1
- Turbine variable bleed valve silencer stack 2
- Combustion turbine (CT) air inlet 1
- CT air inlet 2
- SCR 1
- SCR 2
- CT 1
- CT 2
- Cooling tower
- Water treatment building 1
- Water treatment building 2
- Warehouse
- Administration building
- Fire pump building

The results of the BPIP-Prime analysis were included in the ISC3 input files to enable downwash effects to be simulated. The ISC3 model considers direction-specific downwash using both the Huber-Snyder and Schulman-Scire algorithms, as evaluated in the BPIP-Prime program. I/O electronic files for the BPIP-Prime analysis are included with those from all other dispersion modeling analyses on the compact disks that are being submitted to accompany this Application.

Meteorological Data

The modeling analyses for the project used a 5-year record of hourly meteorological data collected at the nearest long-term meteorological station to the project site, the Fresno Yosemite International Airport (also known as the Fresno Air Terminal). The Fresno Yosemite International Airport is located approximately 10.5 miles (17 kilometers) southeast of the project site, and is the closest full-time meteorological station to the project site that provides data suitable for modeling. Hourly meteorological data from 1987 through 1991 were selected as the five consecutive years with the highest data capture currently available for this station (greater than 90 percent) for all years.

The meteorological data used in this analysis were recommended for this Application by staff of the SVJAPCD (SJVAPCD 2006) and were downloaded from the District's Web site. The proximity of the Fresno Yosemite International Airport to the project site, the terrain and land

use similarities throughout this part of the San Joaquin Valley, and the lack of significant intervening terrain features between the airport and the site suggest that the selected meteorological data are reasonably representative of conditions at the BEC site.

As discussed briefly in Section 5.2.1, Affected Environment, the topography of the San Joaquin Valley area is a wide, relatively flat valley with terrain elevations above sea level. The Diablo Range Mountains provide the terrain boundaries of the valley to the west and southwest, and the Sierra Nevada Mountain range bounds the entire valley on the east side. The California inland valley is a long valley that extends from Redding in the northern portion of California (called the Sacramento Valley north of Stockton) to Bakersfield in the south (San Joaquin Valley south of Stockton). The San Joaquin Valley is approximately 50 miles (80 kilometers) across at the northern edge near Stockton and expands to more than 65 miles (104 kilometers) wide near Visalia and is only about 20 miles (32 kilometers) wide near Bakersfield. The project site is located in the eastern portion of the Valley approximately 20 miles (32 kilometers) west of the foothills of the Sierra Madre Mountains. The Fresno Yosemite International Airport is also located in the eastern central portion of the valley, approximately 10.5 miles (17 kilometers) southeast of the project.

The terrain immediately surrounding the project site can be categorized as flat, or gradually sloping farm lands, and light commercial areas, with residential population encroaching from the east. The terrain around the Fresno Yosemite International Airport is also flat and the area outside the City of Fresno urban area is flat irrigated farmlands. Additionally, there are no significant terrain features in the area between the airport and BEC site that would result in important differences in wind or temperature conditions between the two areas. Therefore, the 5 years of meteorological data selected from the Fresno Yosemite International Airport were determined to be representative for the project.

The upper air meteorological data used in the modeling analysis reflect atmospheric soundings conducted over the same five-year period in Oakland, California, approximately 110 miles (177 kilometers) northwest of BEC. This is the closest National Weather Service data and is appropriate for use in all of central and northern California for modeling purposes.

Receptor Locations

Receptors for the criteria pollutant modeling of the refined operations analysis were placed at off-property locations to evaluate the impacts of the project (see Figure 5.2-4, Near-Field Model Receptor Grid, and Figure 5.2-5, Far-Field Model Receptor Grid). Receptor spacing varies according to distance from the project property boundary. To ensure that the locations of highest potential impact were identified, the receptor spacing was closest at the project property boundary and increased with distance from the boundary. Receptors were placed as far as 6 miles (10 kilometers) from the property boundary. The following receptor spacing was used in the refined modeling analysis:

- 82-foot (25-meter spacing extending around the property boundary and out to 3,280 feet (1,000 meters) beyond the boundary
- 328-foot (100-meter) spacing between 3,280 feet (1,000 meter) and 3 miles (5 kilometers) of the property boundary

- 820-foot (250-meter) spacing between 3 miles (5 kilometers) and 6 miles (10 kilometers) of the property boundary

If a maximum predicted concentration value was located in the portions of the receptor field with 328-foot (100-meter) or 820-foot (250-meter) spacing, the model was rerun using a dense receptor grid that was placed around the initial maximum concentration point. This dense receptor grid utilized 82-foot (25-meter) spacing and extended 1,640 feet (500 meters) in all directions from the point of initial point maximum concentration.

The receptor grid used in the screening modeling to determine the CTG operating scenario corresponding to the maximum incremental ground-level impacts and in the construction modeling is listed below:

- 82-foot (25-meter) spacing extending around the property boundary and out to 328 feet (100 meters) beyond the property line
- 328-foot (100-meter) spacing within 0.62 mile (1 kilometers) of project sources for any locations not covered by the 82-foot (25-meter) grid
- 1,640-foot (500-meter) spacing within 0.62 to 3 miles (1 to 5 kilometers) of project sources
- 3,280-foot (1,000-meter) spacing within 3 to 6 miles (5 to 10 kilometers) of project sources

The receptor locations were designated using Universal Transverse Mercator (UTM) coordinates (North American Datum [NAD] 27). Receptor elevations were obtained from the USGS 7.5-minute electronic terrain data.

Construction Impacts Modeling

Section 5.2.2.1, Construction Emissions, describes the development of project construction emissions estimates. Since construction equipment and operations will move continuously around the site during working hours, the corresponding emissions were represented as composite volume sources for combustion emissions and area sources for fugitive dust emissions for purposes of the dispersion modeling, rather than as point sources at fixed locations. To assess impacts from fugitive dust, the facility site and the laydown site were modeled as a single area source of 24 acres (this is larger than the actual 21.5 acre combined plant site and construction laydown area), since the main site area and the laydown site lie adjacent to each other. Small area sources for the natural gas pipeline (to the west) and the sewer line (to the east) were also created to represent fugitive dust impacts from those sources. There is also a small area where a water line will be expanded, but this area is located in the same area as the sewer line expansion. Thus, no emissions from the water line were included in the construction modeling since no additional excavation or associated activities are assumed to occur. Based on information provided by the engineering design contractor, the peak month in terms of air pollutant emissions is expected to be the sixth month of building construction. Activities associated with the laydown area would have minimal equipment usage as activities would primarily include very short-term grading and parking for worker vehicles. The fuel combustion emissions were represented in the dispersion model simulations as three uniformly spaced volume sources on the main facility site. The same spatial distribution of emissions within the overall site area was assumed for purpose of modeling maximum daily and average annual impacts of the construction activities.

For the natural gas pipeline expansion and the sewer line expansion, the combustion emissions were represented as a series of area sources (45 for the gas line and 27 for the sewer line). The URBEMIS2002 model was used to estimate the emissions associated with the site grading and excavation activities for each of these expansion areas. The criteria pollutant emissions were appropriated to each source accordingly. The ISC3 modeling assumed the expansion of each line occurred during building activities.

Fugitive dust resulting from all construction activities in all areas on the project site was accounted for in the dispersion model as follows. The main facility site and the laydown site were modeled as a single area source of 24 acres (is larger than the actual 21.5 acre combined plant site and construction laydown area), since the areas lie adjacent to each other. The emissions resulting from the natural gas pipeline installation were modeled as 45 area sources to accurately represent the linear path it follows. The emissions resulting from the sewer line installation were modeled as 27 area sources to accurately represent the linear path it follows.

URBEMIS2002 calculations are based on the assumption that none of the phases would occur concurrently. In reality, it is possible that activities associated with the building and asphalt phases may overlap, however the equipment usage for all activities will not exceed that used during the sixth month.

The ozone limiting method (OLM) was employed to estimate maximum 1-hour NO_2 impacts from the construction activities only. Measured O_3 concentration data for the same hour corresponding to the highest modeled NO_x concentrations was used to estimate the atmospheric conversion of emitted NO to NO_2. Short-term and long-term impacts are further discussed in Section 5.2.2.4, Modeling Results – Compliance with Ambient Air Quality Standards.

Turbine Impact Screening Modeling

Screening modeling was performed to determine which turbine operating modes produced "worst-case" impacts (i.e., maximum ground-level concentrations for each pollutant and averaging time). The screening modeling used the ISC3 model with the BPIP-PRIME algorithm (Version 04269) as described in the previous subsections. Building wake information and a slightly smaller receptor grid were also used. All 5 years of meteorological data were used in the screening analysis. Meteorological data from 1989 produced the highest ground-level concentrations identified in the screening modeling for the 1-hour, 3-hour, 8-hour, and 24-hour averaging time periods. Meteorological data from 1990 produced the highest results for the annual averaging time period.

The ISC3 model simulated natural gas combustion emissions from two, 13.5-foot-diameter (4.11-m), 90-foot-tall (27.43-m) stacks. The stacks were modeled as point sources at their proposed locations and with the stack parameters shown in Table 5.2-12, 1-Hour Operating Emission Rates for CTG Operating Load Scenarios. Table 5.2-16, CTG Screening Model Results – All Scenarios, All Years ($\mu g/m^3$), presents the CT screening results for the different turbine operating loads and for each of the 5 years of meteorological input data. Information on hourly operating emission rates were supplied by the turbine vendor and are included in Appendix I, Air Quality Data.

TABLE 5.2-16
CTG SCREENING MODEL RESULTS – ALL SCENARIOS, ALL YEARS (µg/m^3)

Scenario			100% Load				75% Load			50% Load		
		Pollutant	114°F Cooler Off	114°F Cooler On	63°F	17°F	114°F	63°F	17°F	114°F	63°F	17°F
1987	1 hour	$NO_x/CO/SO_2$	2.37/3.49/0.38	2.51/ 3.70/0.40	2.64/ 3.89/0.42	2.57/ 3.77/0.41	2.50/ 3.63/0.41	2.58/ 3.77/0.42	2.53/ 3.69/0.41	1.91/2.76/0.32	1.95/2.90/0.33	1.96/2.82/0.33
	3 hour	SO_2	0.13	0.13	0.14	0.14	0.135	0.14	0.138	0.106	0.111	0.109
	8 hour	CO	0.58	0.62	0.65	0.63	0.49	0.51	0.50	0.415	0.38	0.426
	24 hour	PM_{10}/SO_2	0.10/0.0.19	0.10/0.02	0.09/0.019	0.10/0.021	0.117/0.019	0.116/0.02	0.118/0.02	0.14/0.018	0.14/0.018	0.14/0.018
	Annual	$NO_x/PM_{10}/SO_2$	0.016/0.013/0.003	0.016/0.013/0.003	0.017/0.012/0.003	0.017/0.013/0.003	0.016/0.015/0.003	0.016/0.015/0.003	0.016/0.016/0.003	0.015/0.02/0.002	0.015/0.019/0.002	0.015/0.02/0.003
1988	1 hour	$NO_x/CO/SO_2$	2.41/ 3.50/0.38	2.53/ 3.72/0.40	2.66/ 3.91/0.42	2.58/ 3.80/0.41	2.05/ 2.97/0.33	2.12/ 3.09/0.35	2.08/ 3.03/0.34	1.56/2.24/0.026	1.59/2.36/0.27	1.60/2.30/0.27
	3 hour	SO_2	0.14	0.15	0.16	0.16	0.126	0.131	0.128	0.097	0.101	0.10
	8 hour	CO	0.58	0.53	0.56	0.54	0.495	0.515	0.504	0.426	0.446	0.436
	24 hour	PM_{10}/SO_2	0.10/0.018	0.10/0.019	0.10/0.02	0.10/0.019	0.106/0.018	0.105/0.018	0.107/0.018	0.125/0.016	0.123/0.016	0.125/0.016
	Annual	$NO_x/PM_{10}/SO_2$	0.019/0.016/0.003	0.019/0.015/0.003	0.02/0.015/0.003	0.02/0.015/0.003	0.018/0.018/0.003	0.019/0.018/0.003	0.019/0.018/0.003	0.017/0.023/0.003	0.017/0.022/0.003	0.018/0.023/0.003
1989	1 hour	$NO_x/CO/SO_2$	2.75/ 3.99/0.44	2.91/ 4.28/0.46	3.06/ 4.50/0.48	2.97/ 4.37/0.47	2.34/ 2.97/0.38	2.41/ 3.52/0.39	2.36/ 3.45/0.39	2.08/3.00/0.35	2.12/3.16/0.36	2.14/3.08/0.36
	3 hour	SO_2	0.145	0.153	0.161	0.156	0.126	0.131	0.129	0.116	0.121	0.119
	8 hour	CO	0.50	0.54	0.56	0.55	0.495	0.781	0.766	0.692	0.728	0.709
	24 hour	PM_{10}/SO_2	0.11/0.021	0.11/0.022	0.11/0.023	0.11/0.022	0.155/0.026	0.155/0.027	0.155/0.026	0.195/0.024	0.195/0.025	0.195/0.025
	Annual	$NO_x/PM_{10}/SO_2$	0.021/0.018/0.003	0.022/0.017/0.003	0.022/0.016/0.003	0.022/0.017/0.004	0.021/0.021/0.003	0.022/0.02/0.004	0.022/0.021/0.004	0.02/0.027/0.003	0.02/0.026/0.003	0.02/0.027/0.003
1990	1 hour	$NO_x/CO/SO_2$	2.74/3.98/0.43	2.91/4.28/0.46	2.91/4.29/0.46	2.97/4.36/0.47	2.63/3.80/0.43	2.71/3.96/0.44	2.66/3.87/0.43	2.01/2.89/0.34	2.04/3.04/0.35	2.06/2.96/0.34
	3 hour	SO_2	0.15	0.15	0.16	0.16	0.142	0.147	0.145	0.112	0.116	0.115
	8 hour	CO	0.66	0.67	0.69	0.68	0.558	0.581	0.568	0.411	0.432	0.421
	24 hour	PM_{10}/SO_2	0.108/0.021	0.102/0.02	0.101/0.021	0.102/0.021	0.115/0.019	0.114/0.020	0.116/0.019	0.15/0.019	0.15/0.019	0.15/0.019
	Annual	$NO_x/PM_{10}/SO_2$	0.025/0.021/0.004	0.025/0.02/0.004	0.025/0.019/0.004	0.026/0.02/0.004	0.025/0.024/0.004	0.025/0.024/0.004	0.025/0.025/0.004	0.024/0.032/0.004	0.024/0.031/0.004	0.024/0.032/0.004
1991	1 hour	$NO_x/CO/SO_2$	2.58/3.75/0.41	2.73/4.02/0.43	2.84/4.18/0.45	2.79/4.10/0.44	2.54/3.68/0.41	2.62/3.83/0.43	2.57/3.74/0.42	2.21/3.18/0.37	2.25/3.35/0.38	2.27/3.26/0.38
	3 hour	SO_2	0.14	0.14	0.15	0.15	0.137	0.142	0.14	0.137	0.141	0.14
	8 hour	CO	0.55	0.58	0.61	0.60	0.617	0.641	0.628	0.471	0.496	0.483
	24 hour	PM_{10}/SO_2	0.10/0.018	0.09/0.019	0.09/0.02	0.09/0.019	0.114/0.019	0.114/0.02	0.114/0.019	0.144/0.018	0.143/0.019	0.144/0.018
	Annual	$NO_x/PM_{10}/SO_2$	0.02/0.02/0.003	0.02/0.02/0.003	0.02/0.02/0.004	0.02/0.02/0.004	0.022/0.021/0.004	0.022/0.021/0.004	0.022/0.022/0.004	0.021/0.029/0.004	0.021/0.028/0.004	0.022/0.029/0.004

Notes:
µg/m^3 = micrograms per cubic meter
°F = degrees Fahrenheit
% = percent
CO = carbon monoxide
CTG = combustion turbine generators
NO_x = oxides of nitrogen
NO_2 = nitrogen dioxide
PM_{10} = particulate matter less than 10 microns in diameter
SO_2 = sulfur dioxide

The screening modeling results shown in Table 5.2-16, CTG Screening Model Results – All Scenarios, All Years (µg/m^3), were used to identify the turbine stack parameters that led to the highest predicted ground-level concentration per pound of pollutant emitted for each averaging time. The resulting worst-case turbine operating conditions are summarized in Table 5.2-17, Natural Gas Turbine Stack Parameters Corresponding to Maximum Predicted Ground Level Pollutant Concentrations.

TABLE 5.2-17
NATURAL GAS TURBINE STACK PARAMETERS CORRESPONDING TO MAXIMUM PREDICTED GROUND-LEVEL POLLUTANT CONCENTRATIONS

Pollutant	Averaging Time	Operating Condition
NO_2	1 hour	100 percent load, 63°F, year 1989
	Annual	100 percent load, 17°F, year 1990
CO	1 hour	100 percent load, 63°F, year 1989
	8 hour	75 percent load, 63°F, year 1989
SO_2	1 hour	100 percent load, 63°F, year 1989
	3 hour	100 percent load, 63°F, year 1989
	24 hour	75 percent load, 63°F, year 1989
	Annual	75 percent load, 17°F, year 1990
PM_{10}	24 hour	50 percent load, 17°F, year 1989
	Annual	50 percent load, 17°F, year 1990

Notes:
°F = degrees Fahrenheit
CO = carbon monoxide
NO_2 = nitrogen dioxide
PM_{10} = particulate matter less than 10 microns in diameter
SO_2 = sulfur dioxide

In all subsequent modeling analyses, emissions from the two natural gas turbines were modeled using the stack parameters of the worst-case operating scenarios discussed above. However, the highest pollutant emission rates were assumed in the modeling analyses. This assumption may include commissioning scenarios or 100 percent operating load scenarios.

Refined Modeling

A refined modeling analysis was performed to estimate off-site criteria pollutant impacts from operational emissions of the project. The modeling was performed according to the methodology described in the previous sections using a 5-year record of hourly meteorological data. The turbines were modeled at the worst-case emissions and operating conditions determined in the screening analysis. Emissions from the cooling tower and emergency diesel firewater pump were also included in this analysis. Emission rates and modeling parameters used for the cooling tower and diesel firewater pump are included in Appendix I, Air Quality Data.

Fumigation Analysis

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

A fumigation analysis was performed using the USEPA model SCREEN3 (Version 96043). The SCREEN3 model was used to calculate concentrations from inversion breakup fumigation; no shoreline fumigation was performed for the project site. A unit emission rate was used (1 gram per second [g/s]) in the fumigation modeling to represent the plant emissions and the model results were given in terms of predicted maximum concentrations that were then scaled to reflect plant emissions for each pollutant. Inversion breakup fumigation concentrations were calculated for hourly and 3-hour averaging times using USEPA-approved conversion factors. These multiple-hour model predictions are very conservative since inversion breakup fumigation is a transitory condition that would most likely affect a given plume for only a few minutes at a time. I/O electronic files for the fumigation modeling analysis are included in the modeling compact disks (CDs) submitted with this Application.

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 Dispersion Modeling, to evaluate the maximum increase in ground-level pollutant concentrations resulting from the project emissions, and to compare the maximum predicted impacts, including background pollutant levels, with applicable short-term and long-term NAAQS. The impacts from construction activities and plant operations were analyzed separately because they will occur during different time periods. The same 5-year record of hourly meteorological data described in Section 5.2.2.3 was used in the modeling to evaluate both construction and operational impacts. In each case, the ISC3 model predicted the increases in criteria pollutant concentrations at all receptor locations due to project emissions only. Next, the maximum incremental increases for each pollutant and averaging time were added to the maximum background concentrations, based on air quality data collected at the most representative monitoring stations during the past 5 years (i.e., 2001 through 2005). These background concentrations are presented and discussed in Section 5.2.1.2, Existing Air Quality. The resulting total pollutant concentrations were then compared with the most stringent CAAQS or NAAQS. Modeled criteria pollutant impacts for the construction and operational phases of the project are summarized in Table 5.2-18, ISC3 Modeling Results.

TABLE 5.2-18
ISC3 MODELING RESULTS

Pollutant	Averaging Period	Maximum Modeled Impact ($\mu g/m^3$)	Background[1] ($\mu g/m^3$)	Maximum Total Predicted Concentration ($\mu g/m^3$)	PSD SIL[2] ($\mu g/m^3$)	Most Stringent AAQS ($\mu g/m^3$)	UTM Coordinates East (m)	UTM Coordinates North (m)
Construction Impacts								
CO	1 hour	2,161	7,705	9,866	NA	23,000	242,600	4,078,000
	8 hour	730	5,156	5,886	NA	10,000	242,500	4,078,100
NO_2	1 hour[3]	334.9	112.8	447.7	NA	470	241,625	4,078875
	Annual	67.97	22.64	90.61	NA	100	241,527	4,078,680
PM_{10}	24 hour	2.33	193.0 [4]	195.3	NA	50	242,600	4,078,000
	Annual	0.47	43.0 [4]	43.47	NA	20	242,500	4,078,100
SO_2	1 hour	2.59E-03	23.6	23.6	NA	655	241,625	4,078,875
	3 hour	1.29E-03	15.6	15.6	NA	1,300	241,600	4,078,700
	24 hour	2.20E-04	10.5	10.5	NA	105	241,495	4,078,644
	Annual	6.00E-05	5.3	5.3	NA	80	241,527	4,078,679
Routine Plant Operation Impacts								
CO	1 hour[5]	156.10	7,705	7,861	2,000	23,000	241,600	4,077,800
	8 hour[6]	33.14	5,156	5,189	500	10,000	241,400	4,077,900
NO_2	1 hour[7]	164.41	112.8	277.2	NA	470	241,575	4,078,700
	1 hour (normal)	164.41	112.8	277.2	NA	470	241,575	4,078,700
	Annual[8]	0.05	22.64	22.69	1	100	241,700	4,078,725
PM_{10}	24 hour[9]	0.20	193.0[4]	193.2	5	50	241,400	4,077,800
	Annual[8]	0.05	43.0[4]	43.05	1	20	241,700	4,078,725
$PM_{2.5}$	24 hour[9,10]	0.20	110.0[4]	110.2	NA	65	241,400	4,077,800
	Annual[8,10]	0.05	21.6[4]	21.65	NA	12	241,700	4,078,725

TABLE 5.2-18
ISC3 MODELING RESULTS

Pollutant	Averaging Period	Maximum Modeled Impact ($\mu g/m^3$)	Background[1] ($\mu g/m^3$)	Maximum Total Predicted Concentration ($\mu g/m^3$)	PSD SIL[2] ($\mu g/m^3$)	Most Stringent AAQS ($\mu g/m^3$)	UTM Coordinates East (m)	UTM Coordinates North (m)
SO_2	1 hour[7]	0.49	23.6	24.08	NA	655	241,550	4,077,850
	3 hour[11]	0.16	15.6	16.76	25	1,300	241,600	4,077,800
	24 hour[9]	0.03	10.5	10.53	5	105	241,400	4,077,900
	Annual[8]	0.002	5.3	5.302	1	80	247,275	4,073,925

Notes:
1 Background represents the maximum values measured at Fresno First St. (CO, PM_{10}, $PM_{2.5}$), Madera Pump Yard (NO_2), or Fresno Fremont School (SO_2) monitoring stations, 2001-2005, depending on pollutant.
2 Source: 40 CFR 52.21.
3 Results for 1-hour NO_2 during construction used OLM to estimate NO_2 impacts.
4 PM_{10} and $PM_{2.5}$ background levels exceed ambient standards.
5 Maximum hourly impact based on two turbines with commissioning emissions using Case 109 stack parameters.
6 Maximum 8-hour impact based on two turbines operating for 8 hours under commissioning emission rate and Case 109 parameters.
7 Maximum hourly impact based on two turbines with commissioning emissions and 1 hour of diesel fire pump operation using Case 104 stack parameters. Note that maximum off-site concentration is dominated by the fire pump (for NO_2).
8 Annual impact based on 4,754 hours of normal operation, 365 startups, and 365 shutdowns for all turbines (total of 5,000 hours); 5,000 hours of cooling tower operation, and 52 hours of diesel fire pump engine operation.
9 Maximum 24-hour impact based on three startups, three shutdowns, and remainder of period at normal operations for both turbines and 1 hour of diesel fire pump operation.
10 All operational project equipment PM_{10} emissions assumed to be $PM_{2.5}$.
11 Maximum 3-hour impact based on 3 hours of normal operation for two turbines and 1 hour of diesel fire pump operation.

$\mu g/m^3$ = micrograms per cubic meter
AAQS = Ambient Air Quality Standard
CO = carbon monoxide
ISC3 = USEPA Industrial Source Complex model
m = meters
NA = Not applicable
NO_2 = nitrogen dioxide
OLM = ozone limiting method
PM_{10} = particulate matter less than or equal to 10 microns in diameter
$PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter. All p.m. emissions during operation assumed to be $PM_{2.5}$
PSD = Prevention of Significant Deterioration
SIL = significant impact level
SO_2 = sulfur dioxide
UTM = Universal Transverse Mercator

Construction Impacts

For the construction phase of the project, the predicted maximum short-term and long-term impacts for all pollutants were predicted to occur around the plant, with most peaks falling along the construction site boundary. This result reflects the relatively low source release heights that characterize construction equipment exhaust and dust-generating activities. Specifically, the predicted maximum annual impacts for NO_x, and all SO_2 impacts (except 1-hour) were predicted to occur along the southern boundary of the main construction site. The predicted maximum 1-hour impacts for NO_x and SO_2 were predicted to occur along the northeastern boundary of the main construction site, while the locations of maximum concentrations of PM_{10} and CO were on along the sewer line southeast of the main plant site.

The highest hourly NO_x concentrations predicted by the ISC3 model for each year of meteorological input data (1987 through 1991) plus the maximum background NO_2 values recorded at the Madera Pump Yard monitoring station in the past 5 years (2001 through 2005) were above the California 1-hour NO_2 standard. However, this result corresponds to an assumption of full conversion of NO to NO_2 in the emission plumes, which would not occur in the area around the project site. Therefore, the OLM was applied to the short-term NO_2 modeling results to provide a more reasonable characterization of plume chemistry in this area. O_3 data for the hour when the maximum NO_x concentration was predicted due to construction activities was obtained from the Sierra SkyPark monitoring station (hourly O_3 data from the Madera Pump Yard were not available for the hour of maximum modeled concentration). This O_3 concentration was used in the OLM calculation for the hourly NO_2 concentration.

When the OLM calculations were completed, the peak predicted NO_2 concentration due to project construction emissions, plus the highest recorded NO_2 background level at the Madera Pump Yard monitoring station from 2001 through 2005, resulted in a total concentration of 447.7 $\mu g/m^3$, which is below the 1-hour California standard (470 $\mu g/m^3$).

Normal Plant Operations

As described previously, the emissions used in the model simulations for the project operations were selected to ensure that the maximum potential impacts would be addressed for each pollutant and averaging time corresponding to an ambient air quality standard.

As shown in the lower part of Table 5.2-18, ISC3 Modeling Results, maximum modeled concentrations due to the operational plant are below the federal Prevention of Significant Deterioration (PSD) significant impact levels (SILs) for all criteria pollutants. Although the project emissions will be well below the levels that trigger PSD review (see Section 5.2.5.2, Prevention of Significant Deterioration Requirements), these SILs are often used as a measure of the potential impacts of proposed new sources in California.

Note that Table 5.2-18, ISC3 Modeling Results, lists two maximum values for the 1-hour NO_2 concentration. These include the highest impacts that could occur under the extreme worst-case NO_x emissions scenario during turbine commissioning as well as the highest potential value during normal plant operations with both turbines operating with functional control equipment, which is a more typical condition. The table shows that the modeled impacts due to normal operations of the project would not cause a violation of any NAAQS and would not significantly contribute to the existing violations of the federal and state PM_{10} standards. In addition, as

described later, all of the project's operational emission of nonattainment pollutants and their precursors, including $PM_{10,}$ will be offset to result in a net air quality benefit.

Fumigation Impacts

Potential worst-case fumigation impacts were modeled according to the method described in Section 5.2.2.3, Air Dispersion Modeling. The screening modeling results obtained with a unit emission rate were multiplied by the actual turbine emission rate to obtain the 1-hour values presented below. The 1-hour values are multiplied by the USEPA conversion factor to obtain the 3-hour value. As shown in Table 5.2-19, Project Operations Fumigation Impact Summary, the resulting incremental concentration predictions for fumigation conditions are well below the modeled maximum operational impacts shown in the lower part of Table 5.2-18, ISC3 Modeling Results.

TABLE 5.2-19
PROJECT OPERATIONS FUMIGATION IMPACT SUMMARY

Pollutant	Source	Inversion Impact ($\mu g/m^3$)	Distance to Maximum Impact (meters)
NO_2 1 hour[1]	Normal operation turbine	0.94	13,109
CO 1 hour[2]	Normal operation turbine	1.38	13,109
SO_2 1 hour[3]	Normal operation turbine	0.16	13,109
SO_2 3 hour[4]	Normal operation turbine	0.14	13,109

Notes:
[1]NO_2 modeled with turbine in normal operation, 1.01 g/s emissions, and stack parameters for 50% load at 114°F (Case 103).
[2]CO modeled with turbine in normal operation, 0.835 g/s emissions, and stack parameters for 50% load at 114°F (Case 103).
[3]SO_2 modeled with turbine in normal operation, 0.097 g/s emissions, and stack parameters for 50% load at 114°F (Case 103).
[4]SO_2 1-hour results multiplied by 0.9 to convert to 3-hour.
ºF= Fahrenheit
% = percent
$\mu g/m^3$ = micrograms per cubic meter
CO = carbon monoxide
g/s = gram(s) per second
NO_2 = nitrogen dioxide
SO_2 = sulfur dioxide

Impacts for Nonattainment Pollutants and their Precursors

The emission offset program described in the SJVAPCD Rules and Regulations was developed to facilitate net air quality improvement when new sources locate within the district. Project impacts on the concentration levels of nonattainment pollutants (PM_{10} and O_3) and their precursors (SO_x, NO_x, and VOC) will be fully mitigated by emission offsets. The offsets have not been accounted for in the modeled impacts noted above. Thus, the impacts indicated in the foregoing presentation of model results for the project are significantly overestimated.

Turbine Commissioning

Each natural gas turbine of the project could be operated for up to 136 hours for purposes of commissioning the turbine and associated generating equipment. Emissions estimates for the six phases of commissioning described in Section 5.2.2.2, Operational Emissions, were provided by the turbine vendors and have been used to estimate maximum ground-level pollutant concentrations associated with these activities.

Maximum potential short-term (1-hour, 8-hour) impacts due to NO_x and CO emissions during commissioning were evaluated by dispersion modeling with the extremely conservative assumption that both turbines would be operating at the highest commissioning emission rates for a full 1-hour or 8-hour period. Specifically, the maximum 1-hour emission rates of 187.0 lb/hr/turbine (23.56 g/s/turbine) of NO_x and 309.75 lb/hr/turbine (39.03 g/s/turbine) of CO were predicted to result in maximum incremental hourly concentrations of 94.24 µg/m^3 NO_2 and 156.10 µg/m^3 CO, for all turbines combined.

Similarly, the assumed maximum 8-hour CO emission rate of 309.75 lb/hr resulted in a predicted maximum incremental 8-hour concentration during commissioning of 33.14 µg/m^3 for both turbines combined. In reality, commissioning for the turbines will mostly be staggered, so the likelihood of both turbines being run concurrently under these assumed maximum emission conditions is considered to be small, and actual short-term impacts to air quality during this project phase will be considerably lower than the values represented here.

Table 5.2-20, Project Commissioning Modeling Results for Turbines Only, shows that when these incremental commissioning impacts are added to applicable background concentrations and compared with the most stringent state or national ambient standards, no violations of the AAQS for these pollutants are predicted to occur.

TABLE 5.2-20
PROJECT COMMISSIONING MODELING RESULTS FOR TURBINES ONLY

Pollutant	Averaging Period	Maximum Modeled Impact (µg/m^3)	Background[1] (µg/m^3)	Total Predicted Concentration (µg/m^3)	Most Stringent Standard (µg/m^3)
Commissioning Impacts					
CO	1 hour	156.1	7,705	7,861.1	23,000
	8 hour	33.1	5,156	5,189.1	10,000
NO_2	1 hour	94.2	112.8	207.0	470

Notes:
[1] Background is the maximum value measured at Fresno First St. or Madera Pump Yard monitoring stations 2001-2005.
µg/m^3 = micrograms per cubic meter
CO = carbon monoxide
NO_2 = nitrogen dioxide

5.2.3 Cumulative Impacts Analysis

CEC requirements specify that an analysis is required to determine the cumulative impacts of the project and other projects within a 6-mile (3.7-kilometer) radius that have received construction

permits but are not yet operational or that are in the permitting process or can be expected to do so in the near future. Information requests have been made to SJVAPCD to obtain data on new projects planned within 6 miles (3.7 kilometers) from the site. The resulting list of projects will be submitted to the CEC for final determination of which new projects, if any, need to be evaluated by cumulative modeling. If additional dispersion modeling which includes nearby sources is required, it will be submitted as an addendum to this Application at a later date. Such a cumulative analysis would use the ISC3 model with the same 5-year meteorological input data set used for modeling BEC impacts. Decisions regarding which other sources to be included and the manner in which these sources will be represented for modeling will be made in consultation with CEC and SJVAPCD.

5.2.4 Mitigation Measures – Emissions Offsets

Section 4.5.3 of SJVAPCD Rule 2201 and CEC policy will require that project operational emissions above 10 tons per year (tpy) of NO_x or VOC, 100 tpy of CO, 14.6 tpy of PM_{10} and 27.375 tpy of SO_x be offset by emission reductions from other sources. Per Section 4.6.1 of this rule, offsets for CO are not required if it can be demonstrated by modeling that the project's emissions will not cause or contribute to violations of the ambient standards for that pollutant. Modeling results presented in Section 5.2.2.3, Air Dispersion Modeling, provide this demonstration for CO. Thus, offsets for this pollutant are not proposed.

Based on emissions data presented in Section 5.2.2.2, Operational Emissions, annual emissions of NO_x and VOC would exceed the offsets trigger of 10 tpy for the operating year of 5,000 hours per turbine and PM_{10} emissions would exceed the 14.6 tpy threshold for that pollutant. Emissions of SO_x would be less than half the SJVAPCD threshold of 27 tpy. According to Rule 2201 Section 4.7.2, offsets need to be provided for the quantity of emissions above the offsets thresholds described above. However, it is CEC established policy to require offsets for the full amounts of all nonattainment pollutants and their precursors. Accordingly, the applicant will commit to offsetting the full project emissions of NO_x, VOC, PM_{10}, and SO_2.

Bullard Energy Center LLC will purchase ERCs sufficient to comply with SJVAPCD and CEC requirements. Rule 2201 Section 4.8 specifies distance ratios that must be applied in determining the quantity of ERCs to be provided for a new source. If the location of the offsetting emission reduction is less than 15 miles (9.3 kilometers) from the new source, the ratio for a major source is 1.3 to 1. If the original location of the offsetting emission reduction is 15 miles (9.3 kilometers) or more from the new source, the applicable offset ratio is 1.5 to 1. Note that the BEC will be a major source as this term is defined in Section 3.24 of Rule 2201 (25 tpy of NO_x or VOC, 70 tons of PM_{10} or SO_2, 100 tpy of CO). However, this designation differs from the major source definition for the federal PSD program, which the project does not trigger.

Section 4.5.3 of Rule 2201 states that the required offset amounts for stationary sources that remain constant throughout the year are expressed in lbs/yr, whereas offsets for quarterly potential to emit that is not constant throughout the year and seasonal sources are calculated in lbs. per quarter. The expected distribution of turbine operating hours for the BEC among the quarters of the year will be as follows:

- First quarter 1,100 hours
- Second quarter 1,100 hours

- Third quarter 1,600 hours
- Fourth quarter 1,200 hours

The BEC will clearly not be a seasonal source (defined in Rule 2201 Section 3.35 as a source with more than 90 percent of annual emissions occurring within a consecutive 120-day period). However, since the quarterly potential to emit will not be constant throughout the year, emissions offsets for this facility will be calculated in lbs. per quarter.

Table 5.2-21, Estimated Emissions Offsets Requirements, lists the estimated offset requirements for the operational BEC. Annual project emissions from Table 5.2-15, Annual BEC Operational Emissions of Criteria Pollutants, have been apportioned among the four calendar quarters in proportion to the expected distribution of operating hours shown above. As discussed above, the quantity of credits needed to offset emissions for each pollutant will depend on the distance from the BEC at which the offsetting emission reductions occurred. The ERC requirements in Table 5.2-21, Estimated Emissions Offsets Requirements, are expressed as ranges, representing assumed distance factors of 1.3 to 1 and 1.5 to 1. Because of the rural character of the Central Valley site and the lack of significant emission sources near BEC, it is probable that the maximum distance ratio of 1.5 to 1 will be applicable for most of the credits used to offset project emissions. Note that no distance factor has been applied in calculating ERC requirements for SO_2. This reflects the CEC policy of allowing a 1 to 1 factor in the case of nonattainment or precursor pollutants for which the emissions of the new source will be below the local air district's emissions offsets thresholds.

Estimated emissions offset requirements are shown in Table 5.2-21. As of the date of this Application for Certification (AFC) submittal, BEC has entered into agreements with Certificate holders to meet all the SJVAPCD and CEC requirements. Table 5.2-22 lists each Certificate number, quantity, status of and transactions.

TABLE 5.2-21
ESTIMATED EMISSIONS OFFSETS REQUIREMENTS

Calendar Quarter	Project Emissions (tons)	ERCs Required (tons)[1,2]
NO_x		
First	10.67	13.871 – 16.005
Second	10.67	13.871 – 16.005
Third	15.52	20.176 – 23.280
Fourth	11.64	15.132 – 17.460
Max. Annual Total		72.750
VOC		
First	3.34	4.342 – 5.010
Second	3.34	4.342 – 5.010
Third	4.85	6.305 – 7.275
Fourth	3.64	4.732– 5.460
Max. Annual Total		22.755

TABLE 5.2-21
ESTIMATED EMISSIONS OFFSETS REQUIREMENTS

Calendar Quarter	Project Emissions (tons)	ERCs Required (tons)[1,2]
PM_{10}		
First	6.61	8.593 – 9.915
Second	6.61	8.593 – 9.915
Third	9.62	12.506 – 14.43
Fourth	7.21	9.373 – 10.815
Max. Annual Total		45.075
SO_x		
First	0.88	0.88
Second	0.88	0.88
Third	1.27	1.27
Fourth	0.96	0.96
Max. Annual Total		3.990

Notes:
[1] Quantity of ERCs required depends on distance factor applicable to individual emission reduction sources. Values shown here correspond to a range of distance factors from 1.3/1 to 1.5/1.
[2] No distance factor applied in calculating SO_2 ERC requirements because annual emissions for this pollutant will be below the SJVAPCD offset triggering threshold of 27.375 tons.

ERCs = emission reduction credits
NO_x = oxide(s) of nitrogen
PM_{10} = particulate matter less than 10 microns in diameter
SJVAPCD = San Joaquin Valley Unified Air Pollution Control District
SO_x = sulfur oxides
VOC = volatile organic compounds

TABLE 5.2-22
EMISSION REDUCTION CERTIFICATES

Cert. No.	Holder	Type	Annual	Reduction Mechanism	Status/Comment
Required		SO_x	3.990		
N-268-5	J R Simplot Company	SO_x	3.990	Modification to Sulfuric Acid Adsorption process	Agreement signed August 29, 2006
Required		PM_{10}	45.075		
N-268-5	J R Simplot Company	PM_{10}*	6.630	Modification to Sulfuric Acid Adsorption process	Agreement signed August 29, 2006
C-347-4	Calpine Corp.	PM_{10}**	38.442	Shutdown of vegetable oil mill	**Targeted Holding**
Required		VOC	22.755		
S-2333-1	Big West	VOC	22.755	Modify process to incinerate Coker exhaust in CO boiler	Agreement signed September 26, 2006
Required		NO_x	72.750		
S-2217-2	Complete Energy (LaPaloma)	NO_x	14.2805	Convert steam generators from oil/NG to NG only	Agreement signed October 26, 2006
S-2218-2	Complete Energy (LaPaloma)	NO_x	8.1395	Modify steam generators to fire on NG only (not oil)	Agreement signed October 26, 2006
S-2362-2	Panoche Energy Center, LLC	NO_x	50.779	Retrofit of stationary reciprocating engines with pre-combustion chambers	SJVAPCD issued Certificate on September 25, 2006

Notes:
All ERC values expressed in tons.
All ERC values assume that 1.5 distance ration applies.
*SOx used for PM_{10} inter-pollutant offset at 1.8 to 1 ratio.
**This Certificate has not been secured.

ERC = emission reduction credit
NO_x = oxides of nitrogen
PM_{10} = particulate matter less than 10 micrometers in diameter
SO_x = oxides of sulfur
SVVAPCD = San Joaquin Valley Unified Air Pollution Control District
TBD = to be determined
VOC = volatile organic compound

5.2.5 Laws, Ordinances, Regulations, and Standards

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

5.2.5.1 Ambient Air Quality Standards

In response to the federal Clean Air Act (CAA) of 1970, USEPA established NAAQS in 40 CFR Part 50. The 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 NAAQS. In addition to the NAAQS described above, a new federal standard for $PM_{2.5}$ and a revised O_3 standard were promulgated in July 1997. In 1988, as part of the California CAA, the State of California adopted the CAAQS that are in some cases more stringent than the NAAQS. The CAAQS and NAAQS are summarized in Table 5.2-23, National and California Ambient Air Quality Standard.

TABLE 5.2-23
NATIONAL AND CALIFORNIA AMBIENT AIR QUALITY STANDARDS

			NAAQS[2,3]	
Pollutant	**Averaging Time**	**CAAQS[1,2]**	**Primary**	**Secondary**
O_3	8 hour[4]	0.07 ppm (137 μg/m^3)	0.08 ppm (157 μg/m^3)	Same as primary standard
	1 hour	0.09 ppm (180 μg/m^3)	See footnote "4"	
CO	8 hour	9 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)	
	1 hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)	
NO_2[5]	Annual (arithmetic mean)		0.053 ppm (100 μg/m^3)	Same as primary standard
	1 hour	0.25 ppm (470 μg/m^3)		
SO_2	Annual (arithmetic mean)		0.03 ppm (80 μg/m^3)	
	24 hour	0.04 ppm (105 μg/m^3)	0.14 ppm (365 μg/m^3)	
	3 hour			0.05 ppm (1,300 μg/m^3)
	1 hour	0.25 ppm (655 μg/m^3)		

TABLE 5.2-23
NATIONAL AND CALIFORNIA AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Time	CAAQS[1,2]	NAAQS[2,3] Primary	NAAQS[2,3] Secondary
Respirable particulate matter (PM_{10})[6]	Annual (arithmetic mean)	20 μg/m^3	50 μg/m^3	Same as primary standard
	24 hour	50 μg/m^3	150 μg/m^3	
Fine particulate matter ($PM_{2.5}$)[6,7]	Annual (arithmetic mean)	12 μg/m^3	15 μg/m^3	Same as primary standard
	24 hour		65 μg/m^3	
Sulfates	24 hour	25 μg/m^3		
Visibility-reducing particles	1 observation	See footnote "8"	No federal standard	No federal standard

Notes:

[1] Title 17, California Code of Regulations, CAAQS for O_3, (as VOCs), CO, SO_2 (1-hour), NO_2, and PM_{10}, are values that are not to be exceeded. The visibility standard is not to be equaled or exceeded.

[2] Concentrations are expressed first in units in which they were promulgated. Equivalent units are given in parentheses and based on a reference temperature of 25°C and a reference pressure of 760 mm of mercury. All measurements of air quality area to be corrected to a reference temperature of 25°C and a reference pressure of 760 mm of mercury (1,013.2 millibar); ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of natural gas.

[3] 40 CFR 50. NAAQS, other than those for O_3 and based on annual averages, are not to be exceeded more than once a year. The 8-hour O_3 standard is based on a 3-year average of the fourth-highest daily maximum.

[4] New federal 8-hour O_3 and fine $PM_{2.5}$ standards were promulgated by USEPA on July 18, 1997. The federal 1-hour O_3 standard was revoked by USEPA on June 15, 2005. California 8-hour standard officially implemented May 17, 2006.

[5] NO_2 is the compound regulated as a criteria pollutant; however, emissions are usually based on the sum of all NO_x.

[6] CARB established new standards for PM_{10} and $PM_{2.5}$ in June 2002.

[7] Annual federal standard is 3-year average. The 24-hour federal standard is 3-year average of 98th percentile.

[8] In sufficient amount to reduce the prevailing visibility to less than 10 miles (6.2 kilometers) when the relative humidity is less than 70 percent. "Prevailing visibility" is defined as the greatest visibility which is attained or surpassed around at least half of the horizon circle, but not necessarily in continuous sectors.

μg/m^3 = micrograms per cubic meter
CAAQS = California Ambient Air Quality Standard
CO = carbon monoxide
mg/m^3 = milligrams per cubic meter
mm = millimeter(s)
NAAQS = National Ambient Air Quality Standard
NO_2 = nitrogen dioxide
NO_x = oxide(s) of nitrogen
O_3 = ozone
PM_{10} = particulate matter less than 10 microns in diameter
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter
ppm = parts per million
SO_2 = sulfur dioxide
VOC = volatile organic compound

USEPA, CARB, and the local air pollution control districts determine the air quality attainment status of areas within the state by comparing ambient air quality measurements from the state or local agency ambient air monitoring stations with the national and California AAQS. Those areas that meet AAQS 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. Fresno County has been designated as a federal and state nonattainment area for O_3, $PM_{2.5}$, and PM_{10}. The District's status for all other criteria pollutants is considered to be attainment or unclassified. Table 5.2-24, Federal and State Attainment Status for Fresno County, presents the county's attainment status with respect to both the national and California AAQS.

TABLE 5.2-24
FEDERAL AND STATE ATTAINMENT STATUS FOR FRESNO COUNTY

Pollutant	Federal Attainment Status	State Attainment Status
O_3	Nonattainment	Nonattainment
CO	Attainment	Attainment
NO_2	Attainment	Attainment
SO_2	Attainment	Attainment
PM_{10}	Nonattainment	Nonattainment
$PM_{2.5}$	Nonattainment	Nonattainment
Pb	Unclassified	Attainment

Notes:
CO = carbon monoxide
NO_2 = nitrogen dioxide
O_3 = ozone
Pb = lead
PM_{10} = particulate matter less than 10 microns in diameter
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter
SO_2 = sulfur dioxide

As mentioned above, both USEPA and CARB are involved with air quality management in Fresno County, along with SJVAPCD. The area of responsibility for each of these agencies is described below.

USEPA has ultimate responsibility for ensuring that, pursuant to the CAAA, all areas of the U.S. meet, or are making progress toward meeting the NAAQS. The state of California falls under the jurisdiction of USEPA Region IX, which is headquartered in San Francisco. USEPA requires that all states submit State Implementation Plans (SIPs) for nonattainment areas that describe how and when the NAAQS will be achieved and maintained. USEPA has delegated this responsibility for the state of California to the CARB.

The CARB, in turn, has delegated attainment responsibility to regional or local air quality management districts (or air pollution control districts), such as SJVAPCD. CARB is responsible for 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 jurisdiction. The air district also prepares an Air Quality Management Plan (AQMP) that includes an inventory of all emission sources within the district (both man-made and natural), a projection of future emissions growth, an evaluation of current air quality trends, and any rules or control measures needed to attain the NAAQS. The AQMP is submitted to CARB, which then compiles the plans from all air districts within the state into the SIP. The responsibility of the air districts also includes maintaining an effective permitting

system for existing, new, and modified stationary sources, monitoring local air quality trends, and adoption and enforcement of such rules and regulations as may be necessary to achieve the NAAQS.

5.2.5.2 Prevention of Significant Deterioration (PSD) Requirements

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

The PSD regulations require major stationary sources to undergo a preconstruction review that includes an analysis and implementation of BACT, a PSD increment consumption analysis, an ambient air quality impact analysis, and analysis of air quality related values. For PSD purposes, a major source is one with annual emissions that exceed threshold values. The trigger levels applicable to new sources of air pollutants, such as the BEC, are shown in Table 5.2-25, PSD Emission Threshold Triggers for New Stationary Sources, along with the projected annual emissions for the project. The 250 tpy emission threshold is applicable to all new stationary sources that do not belong to one of 28 named source categories that trigger PSD at an annual emission level of 100 tpy. As a simple-cycle gas turbine plant, the BEC does not belong to any of the named 28 source categories, and is thus subject to the 250 tpy trigger. Since emissions from the project will be less than 250 tpy for each pollutant, the PSD regulations are not applicable to the project. Discussions with CEC and SJVAPCD staff indicate that neither regulatory agency requires PSD or Class I Area impact analysis for a non-PSD project.

TABLE 5.2-25
PSD EMISSION THRESHOLD TRIGGERS
FOR NEW STATIONARY SOURCES[1]

Pollutant	Significant Thresholds (tpy)	Project Emissions (tpy)	PSD Triggered by Project?
SO_2	250	3.98	No
NO_x	250	48.49	No
VOC	250	15.17	No
PM_{10}	250	30.05	No
CO	250	92.74	No

Notes:
[1]Project emissions include all emissions from natural gas turbines, cooling tower, and emergency diesel fire pump driver.
CO = carbon monoxide
NO_x = oxide(s) of nitrogen
PM_{10} = particulate matter less than 10 microns in diameter
PSD = prevention of significant deterioration
SO_2 = sulfur dioxide
tpy = tons per year
VOC = volatile organic compounds

5.2.5.3 Acid Rain Program Requirements

Title IV of the CAAA applies to sources of air pollutants that contribute to acid rain formation, including sources of SO_2 and NO_x emissions. The SJVAPCD has been delegated the authority by USEPA to administer the Title IV requirements under its Title V Operating Permit program in Regulation II. The Acid Rain Program provisions of Part 72, Chapter I, Title 40 of the CFR (40 CFR Part 72), Subparts A through I are incorporated in SJVAPCD Rule 2540. Allowances of SO_2 emissions are set aside according to the provisions of 40 CFR 73. Affected sources are required to obtain SO_2 allowances, monitor their emissions, and obtain SO_2 allowances when a new source is permitted. Sources such as the project that use pipeline-quality natural gas as the exclusive fuel are exempt from many of the acid rain program requirements. However, BEC will be required to estimate SO_2 and carbon dioxide (CO_2) emissions from the project and to monitor NO_x emissions with a certified CEMS, and must submit an acid rain permit Application within 12 months after commencement of plant operations.

5.2.5.4 New Source Performance Standards

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

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

5.2.5.5 Federally Mandated Operating Permits

Title V of the CAA requires USEPA to develop a federal operating permit program that is implemented under 40 CFR Part 70. This program is administered by SJVAPCD under Regulation II, Rule 2520. Each major source, Phase II acid rain facility, and other source types designated by USEPA must obtain a Part 70 permit. Permits must contain emission estimates based on potential to emit, identification of all emissions sources and controls, a compliance plan, and a statement indicating each source's compliance status. The permits must also incorporate all applicable federal requirements. The project will have annual emissions greater than 100 tpy for several pollutants, and will thus be considered a major source according to the definition in Rule 2520 and will be subject to the Title V Operating Permit requirements.

5.2.5.6 California Power Plant Siting Requirements

Under the Warren-Alquist Act (WAA), the CEC has been charged with assessing the environmental impacts of each new power plant greater than 50 MW and considering the implementation of feasible mitigation measures to prevent potential impacts. California Environmental Quality Act (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 the evaluation of the project's compliance 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 project emissions will be appropriately mitigated to ensure that the impacts from the project are insignificant and will not jeopardize attainment and maintenance of the NAAQS. Cumulative impacts, impacts due to pollutant interaction, and impacts from non-criteria pollutants must also be considered.

5.2.5.7 Air Toxics "Hot Spots" Program

As required by the California Health & Safety Code Section 4430, all facilities with criteria air pollutant emissions in excess of 10 tpy are required to submit air toxic "Hot Spots" emissions information. The operational BEC will be required to provide quantitative information to SJVAPCD on the facility's emissions of toxic air contaminants (TACs), but this requirement is applicable only after the start of operation. Section 5.16, Public Health, of this Application demonstrates that the project's emissions of TACs will not cause a significant health risk to the neighboring area.

5.2.5.8 Determination of Compliance, Authority to Construct, and Permit to Operate

Under Regulation II, Rule 2010, 2070, and 2201, SJVAPCD administers the air quality regulatory program for the construction, alteration, replacement, and operation of new power plants. As part of the AFC process, the project will be required to obtain a preconstruction DOC from the SJVAPCD. Regulation II, Rule 2201 incorporates other SJVAPCD rules that govern how sources may emit air contaminants through the issuance of air permits (i.e., ATC and Permit to Operate [PTO]). This permitting process allows the SJVAPCD 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. Projects that are reviewed under the CEC Application process must obtain an ATC from the local air district (in this case, SJVAPCD) prior to construction of the new power plant. The ATC remains in effect until the PTO Application is granted, denied, or canceled. Once the project commences operations and demonstrates compliance with the ATC, SJVAPCD will issue a PTO. The PTO specifies conditions that the facility must meet to comply with all applicable air quality rules, regulations, and standards.

5.2.5.9 New Source Review Requirements

The SJVAPCD's New Source Review (NSR) rule (Regulation II, Rule 2201) establishes the criteria for siting new and modified emission sources and this rule is applicable to the project. SJVAPCD has been delegated authority for NSR rule development and enforcement according to

the terms of Rule 2201. There are three basic requirements within the NSR rules. First, BACT must be applied to any new source with potential emissions above specified threshold quantities(TQs). Second, all potential emission increases of nonattainment pollutants or precursors from the proposed source above specified thresholds must be offset by real, quantifiable, surplus, permanent, and enforceable emission decreases in the form of ERCs. Third, an ambient air quality impact assessment must be conducted to confirm that the project does not cause or contribute to a violation of a NAAQS or CAAQS or jeopardize public health.

5.2.5.10 San Joaquin Valley Air Pollution Control District Specific 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. The following paragraphs outline the SJVAPCD rules and regulations that apply to the project.

Rule 1080, Stack Monitoring. Outlines facility requirements for continuous monitoring equipment from any facility emitting pollutants for which emission limits have been established. The BEC will be constructed and operated to comply with the requirements of Rule 1080.

Rule 1081, Source Sampling. Outlines facility design requirements for source sampling from any facility emitting pollutants for which emission limits have been established. The BEC will be constructed and operated to comply with the requirements of Rule 1081.

Rule 1100, Equipment Breakdown. This rule details the notification and corrective action requirements necessary in an equipment breakdown situation. As operator of the project, Bullard Energy Center, LLC will comply with these requirements.

Rule 2010, Permits Required. An ATC and PTO will be required for the project. Bullard Energy Center, LLC will submit the required application materials for these permits to SJVAPCD.

Rule 2201, 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 AAQS, 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.

Section 4.1, BACT. An applicant must apply BACT to any new or modified emissions unit that has a potential to emit 2.0 lb per day or more of any pollutant. The SJVAPCD maintains a list of current BACT standards for specific source categories, which is posted on the District's Web site.

The majority of pollutant emissions from the project will be from the natural gas turbines, which will be fired exclusively on natural gas and be equipped with water injection and SCR for the control of NO_x emissions and an oxidation catalyst for control of CO emissions. Aqueous ammonia (NH_4 [OH]) at a concentration not to exceed 20 percent in water will be used as the reagent for the SCR control system. NH_3 slip will be limited to 10 parts per million, volumetric dry (ppmvd). The BACT levels for the project turbines are shown in Table 5.2-26, BACT for Simple Cycle Gas Turbines.

TABLE 5.2-26
BACT FOR SIMPLE CYCLE GAS TURBINES

Pollutant	Control Technology	Concentration ppm @ 15 percent O_2 dry
NO_x	Water injection and SCR with NH_3 injection	2.5
CO	Catalytic oxidation	6
VOC	Catalytic oxidation	2
NH_3 slip	NH_4 (OH) strength not to exceed 20 percent by weight in water mixture	10
SO_x	Pipeline quality natural gas	NA
PM_{10}	Pipeline quality natural gas	NA

Notes:
BACT = best available control technology
CO = carbon monoxide
NA = not applicable
NH_3 = ammonia
NH_4 (OH) = aqueous ammonia
NO_x = oxide(s) of nitrogen
O_2 = oxygen
PM_{10} = particulate matter less than 10 microns in diameter
ppm = parts per million
SCR = selective catalytic reduction
SO_x = sulfur oxide(s)
VOC = volatile organic compounds

Testing of the planned emergency equipment unit (diesel firewater pump engine) will be conducted periodically to confirm the equipment's operability. The unit will not be run long enough for these tests to result in daily emissions of 2.0 lb of any pollutant. Thus, BACT will not be required under Rule 2201 4 for the firewater pump engine.

The BACT for PM_{10} from the evaporative cooling tower is a drift elimination system capable of limiting drift to no more than 0.0005 percent of the tower circulating water rate.

Appendix I, Air Quality Data, provides a formal BACT evaluation for the project.

Section 4.5, Emissions Offset Requirements. This section of Rule 2201 requires that offsets be provided for a new stationary source with a potential to emit equal to or exceeding the levels shown in Table 5.2-27, SJVAPCD Offset Thresholds, and describes the methods for determining the quantities of ERCs needed to offset emissions for a new stationary source.

TABLE 5.2-27
SJVAPCD OFFSET THRESHOLDS

Pollutant	lb/yr
VOC	20,000
NO_x	20,000
SO_x	54,750
PM_{10}	29,200
CO (attainment areas)	200,000

Notes:
CO = carbon monoxide
lb/yr = pounds per year
NO_x = oxide(s) of nitrogen
PM_{10} = particulate matter less than 10 microns in diameter
VOC = volatile organic compounds
SO_x = sulfur oxide(s)

As described in Section 5.2.2.2, Operational Emissions, annual emissions from the project will exceed the offset triggers for NO_x, VOC, CO, SO_x, and PM_{10} if the facility operates for 5,000 hours per year as requested in this Application. Information on the required offset amounts for the BEC operations and on the progress to date in obtaining the required numbers of ERC is provided in Section 5.2.4, Mitigation Measures – Emissions Offsets.

Section 4.14, Ambient Air Quality Standards. Emissions from a new or modified stationary source may not cause or make worse the violation of an ambient air quality standard. Modeling used for the purposes of demonstrating compliance with this rule must be consistent with the requirements contained in the most recent edition of USEPA's *Guidelines on Air Quality Models*, unless the Air Pollution Control Officer finds that such model is inappropriate for use. After making such a finding, the Air Pollution Control Officer may designate an alternate model only after allowing for public comments and only with the concurrence of the CARB or the USEPA.

As described in Section 5.2.2.4, Modeling Results – Compliance with Ambient Air Quality Standards, an air quality modeling analysis has been conducted to demonstrate that the project will not cause or make worse the violation of any air quality standard.

Section 5.8, Power Plants. This section applies to all power plants to be constructed in the SJVAPCD and for which a Notice of Intention (NOI) or AFC has been accepted by the CEC. It describes the actions to be taken by SJVAPCD to provide information to CEC and CARB to ensure that the project will conform to the District's rules and regulations. After the Application has been submitted to CEC and other responsible agencies, including SJVAPCD, the Air Pollution Control Officer 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 Air Pollution Control Officer is required to so inform the CEC within 20 calendar days following receipt of the AFC. In such an instance, the AFC is considered to be incomplete and returned to the applicant for resubmittal.

***Section 6.0, Certification of Conformity*.** This section describes how a new or modified source that is subject to the requirements of Rule 2520 may choose to apply for a certificate of conformity with the procedural requirements of 40 CFR Part 70 for a Federal Operating Permit. A certificate of conformity will allow changes authorized by the ATC permit to be incorporated in the Part 70 permit as administrative permit amendments.

Rule 2520, Federally Mandated Operating Permits. Provides an administrative mechanism for issuing operating permits for new and modified sources of air contamination accordance with the federal requirements of 40 CFR Part 70.

Rule 3010/3020, Permit Fees. This rule and the fee schedules in rule 3020 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.

Rule 3110, Air Toxics Fees. This rule applies to facilities subject to the requirements of the Air Toxics "Hot Spots" Information and Assessment Act (Sections 44340 and 44383 of the California Health and Safety Code [CHSC]) and to facilities subject to National Emission Standards for Hazardous Air Pollutants (NESHAPs) issued pursuant to Section 112 of the federal CAA.

Rule 3135, Dust Control Plan Fee. This rule recovers the District's cost for reviewing dust control plans and conducting site inspections to verify compliance with such plans.

Rule 3170, Federally Mandated Ozone Nonattainment Fee. The purpose of this rule is to satisfy requirements specified in Section 185 and Section 182(f) of the CAA. This rule applies to major sources of NO_x and VOC. The fees required pursuant to this section are additional to the permit fees and other fees required under other rules and regulations. This rule will cease to be effective when the Administrator of USEPA designates the SJVAPCD to be in attainment of the federal 1-hour standard for O_3.

Rule 4001, New Source Performance Standards. This rule incorporates the federal NSPS from 40 CFR Part 60.

Rule 4002, National Emission Standards for Hazardous Air Pollutants. This rule incorporates the federal NESHAPs from Part 61 and Part 63, Chapter I, Subchapter C, Title 40 CFR.

Rule 4101, Visible 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 4102, Nuisance. 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.

Rule 4201, Particulate Matter Concentration. This rule applies to the discharge of PM into the atmosphere. The relevant limit for the project is expressed in Rule 4201, which states that no person shall release or discharge into the atmosphere from any single source operation dust, fumes, or total suspended PM, in excess of 0.1 grains per dry standard cubic foot of natural gas as determined by following test methods: PM concentration – USEPA Method 5; Stack gas velocity – USEPA Method 2; Stack gas moisture – USEPA Method 4. The BEC natural gas turbines will easily comply with this requirement, with a maximum PM_{10} emission rate of approximately 0.0035 grains per dry standard foot of exhaust gas.

Rule 4301, Fuel-burning Equipment. This rule limits the emission levels of NO_x, SO_2, and fuel combustion contaminants (particulates) from any fuel-burning equipment unit. The specific limits are 140 lb per hour of NO_x, calculated as NO_2, 200 lb per hour of SO_2, 0.1 grains per cubic foot of gas calculated to 12 percent of CO_2 at dry standard conditions, and 10 lb per hour of combustion contaminants.

Rule 4703, Stationary Gas Turbines. This rule limits the NO_x and CO emissions from gas turbines with ratings greater than 0.3 MW. NO_x emissions concentrations shall be averaged over a 3-hour period using consecutive 15-minute sampling periods, or, if CEMS are used, all applicable requirements of 40 CFR Part 60 must be met.

Rule 4801 – Sulfur Compounds. This rule limits the emissions of sulfur compounds to less than 0.2 percent by volume on a dry basis averaged over 15 consecutive minutes by using USEPA Method 8 and CARB Method 1-100.

Rule 7012, Hexavalent Chromium Cooling Towers. This rule limits the emissions of hexavalent chromium from circulating water in cooling towers and prohibits the use or sale of products containing this compound for treating cooling tower water.

Rule 8021, Construction, Demolition, Excavation, Extraction, and Other Earthmoving Activities. This rule limits fugitive dust emissions from construction, demolition, excavation, extraction, and other earthmoving activities such that opacity levels are kept to no more than 20 percent.

Rule 8041, Carryout and Trackout. This rule that requires the limiting of carryout and trackout dust emissions from sites is applicable to construction of the project.

Rule 8051, Open Areas. This rule applies to any open area of 3.0 acres or more in rural areas with at least 1,000 square feet of disturbed surface area. Dust emissions must be kept below 20 percent opacity.

Rule 8061, Paved and Unpaved Roads. This rule limits the emission of fugitive dust from roads to no more than 20 percent opacity through different control measures. Depending on traffic levels, the road must meet certain width requirements.

Rule 8071, Unpaved Vehicle/Equipment Traffic Areas. This rule limits the emission of fugitive dust to no more than 20 percent opacity through different control measures.

Table 5.2-28, Applicable LORS, summarizes the LORS pertaining to air quality aspects of the project, and references the subsection where the project's compliance with each requirement is discussed.

TABLE 5.2-28
APPLICABLE LORS

LORS	Applicability	Section
Federal		
40 CFR Part 50	NAAQS	Section 5.2.2.4, Modeling Results – Compliance with Ambient Air Quality Standards, and Section 5.2.5.1, Ambient Air Quality Standards
40 CFR Part 52.21	PSD	Section 5.2.5.2, Prevention of Significant Deterioration Requirements
40 CFR Part 73	Acid Rain Program	Section 5.2.5.3, Acid Rain Program Requirements
40 CFR Part 60 Subpart KKKK	NSPS	Section 5.2.5.4, New Source Performance Standards
40 CFR Part 70	Federally mandated operating permits	Section 5.2.5.5, Federally Mandated Operating Permits
State		
Title 17, California Code of Regulations	CAAQS	Section 5.2.2.4, Modeling Results – Compliance with Ambient Air Quality Standards, and Section 5.2.5.1, Ambient Air Quality Standards
California Administrative Code, Title 14, Section 15002(a)(3)	Power plant siting requirements	Section 5.2.5.6, Power Plant Siting Requirements
CHSC Section 4430	Air toxics “Hot Spots” emission inventory	Section 5.2.5.7, Air Toxics “Hot Spots” Program
Local		
SJVAPCD Regulation I, Rule 1080	Stack monitoring	Section 5.2.5.10, SJVAPCD Requirements
SJVAPCD Regulation I, Rule 1081	Source sampling	Section 5.2.5.10, SJVAPCD Requirements
SJVAPCD Regulation I, Rule 1100	Equipment breakdown	Section 5.2.5.10, SJVAPCD Requirements
SJVAPCD Regulation II, Rule 2010	Permits required	Section 5.2.5.10, SJVAPCD Requirements
SJVAPCD Regulation II, Rule 2201	New and modified stationary source review	Section 5.2.5.10, SJVAPCD Requirements
SJVAPCD Regulation II, Rule 2520	Federally mandated operating permits	Section 5.2.5.10, SJVAPCD Requirements
SJVAPCD Regulation III, Rule 3010/3020	Permit fees/fee schedules	Section 5.2.5.10, SJVAPCD Requirements
SJVAPCD Regulation III, Rule 3110	Air toxics fees	Section 5.2.5.10, SJVAPCD Requirements
SJVAPCD Regulation III, Rule 3135	Dust control plan fee	Section 5.2.5.10, SJVAPCD Requirements

TABLE 5.2-28
APPLICABLE LORS

LORS	Applicability	Section
SJVAPCD Regulation III, Rule 3170	Federally mandated O_3 nonattainment fee	Section 5.2.5.10, SJVAPCD Requirements
SJVAPCD Regulation IV, Rule 4001	NSPS	Section 5.2.5.10, SJVAPCD Requirements
SJVAPCD Regulation IV, Rule 4002	NESHAPS	Section 5.2.5.10, SJVAPCD Requirements
SJVAPCD Regulation IV, Rule 4101	Visible emissions	Section 5.2.5.10, SJVAPCD Requirements
SJVAPCD Regulation IV, Rule 4102	Nuisance	Section 5.2.5.10, SJVAPCD Requirements
SJVAPCD Regulation IV, Rule 4201	PM concentrations	Section 5.2.5.10, SJVAPCD Requirements
SJVAPCD Regulation IV, Rule 4301	Fuel-burning equipment	Section 5.2.5.10, SJVAPCD Requirements
SJVAPCD Regulation IV, Rule 4703	Stationary gas turbines	Section 5.2.5.10, SJVAPCD Requirements
SJVAPCD Regulation IV, Rule 4801	Sulfur compounds	Section 5.2.5.10, SJVAPCD Requirements
SJVAPCD Regulation VII, Rule 7012	Hexavalent chrome from cooling towers	Section 5.2.5.10, SJVAPCD Requirements
SJVAPCD Regulation VIII, Rule 8021	Construction, demolition, excavation, extraction, and other earthmoving activities	Section 5.2.5.10, SJVAPCD Requirements
SJVAPCD Regulation VIII, Rule 8041	Carryout and trackout	Section 5.2.5.10, SJVAPCD Requirements
SJVAPCD Regulation VIII, Rule 8051	Open areas	Section 5.2.5.10, SJVAPCD Requirements
SJVAPCD Regulation VIII, Rule 8061	Paved and unpaved roads	Section 5.2.5.10, SJVAPCD Requirements
SJVAPCD Regulation VIII, Rule 8071	Unpaved vehicle/equipment traffic areas	Section 5.2.5.10, SJVAPCD Requirements

Notes:
CAAQS = California Ambient Air Quality Standards
CFR = Code of Federal Regulations
CHSC = California Health and Safety Code
LORS = laws, ordinances, regulations, and standards
NAAQS = National Ambient Air Quality Standards
NESHAPs = National Emission Standards for Hazardous Air Pollutants
NSPS = New Source Performance Standards
O_3 = ozone
PM = particulate matter
PSD = Prevention of Significant Deterioration
SJVAPCD = San Joaquin Valley Unified Air Pollution Control District

5.2.6 Involved Agencies and Agency Contacts

Agencies and individuals contacted in connection with the air quality assessment of the project are detailed in Table 5.2-29, Involved Agencies and Agency Contacts.

TABLE 5.2-29
INVOLVED AGENCIES AND AGENCY CONTACTS

Agency	Contact/Title	Telephone
California Energy Commission	Will Walters CEC Contractor Air Quality Specialist Aspen Environmental Group 30423 Canwood Street, Suite 211 Agoura Hills, CA 91301	818-597-3407
U.S. Environmental Protection Agency	Laura Yannayan Region 9 Permit Engineer 75 Hawthorne Street (ORC-2) San Francisco, CA 94105	415-972-3534
San Joaquin Valley Unified Air Pollution Control District	Errol Villegas and Leland Villalvazo Senior Permit Engineers 1990 East Gettysburg Avenue Fresno, CA 93726	559-230-6000

5.2.7 Permits and Permitting Schedule

Under Regulation II of its Rules and Regulations, SJVAPCD regulates the construction, alteration, replacement, and operation of new stationary emissions sources and modifications to existing sources. During the CEC review of this Application, a DOC for the project will be provided by SJVAPCD as part of the CEC review to confirm that the project will meet all of the District's rules and regulations. In addition to the CEC License, the SJVUPACD will be responsible for issuing an ATC and PTO for the BEC. This permitting process allows the SJVAPCD to adequately review new and modified air pollution sources to ensure compliance with all applicable prohibitory rules and to ensure that appropriate emission controls will be 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. The ATC should be issued within 3 to 6 months following submittal by the applicant of a complete Application. Once the project has completed construction and commences operations, SJVAPCD will require verification that the BEC conforms to the ATC Application and then issues a PTO. The PTO specifies conditions that the air pollution source must meet to comply with all air quality standards and regulations.

5.2.8 References

Auer, Jr., A.H. 1978. "Correlation of Land Use and Cover with Meteorological Anomalies." *Journal of Applied Meteorology*. 17: 636-643.

California Air Resources Board (CARB). 1998. California Ambient Air Quality Data 1980-1997. CD# PTSD-98-010-CD. December.

CAPCOA. 1993. Air Toxics "Hot Spots" Program: Revised 1992 Risk Assessment Guidelines. California Air Pollution Control Officers Association.

San Joaquin Valley Unified Air Pollution Control District (SJVAPCD). 2006. Telephone conversation between Leland Villalvazo of SJVAPCD and Tom Carr of URS Corporation, May 11.

U.S. Environmental Protection Agency (USEPA). 1985. Guideline for Determination of Good Engineering Stack Height (Technical Support Document for the Stack Height Regulation) (Revised), EPA-450/4-80-023R. Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina. June.

_____. 1995a. User's Guide for the Industrial Source Complex (ISC3) Dispersion Models, EPA-454/B-95-003a, Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina. September.

_____. 1995b. User's Guide to the Building Profile Input Program (Revised), EPA-454/R-93-038, Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina. February.

_____. 1999. Office of Air Quality Planning and Standards. Monitor Reports, 1999. http://www.epa.gov/airsdata/monvals.htm

_____. 2004. Exhaust and Crankcase Emission Factors for Nonroad Engine Modeling: Compression-Ignition, Publication EPA420-P-04-009, Research Triangle Park, North Carolina. April.

URS Corporation. 2006. Revised Modeling Protocol for the Panoche Energy Center, Fresno County, California. Prepared by URS Corporation for submittal to the San Joaquin Valley Unified Air Pollution Control District and the California Energy Commission. June.

Adequacy Issue: Adequate ____ Inadequate ____

DATA ADEQUACY WORKSHEET

Revision No. ____ Date ____

Technical Area: **Air Quality** Project: ____ Technical Staff: ____

Project Manager: ____ Docket: ____ Technical Senior: ____

SITING REGULATIONS	INFORMATION	AFC PAGE NUMBER AND 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 - Sections 5.2.2 and 5.2.3 - 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 5.2.5		
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 - Appendix I, Attachment C		
Appendix B (g) (8) (C)	A description of the control technologies proposed to limit the emission of criteria pollutants.	- Section 5.2.2. - Table 5.2-27 - Appendix I, Attachments C and E		
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.	- Section 5.2.2 - Appendix I, Attachment C		
Appendix B (g) (8) (E)	The emission rates of criteria pollutants from the stack, cooling towers, fuels and materials handling processes, delivery and storage systems, and from all secondary emission sources.	- Section 5.2.2.2 - Appendix I, Attachment C		
Appendix B (g) (8) (F)	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 - Appendix I, Attachment C		

Adequacy Issue: Adequate ____ Inadequate ____

DATA ADEQUACY WORKSHEET

Revision No. ____ Date ____

Technical Area: **Air Quality** Project: ____ Technical Staff: ____

Project Manager: ____ Docket: ____ Technical Senior: ____

SITING REGULATIONS	INFORMATION	AFC PAGE NUMBER AND SECTION NUMBER	ADEQUATE YES OR NO	INFORMATION REQUIRED TO MAKE AFC CONFORM WITH REGULATIONS
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 5.2.2.3 - Modeling input/output data on compact disk provided with AFC		
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 U.S. 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 5.2.1.1 - Appendix I, Attachment A		
Appendix B (g) (8) (I)	An evaluation of the project's direct and cumulative air quality impacts, consisting of the following:			

Adequacy Issue: Adequate ____ Inadequate ____

DATA ADEQUACY WORKSHEET

Revision No. ____ Date ____

Technical Area: **Air Quality** Project: ____ Technical Staff: ____

Project Manager: ____ Docket: ____ Technical Senior: ____

SITING REGULATIONS	INFORMATION	AFC PAGE NUMBER AND SECTION NUMBER	ADEQUATE YES OR NO	INFORMATION REQUIRED TO MAKE AFC CONFORM WITH REGULATIONS
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 inert 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})] from construction-related equipment;	- Section 5.2.2.4 -Modeling input/output data on compact disk provided with AFC		
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 inert criteria pollutant (NO_x, SO_2, CO and PM_{10}) 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; and	- Section 5.2.2.4 - Modeling input/output data on compact disk provided with AFC		
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.	- Section 5.2.3		
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:			

Adequacy Issue: Adequate ____ Inadequate ____

DATA ADEQUACY WORKSHEET

Revision No. ____ Date ____

Technical Area: **Air Quality** Project: ____ Technical Staff: ____

Project Manager: ____ Docket: ____ Technical Senior: ____

SITING REGULATIONS	INFORMATION	AFC PAGE NUMBER AND SECTION NUMBER	ADEQUATE YES OR NO	INFORMATION REQUIRED TO MAKE AFC CONFORM WITH REGULATIONS
Appendix B (g) (8) (J) (i)	The quantity of offsets needed;	- Section 5.2.4		
Appendix B (g) (8) (J) (ii)	Potential offset sources, including location, and quantity of emission reductions; and	- Section 5.2.4		
Appendix B (g) (8) (J) (iii)	Method of emission reduction.	- Section 5.2.4		
Appendix B (g) (8) (K)	A topographic map containing contour and elevation data, at a scale of 1:24,000, showing the area within 6 miles of the power plant site.	- Section 5.2.1		
Appendix B (h) (1) (A)	Tables which identify laws, regulations, ordinances, standards, adopted local, regional, state, and federal land use plans, and permits applicable to the proposed project, and a discussion of the applicability of 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;	- Section 5.2.5 - Table 5.2-28		
Appendix B (h) (1) (B)	Tables which identify each agency with jurisdiction to issue applicable permits 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 5.2-28		
Appendix B (h) (2)	A discussion of the conformity of the project with the requirements listed in subsection (h)(1)(A).	- Section 5.2.5		
Appendix B (h) (3)	The name, title, phone number, and address, if known, of an official within each agency who will serve as a contact person for the agency.	- Section 5.2.6 - Table 5.2-29		

Adequacy Issue: Adequate ____ Inadequate ____

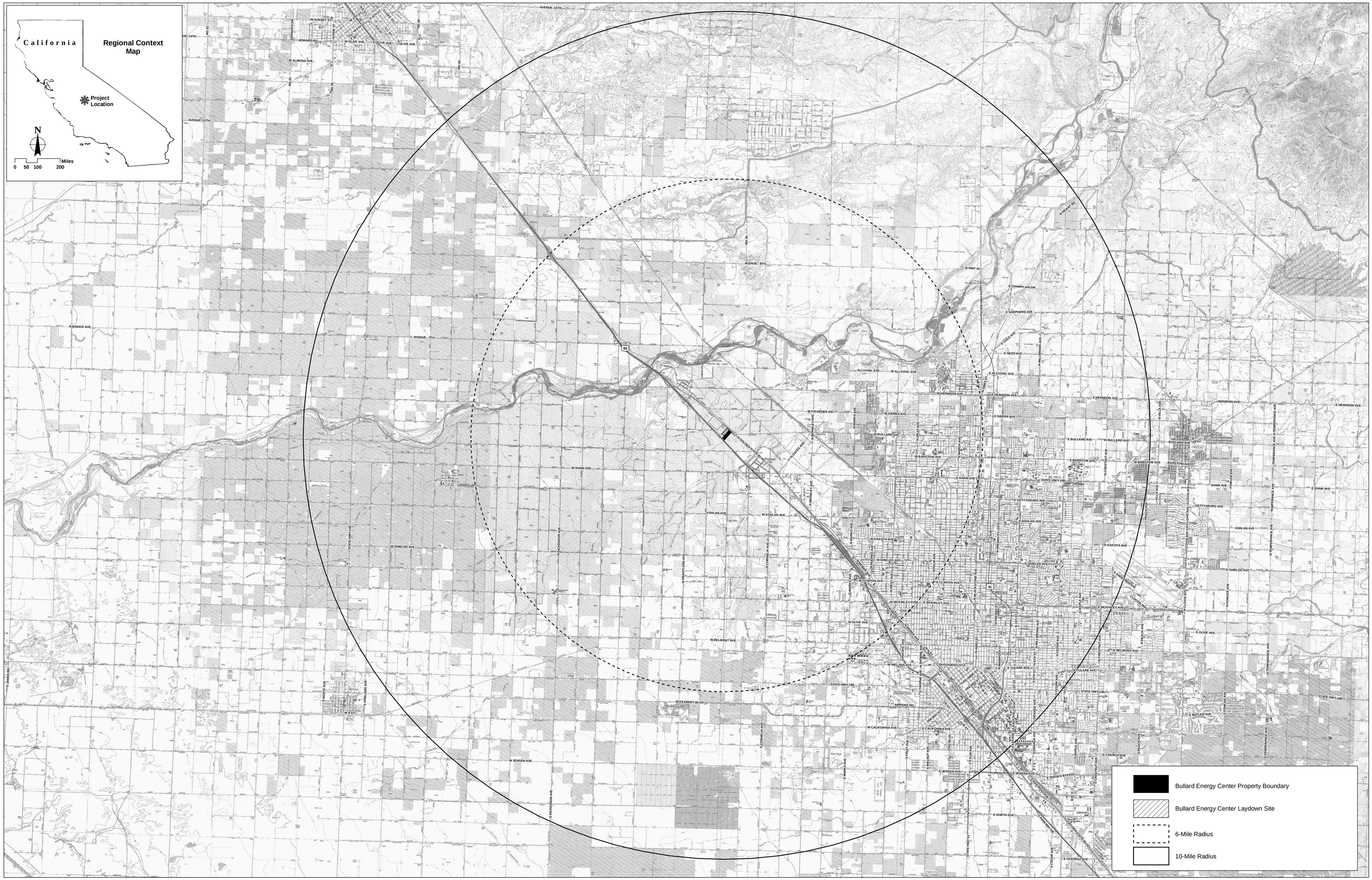
DATA ADEQUACY WORKSHEET

Revision No. ____ Date ____

Technical Area: **Air Quality** Project: ____ Technical Staff: ____

Project Manager: ____ Docket: ____ Technical Senior: ____

SITING REGULATIONS	INFORMATION	AFC PAGE NUMBER AND SECTION NUMBER	ADEQUATE YES OR NO	INFORMATION REQUIRED TO MAKE AFC CONFORM WITH REGULATIONS
Appendix B (h) (4)	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 5.2.7		



G:\gis\projects\1577\28906905\mxds\bullard_quad_10mile_fig5.2-1_b&w.mxd

Feet
0 2000 4000 6000 8000
SCALE: 1" = 4000' (1:48,000)

N

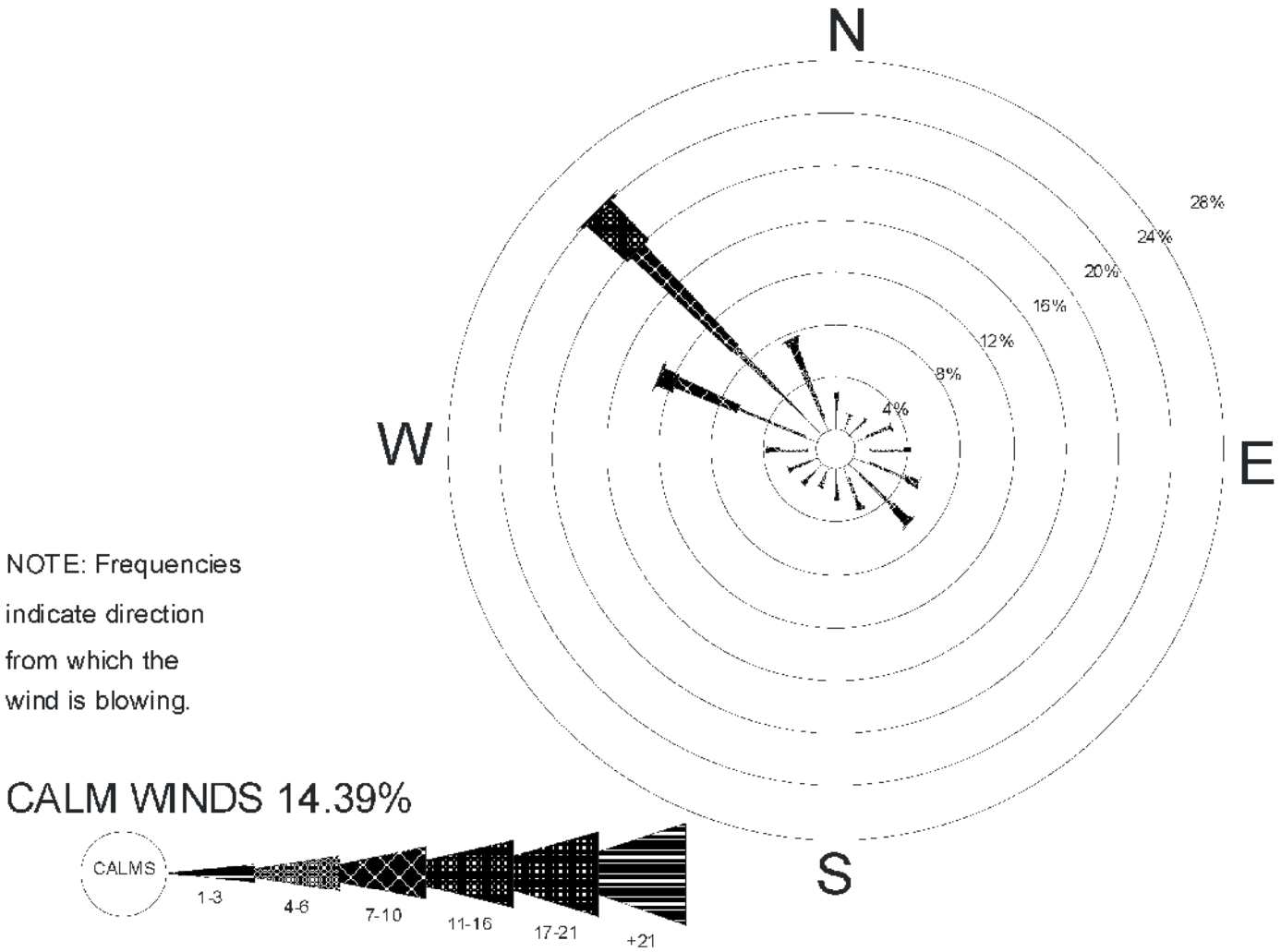
SOURCES:
USGS (7.5 quads: Bonita Ranch, Gravelly Ford, Jamesan, Madera, Biola, Kerman, Gregg, Herndon, Kearney Park, Lanes Bridge, Fresno North, Fresno South, Friant, Clovis, Malaga);
Duke Energy (site plan); ESRI.

Topography within a 6- and 10-Mile Radius of the Project Site

Bullard Energy Center

URS

FIGURE 5.2-1



Windrose from Fresno 1987-1991 for All Months

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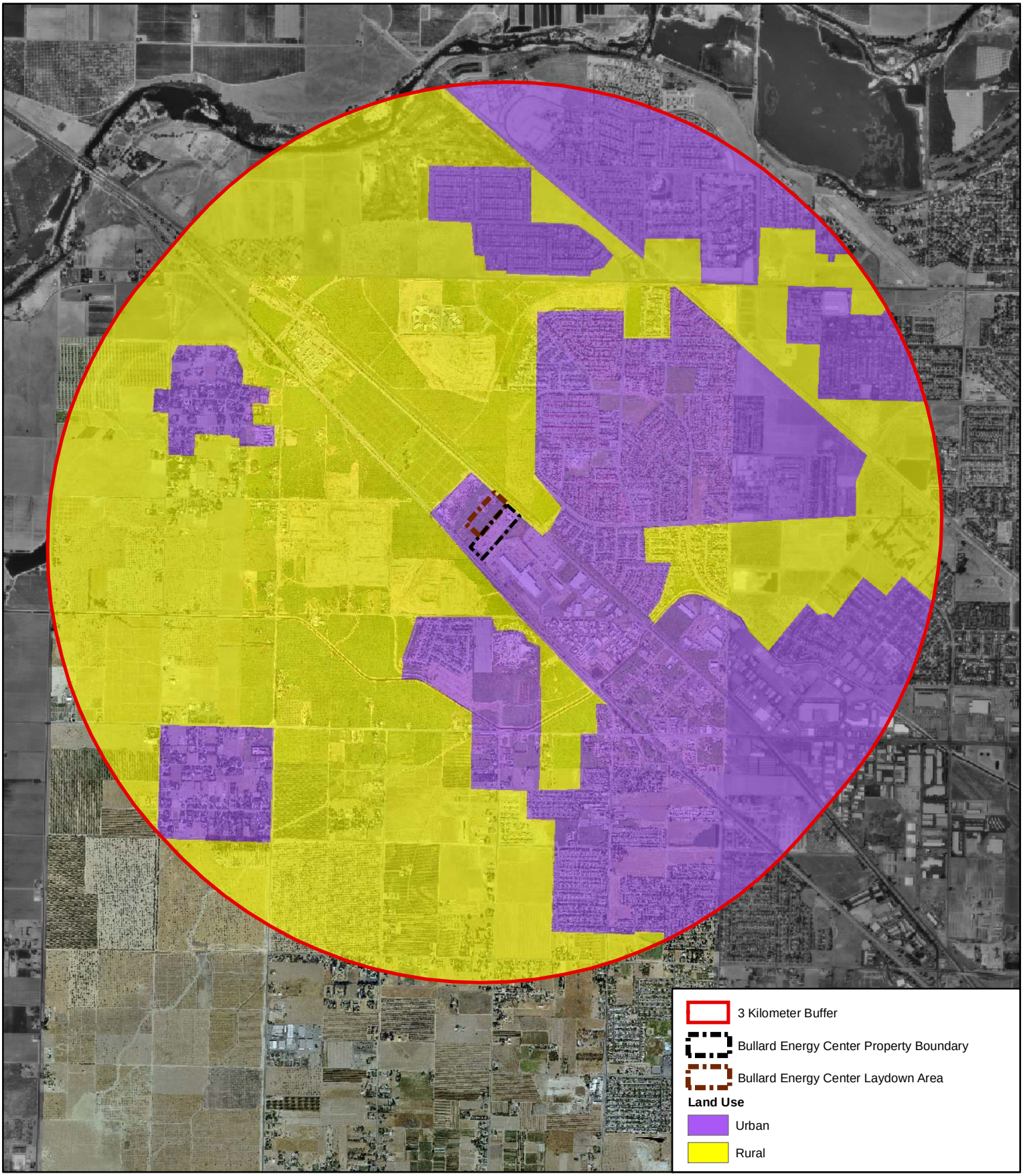
Windrose for All Months 1987-1991
Fresno-Yosemite International Airport

Bullard Energy Center

URS

FIGURE 5.2-2



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Auer Land Use Classification within 3 Kilometers of BEC

Bullard Energy Center

0 750 1,500 3,000 Feet

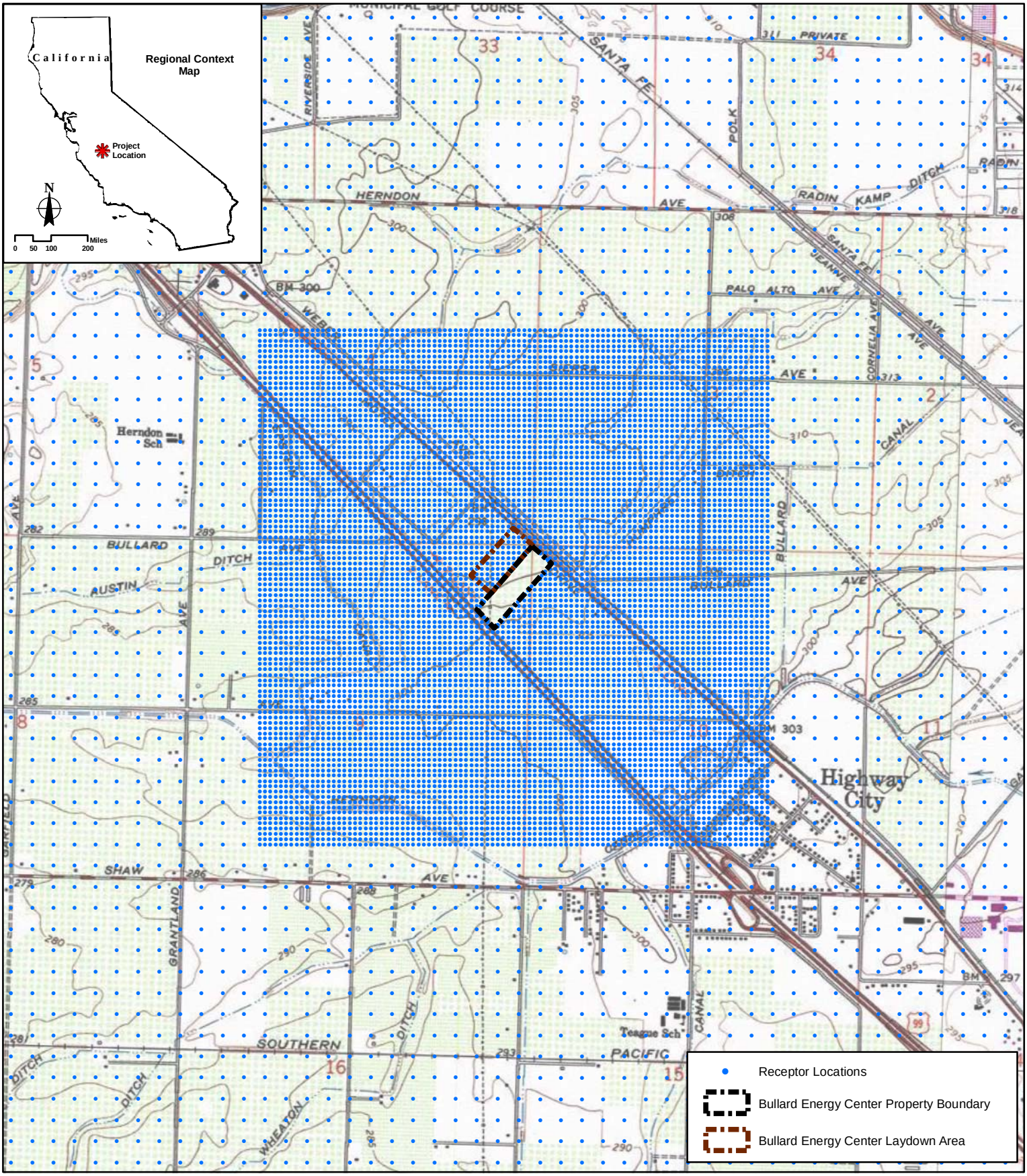
SCALE: 1" = 3000'

N

SOURCES:
Airphoto USA (color aerial Feb. 2005);
Western Mapping Center (aerial 1998);
Duke Energy (site plan); ESRI.

URS

FIGURE 5.2-3



SOURCES:
USGS (7.5 quad: Herndon 1978);
Duke Energy (site plan); ESRI.

Near-Field Model Receptor Grid

Bullard Energy Center

URS

FIGURE 5.2-4

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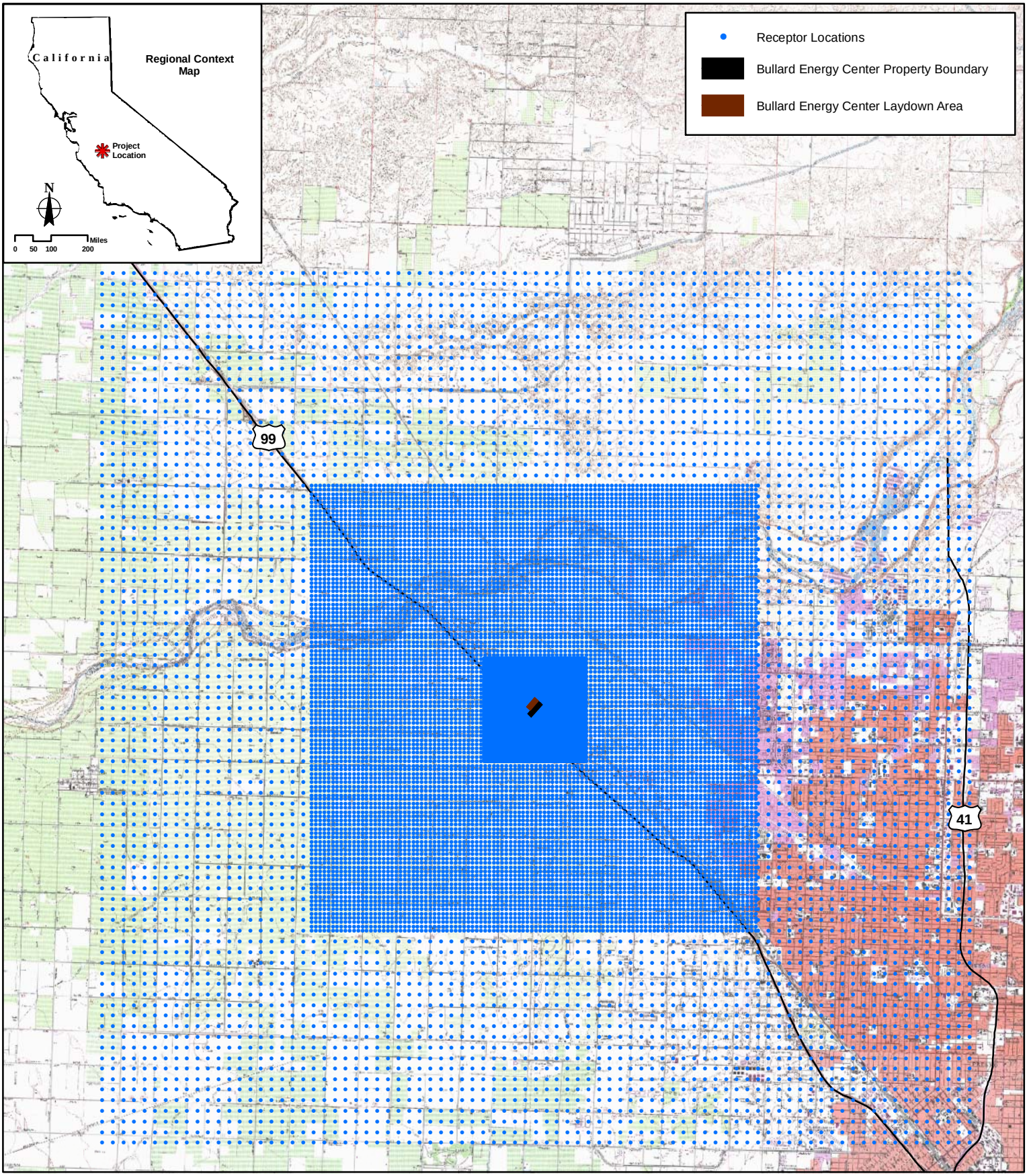

G:\gis\projects\15771289069905\mxd\bullard_far_field_receptors_fig5.2-5.mxd

0 2,500 5,000 10,000 Feet

SCALE: 1" = 10,000'

N

SOURCES:
USGS (7.5 quads: Herndon, Biola, Gregg, Kearny Park, Lanes Bridge, Fresno North, Fresno South); Duke Energy (site plan); ESRI.

URS

Far-Field Model Receptor Grid

Bullard Energy Center

FIGURE 5.2-5