5.1 INTRODUCTION

This section presents a description of the affected environment and potential environmental consequences that are associated with the Panoche Energy Center (PEC), along with measures to mitigate or avoid adverse impacts as appropriate. Supporting information to determine compliance with applicable laws, ordinances, regulations and standards is included within the discussion in each applicable section.

The analyses presented in this section are based on the following:

- Details of the proposed project as presented in Sections 3 and 4
- Consideration of California Energy Commission (CEC) regulations, including regulations applicable to the expedited processing of projects
- Consideration of CEC staff input

The environmental assessments presented in this section are meant to comply with CEC requirements, including those of the California Environmental Quality Act (CEQA). In general each section follows the same format of presenting the affected environment and existing site conditions, followed by the environmental consequences of the proposed project with measures proposed to mitigate significant adverse impacts.

5.2 AIR QUALITY

This section describes an analysis of the potential air quality impacts of the 400 megawatt (MW) Panoche Energy Center (PEC or the project), which will be located in western Fresno County. 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 PEC, 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 nitrogen oxides (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 PEC.
- Section 5.2.4, Mitigation Measures, 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 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 Safety) and information relating to the fuel characteristics, heat rate, and startup and operating limits (see Section 3.0, Facility and Project Description).

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 project site is located in far western Fresno County in the San Joaquin Valley, southeast of the intersection of West Panoche Road and Davidson Avenue, off the alignment of Davidson Avenue. The project site is about 2.2 miles (3.5 kilometers [km]) east of Interstate 5 (I-5) and approximately 3 miles (5.0 km) west of the California Aqueduct. The site abuts the existing Pacific Gas & Electric (PG&E) substation on the west. Land use within 10 miles of the site is dedicated to the cultivation of agricultural crops.

The cities nearest to the project site are Mendota and Firebaugh. The project site is at an elevation of approximately 420 feet above sea level in terrain that slopes gently downward to the north, northeast, and east toward the San Joaquin River and Fresno Slough about 15 miles (25 km) from the site. Terrain elevations as high as the proposed natural gas turbine stacks are found within about 2 miles (3.2 km) to the southwest and south of the site and the elevation rise continues in this direction to the Ciervo Hills (one of the foothills of the Diablo Range Mountains) about 6 miles (10 km) away. Topography within a 6- and 10-mile radius of the project site is shown on Figure 5.2-1. The nearest rural residence is within 550 feet (170 meters) north of the site's northwest corner fence line.

5.2.1.1 <u>Meteorology and Climate</u>

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. The area's climatic conditions are strongly influenced by the large-scale sinking and warming of air in the semi-permanent subtropical high-pressure center over the eastern Pacific. This high-pressure system effectively blocks out most mid-latitude storms, except in winter when the ridge is weaker and farther south. The coastal mountains on the western edge of the 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 1991 to 1995 is presented in Figure 5.2-2. Quarterly wind roses for the project area are provided in Appendix I.

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 Madera over a 30-year period (1971-2000) are presented in Table 5.2-1. This weather station is located approximately 35 miles to the northeast of the PEC facility at latitude 36°58’N, longitude 120°02’W. The hottest month, July, has an average maximum temperature of 96.4 degrees Fahrenheit (°F) and an average minimum temperature of 61.8°F. The coldest month, December, has an average maximum temperature of 54.6°F, and an average minimum temperature of 35.0°F.

TABLE 5.2-1
AVERAGE TEMPERATURES AND PRECIPITATION
IN MADERA, FRESNO COUNTY (1971-2000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Average Max Temperature (°F)	54.4	61.3	67.0	74.3	83.0	91.0	96.4	95.0	89.7	79.8	62.9	54.6	76.0
Average Min Temperature (°F)	36.4	39.1	42.7	46.1	52.0	57.8	61.8	60.7	56.1	48.1	38.5	35.0	48.0
Precipitation (in)	2.23	2.21	2.06	1.07	0.44	0.13	0.01	0.06	0.23	0.59	1.34	1.50	11.9

Notes:
°F = degrees Fahrenheit
in = inches
Max = maximum
Min = minimum
Source: Western Regional Climate Center

During winter, the semi-permanent, subtropical high pressure system over the Pacific Ocean moves south, allowing the passage of frontal systems that bring most of the area’s annual precipitation, which totals about 12 inches on average. Monthly mean precipitation amounts at Madera range from 2.23 inches in January to 0.01 inches in July. 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 20 percent in the afternoon. In winter, relative humidity averages 90 percent in the early morning and 50 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 ADAM website and/or by U.S. Environmental Protection Agency (USEPA) on the AIRS data website. Ambient air concentrations of ozone (O_3), NO_2, SO_2, CO, PM_{10}, and $PM_{2.5}$ and airborne lead are recorded at monitoring stations throughout Fresno County. The region surrounding the project site is a remote, agricultural environment with a very sparse population. 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 remote, 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 lead, O_3, NO_2, CO, $PM_{2.5}$, and PM_{10} are recorded at the Fresno First Street monitoring station located at 3425 North First Street, approximately 46 miles east of the project site. The Fresno First Street station is the closest station with a long-term record of all the criteria pollutants, except SO_2. 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 PEC 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.

5.2.1.2.1 Ozone (O_3). Ozone 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 ozone.

Table 5.2-2 shows the measured ozone levels at the Fresno First Street station during the last five years. The 1-hour ozone NAAQS of 0.12 parts per million (ppm) has been exceeded at Fresno First Street each of the past five years with the maximum concentration of 0.144 ppm recorded in 2002. The more stringent state ozone CAAQS of 0.09 ppm was exceeded numerous times in each of the last five years, including 56 times in 2003.

TABLE 5.2-2
OZONE LEVELS AT FRESNO FIRST STREET (ppm)

Fresno First Street Station, Fresno County	2001	2002	2003	2004	2005
Maximum 1-hour Average	0.135	0.144	0.135	0.123	0.134
Number of Days Exceeding California 1-hour Standard (0.09 ppm)	51	45	56	23	31
Number of Days Exceeding National 1-hour Standard (0.12 ppm)	5	11	5	0	3
Maximum 8-hour Average	0.113	0.119	0.111	0.103	0.111
Number of Days Exceeding National 8-hour Standard (0.08 ppm) [1]	40	41	47	18	27

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

[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.

NA = not applicable
ppm = parts per million

The federal 8-hour ozone 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 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 Fresno First Street station was 0.106 ppm, which is above the allowable standard of 0.08 ppm.

O_3 data completeness at Fresno First Street was 98 percent for 2001 and 2002, and 99 percent for 2003 through 2005.

5.2.1.2.2 Nitrogen Dioxide (NO_2). NO_2 is formed primarily from reactions in the atmosphere between NO (nitric oxide) and oxygen (O_2) or ozone. NO is formed during high-temperature combustion processes, when the nitrogen and oxygen 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 ozone.

Historical data presented in Table 5.2-3 show NO_2 levels at the Fresno First Street 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 higher NO_2 concentrations than the project site, which has much lower exposure to significant emission sources. Accordingly, data for the less urban Fresno County site in Parlier, about 15 miles south-southeast from Fresno, are also displayed in Table 5.2-3.

TABLE 5.2-3
NITROGEN DIOXIDE LEVELS AT FRESNO FIRST STREET AND AT PARLIER IN FRESNO COUNTY (ppm)

Fresno First Street Station, Fresno County	**2001**	**2002**	**2003**	**2004**	**2005**
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
Parlier, Fresno County					
Maximum 1-hour Average	0.060	0.056	0.051	0.052	0.063
Annual Average	0.012	0.013	0.012	0.011	0.011
Days Over State Standard (0.25 ppm, 1-hour)	0	0	0	0	0

Sources: CARB ADAM Website (www.arb.ca.gov/adam/welcome.html);
USEPA AIRS Website (www.epa.gov/air/data/index.html)
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 last five years, there have been no violations of the CAAQS 1-hour standard (0.25 ppm) at either the Fresno First Street or Parlier station. The highest 1-hour concentration recorded at the stations during the last five years were 0.090 ppm and 0.06 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 of actual concentrations in the very rural project site area. Thus, for purposes of the air impact assessment described later in this section, the Parlier NO_2 data were used to estimate background concentrations at the PEC site.

NO_2 data completeness for each year was 100 percent for 2001, 99 percent for 2002 through 2004, and 96 percent for 2005.

5.2.1.2.3 Carbon Monoxide (CO). Carbon monoxide 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 non-attainment area for CO, was re-designated to attainment in 1998.

Table 5.2-4 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 very 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 Website (www.arb.ca.gov/adam/welcome.html);
USEPA AIRS Website (www.epa.gov/air/data/index.html)
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.

5.2.1.2.4 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. 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 very rural project site area.

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

Fresno Fremont School Station, Fresno County	2001	2002	20032	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 Website (www.arb.ca.gov/adam/welcome.html);
USEPA AIRS Website (www.epa.gov/air/data/index.html)
NA = not recorded
ppm = parts per million

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

5.2.1.2.5 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, sulfur oxides, and nitrogen oxides. 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 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 (µg/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 Website (www.arb.ca.gov/adam/welcome.html);
USEPA AIRS Website (www.epa.gov/air/data/index.html)
µg/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 (µg/m^3) many times per year. The maximum daily concentration was 204 µg/m^3 (state samplers) in 2001. The maximum annual arithmetic mean concentration recorded at Fresno First Street was 43 µg/m^3 in 2001, which is below the federal standard of 50 µg/m^3 but above the state standard of 30 µg/m^3. Because of the low population density and low level of industrial development in western Fresno County, 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.

PM_{10} concentration data completeness 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.

5.2.1.2.6 Fine Particulates ($PM_{2.5}$). The $PM_{2.5}$ data in Table 5.2-7 show that the national 24-hour average NAAQS of 65 µg/m^3 has been exceeded in three of the past five years. The maximum recorded 24-hour average value was 110.0 µg/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 µg/m^3 which is above both the national standard of 15 µg/m^3 and the California standard of 12 µg/m^3.

TABLE 5.2-7
PARTICULATE MATTER ($PM_{2.5}$) LEVELS AT FRESNO FIRST STREET (µg/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 Website (www.arb.ca.gov/adam/welcome.html);
USEPA AIRS Website (www.epa.gov/air/data/index.html)
µg/m^3 = micrograms per cubic meter
$PM_{2.5}$ = particulate matter less than 2.5 emissions microns in diameter

5.2.1.2.7 Airborne Lead (Pb). Lead (Pb) pollution has historically been emitted predominantly from the combustion of fuels. However, legislation in the early 1970s required gradual reduction of the lead content of gasoline. Coupled with the introduction of unleaded gasoline in 1975, lead 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 shows the recorded 24-hour and quarterly lead concentration averages at the Fresno First Street station for the years 1999 through 2003. Both state and federal standards limit long-term average lead concentrations to 1.5 µg/m^3, although NAAQS pertains to a quarterly average, while CAAQS applies to a 30-day average.

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 Website (www.arb.ca.gov/adam/welcome.html);
USEPA AIRS Website (www.epa.gov/air/data/index.html)
µg/m^3 = micrograms per cubic meter

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 five years. Both maxima are far below the state and federal standards for lead. In addition, lead concentrations measured in the City of Fresno are almost certainly higher than at the rural project site.

5.2.1.2.8 **<u>Particulate Sulfates</u>.** 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 oxides of sulfur (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.

5.2.1.2.9 **<u>Other State-designated Criteria Pollutants</u>.** 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 non-attainment 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 <u>Construction Emissions</u>

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 12.8-acre site where the new turbines will be located; an 8-acre laydown area that will be used as a parking area during the construction phase, a 1.0-acre area north of the site where the natural gas pipeline will be connected, and a 1.1-acre site adjunct to the existing substation. While 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 files are included in Attachment B to Appendix I. Based on information provided by the project design engineering firm, construction emissions calculations were made for an expected 16-month construction period with an 8-hour workday and a 5-day workweek. For purposes of the URBEMIS2002 calculations, construction activities will occur in three phases: 1) site grading; 2) building of facility structures; and 3) asphalt paving. In order to accurately represent construction activities, URBEMIS2002 was run for each phase separately. The first simulation estimated emissions resulting from site grading activities that would occur over the first two months. No building or asphalt activities were assumed to occur during this time. The second model simulation estimated emissions from the building of the facility, with no part of the final two phases expected to overlap. The third model simulation estimated emissions from asphalt laying activities. The simulations that provided the highest daily emission rates were used in the modeling analysis.

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, Attachment B). 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, while emissions associated with the asphalt phase are based on equipment usage in Month 10. The expected equipment usage was input into URBEMIS2002 to estimate emissions. Fugitive dust emissions resulting from onsite soil disturbances were estimated from the total acreage disturbed (22.1 acres) 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 URBEMIS2002, with inputs representing heavy industrial land use in a rural area within the San Joaquin Valley.

Tables 5.2-9 and 5.2-10 present the mitigated maximum daily emissions for each phase as estimated by URBEMIS2002. Table 5.2-11 presents the total mitigated emissions of air pollutants for each phase over the full 16-month construction project (2 months for site grading, 0.5 months for asphalt, 14 months for building).

TABLE 5.2-9
DAILY MAXIMUM CRITERIA POLLUTANT CONSTRUCTION EMISSIONS SITE GRADING PHASE (lbs/day)

Activity	VOC	CO	NO_x	PM_{10}	SO_x
Fugitive Dust	-	-	-	2.84	-
Off-road Diesel	41.40	334.84	241.05	4.51	-
On-road Diesel	-	-	-	-	-
Worker Trips	0.40	9.49	0.99	0.05	0.01
Total Max. Daily Emissions	**41.80**	**344.33**	**242.04**	**7.40**	**0.01**

Notes:
- = not applicable
CO = carbon monoxide
lbs = pounds
NO_x = nitrogen oxide(s)
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 CRITERIA POLLUTANT CONSTRUCTION EMISSIONS BUILDING AND ASPHALT PAVING PHASE (lbs/day)

Activity	VOC	CO	NO_x	PM_{10}	SO_x
Bldg Const Off-road Diesel	46.18	381.37	267.43	4.90	-
Bldg Const Worker Trips	4.18	98.87	9.72	0.16	0.06
Asphalt Off-road Gas	0.48	-	-	-	-
Asphalt Off-road Diesel	18.03	149.84	98.40	1.60	-
Asphalt On-road Diesel	0.14	0.52	2.41	0.02	-
Asphalt Worker Trips	0.15	4.27	0.48	0.03	0.0
Total Max. Daily Emissions	**69.16**	**634.87**	**378.44**	**6.71**	**0.06**
Offsite On-Highway Emissions					
Passenger Vehicle - Combustion Emissions	5.5	51.6	5.1	0.3	0.04
Delivery Truck - Combustion Emissions	11.6	114.7	20.9	0.3	0.01
Passenger Vehicle - Paved Road Dust				1.6	
Delivery Truck - Paved Road Dust				12.7	
Subtotal of Off-site Emissions (lbs)	**17.1**	**166.3**	**26**	**14.9**	**0.05**

Notes:
- = not applicable
CO = carbon monoxide
lbs = pounds
NO_x = nitrogen oxide(s)
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]	0.92	7.58	5.32	0.16	0.00
Total Building Phase[2]	7.76	73.96	42.68	0.78	0.01
Total Asphalt Paving Phase[3]	0.10	0.85	0.56	0.01	0.00
Total Project Emissions (tons)	8.78	82.39	48.56	0.95	0.01

Notes:
1 = Site grading totals are for only 2 months of activity.
2 = Building total is for 12 months.
3 = Asphalt total is for 0.5 months.
CO = carbon monoxide
lbs = pounds
NO_x = nitrogen oxide(s)
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 four simple-cycle combustion turbine generators (CTG) burning exclusively natural gas fuel. Annual operational emissions from each of the four project CTGs were estimated by summing the emissions corresponding to normal operating conditions, limited hours of maintenance operations without emissions controls, 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 20 hours of maintenance (operation without SCR and CO catalyst), and 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 percent, 75 percent, and 100 percent) are presented in Table 5.2-12. These three scenarios represent the expected normal operating range of these turbines at the project facility.

In addition to the four 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 five-cell mechanical draft evaporative cooling tower. There are no other operational emissions sources at the project site.

The scenarios presented below 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).

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 Un-controlled (lbs/hr)	CO Normal (lbs/hr)	CO Un-controlled (lbs/hr)	SO_2 Normal (lbs/hr)	SO_2 Un-controlled (lbs/hr)	VOC Normal (lbs/hr)	VOC Un-controlled (lbs/hr)	PM_{10} Normal (lbs/hr)	PM_{10} Un-controlled (lbs/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	10.0	10.0
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	10.0	10.0
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	10.0	10.0
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	10.0	10.0
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	10.0	10.0
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	10.0	10.0
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	10.0	10.0
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	10.0	10.0
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	10.0	10.0
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	10.0	10.0

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

The expected emissions and durations associated with individual turbine startup and shutdown events are summarized in Table 5.2-13. Based on vendor information, each turbine startup is expected to take 10 minutes, followed by a 20-minute SCR warm-up 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).

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 lbs per Event**	**Warmup Total lbs per Event**	**Total lbs 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}	11.0	3.7	11.0

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

Table 5.2-14 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 ambient air quality standards. 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, 24-hour, and annual averaging periods were conservatively calculated assuming a fuel sulfur concentration of 0.50 grains per 100 standard cubic feet of natural gas. A 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 1-4	Sources: Diesel Fire Pump	Sources: Cooling Tower
			Emissions in lbs – Entire Period		
1-hour	Four turbines operating at highest commissioning rate, except for SO_2 which uses normal operating load for all.	NO_x	282.69	1.38	-
		CO	523.08	0.23	-
		SO_2	5.08	0.002	-
3-hour	All turbines operating at normal operating loads.	SO_2	15.24	0.002	-
8-hour	Four turbines operating 8 hours at highest commissioning rates.	CO	4,979.62	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}	960.0	0.05	8.5
		SO_2	111.56	0.002	-
Annual	Turbines operate for 5,000 total hours which include 365 startups, 365 shutdowns, 20 hours of maintenance and 4,734 hour at normal operating loads. Cooling Tower operates 5,000 hours and fire pump operates 52 hours (1 hour per week).	NO_x	200,347.2	71.54	-
		PM_{10}	200,078.4	2.75	1,762
		SO_2	24,614.8	0.12	-

Notes:
CO = carbon monoxide
lbs = pounds
NO_x = nitrogen oxide(s)
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 four 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 and maintenance 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 ambient air quality standard for the 8-hour averaging time. The maximum 8-hour emission scenario used for modeling consists of all four turbines at the highest commissioning emission rate. This is clearly an extreme worst-case assumption that would be highly unlikely to occur in practice.

The scenario selected to represent a conservative maximum potential 24-hour average emission rates for particulate matter assumes three startups and three shutdowns for all four 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 normal full-load operating mode.

Annual emissions of all pollutants were calculated for each turbine assuming total operations of 5,000 hours, including 365 startup and shutdown cycles in addition to 20 hours of maintenance operation. Estimated maximum annual emissions for the project are presented in Table 5.2-15.

TABLE 5.2-15
ANNUAL PEC OPERATIONAL EMISSIONS
OF CRITERIA POLLUTANTS

Pollutant	Emissions (tons/year)[1,2]
SO_2	12.31
NO_x	100.21
VOC	30.42
PM_{10}[3]	100.9
CO	193.26
Lead	Negligible[4]

Notes:

[1] Includes emissions from four 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, 20 hours maintenance, and 4,734 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 = nitrogen oxide(s)
PM_{10} = particulate matter less than 10 microns in diameter
VOC = volatile organic compounds
SO_2 = sulfur dioxide

5.2.2.2.1 <u>Turbine Commissioning</u>. The commissioning of the 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 would not be functioning and because the combustor burners would 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 would 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 General Electric, 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 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 – 24 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 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., 37,638 lbs of NO_x and 46,038 lbs 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, Attachment C 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 non-criteria pollutant emissions from the project are evaluated in Section 5.16, Public Health and Safety. 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 four 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, Attachment D, 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.

5.2.2.3.1 Model and Model Option Selections. The modeling was conducted using USEPA Industrial Source Complex model (ISCST3) (Version 02035) 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 ISCST3 is acceptable for evaluating the air quality impacts of this project (SJVAPCD, 2006). ISCST3 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 ambient air quality standards (i.e., NO_2, SO_2, and PM_{10}), modeling was conducted using ISCST3 with the PERIOD option to predict annual average impacts. The ISCST3 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, and site visits indicate that the area surrounding the project is more than 90 percent rural; therefore, rural dispersion coefficients were used in the modeling analyses for this project.

5.2.2.3.2 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 Building Profile Input Program – Prime (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
- Variable bleed valve 1
- Variable bleed valve 2
- Variable bleed valve 3
- Variable bleed valve 4
- Exhaust duct 1
- Exhaust duct 2
- Exhaust duct 3
- Exhaust duct 4
- Combustion turbine 1
- Combustion turbine 2

- Combustion turbine 3
- Combustion turbine 4
- Cooling tower
- Fire pump building

The results of the BPIP-Prime analysis were included in the ISCST3 input files to enable downwash effects to be simulated. The ISCST3 model considers direction-specific downwash using both the Huber-Snyder and Schulman-Scire algorithms, as evaluated in the BPIP-Prime program. Input and output 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.

5.2.2.3.3 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. The Fresno Yosemite International Airport is located approximately 48 miles east 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 5 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 San Joaquin Valley Air Pollution Control District (SJVAPCD, 2006), and were downloaded from the District's website. Despite the distance of the project site from the Fresno Yosemite International Airport, 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 PEC site.

As discussed briefly in Section 5.2.1, 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 across at the northern edge near Stockton and expands to more than 65 miles wide near Visalia and is only about 20 miles wide near Bakersfield. The project site is located in the northwestern portion of the Valley approximately 6 miles southeast of the Panoche Hills, foothills of the Diablo

Range. The Fresno Yosemite International Airport is located in the eastern central portion of the valley, approximately 48 miles east of the project.

The terrain immediately surrounding the project site can be categorized as flat, or gradually sloping irrigated farm lands, with very few areas of concentrated human population. The terrain around the Fresno Yosemite International Airport is also flat and the area outside the City of Fresno urban area is flat irrigated farm lands. Additionally, there are no significant terrain features in the area between the Airport and PEC 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 northwest of PEC. This is the closest National Weather Service data and is appropriate for use in all of central and northern California for modeling purposes.

5.2.2.3.4 Receptor Locations. Receptors for the criteria pollutant modeling analysis were placed at off-property locations to evaluate the impacts of the project (see Figures 5.2-3 and 5.2-4). 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 10 kilometers from the property boundary. The following receptor spacing was used in the modeling analysis:

- 25-meter spacing extending around the property boundary and out to 1,000 meters beyond the boundary
- 100-meter spacing between 1,000 meters and 5 kilometers of the property boundary
- 250-meter spacing between 5 kilometers and 10 kilometers of the property boundary

If a maximum predicted concentration value was located in the portions of the receptor field with 100-m or 250-m spacing, the model was rerun using a dense receptor grid that was placed around the initial maximum concentration point. This dense receptor grid utilized 25-m spacing and extended 500 meters in all directions from the point of initial point maximum concentration.

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

5.2.2.3.5 **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 20 acres, since the main site area and the laydown area lie adjacent to each other. Small area sources for the natural gas pipeline and the substation expansion were also created to represent fugitive dust impacts from those sources. 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 construction. The equipment usage during this month was assumed to be divided between the main facility site and the substation expansion site in proportion to the sizes of these areas. Activities associated with the natural gas pipe installation and the laydown area would have minimal equipment usage as activities would primarily include very short-term digging and parking for worker vehicles. Combustion emissions from the main facility site and the substation expansion area were distributed based on size. Thus, 1.1/ 13.9 of all combustion emissions were assumed to occur in the substation expansion area (1.1 acres) and 12.8/13.9 of the construction combustion emissions were assumed to be associated with the main facility site (12.8 acres). The fuel combustion emissions were represented in the dispersion model simulations as two uniformly spaced volume sources on the main facility site, and two other volume sources were placed on the substation expansion 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.

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 20 acres, since the areas lie adjacent to each other. The emissions resulting from the pipeline installation were modeled as ten area sources to accurately represent the linear path it follows. Total emissions resulting from 2 months of grading and 10 months of other activities were divided among a 20-acre area including the main facility site and laydown area, a 1.1 acre expansion area, and a 1.0 acre pipe installation area. Accordingly, 20/22.1 of total emissions were placed as an area source over the main facility and laydown area, 1.1/22.1 of the total dust emissions were placed as one area source over the expansion site, and 1.0/22.1 of total dust emissions were placed as 10 area sources along the expected pipeline route.

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. In order to account for grading activities that may occur concurrently, particulate emissions resulting from fugitive dust are included. This model input would simulate a worst-case scenario, as it is unlikely that all fugitive dust resulting from the site grading would occur at the same time as maximum combustion emissions.

The ozone limiting method (OLM) was employed to estimate maximum 1-hour and annual NO_2 impacts from the construction activities only. Measured ozone 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. The annual NO_2 impacts were estimated by the OLM using the annual average concentration of ozone to estimate the atmospheric conversion to NO_2. Short term and long term impacts are further discussed in Section 5.2.2.4.

5.2.2.3.6 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 ISCST3 (Version, 02035) as described in the previous subsections. Building wake information and the receptor grid described above were also used. All five years of meteorological data were used in the screening analysis. Meteorological data from 1990 produced the highest ground-level concentrations identified in the screening modeling for the 3-hour averaging time, as did 1989 data for the 8-hour, 24-hour and annual averaging time periods. Meteorological data from 1988 produced the highest results for the 1-hour averaging time period. Stack parameters corresponding to the 100 percent load turbine and 63°F ambient temperature produced the highest offsite pollutant concentrations (except for PM_{10} which peaked with the parameters for 50 percent load and 114°F ambient temperature).

The ISCST3 model simulated natural gas combustion emissions from four, 13.5-foot-diameter (4.11 meter), 90-foot-tall (27.43 meter) stacks. The stacks were modeled as point sources at their proposed locations and with the stack parameters shown in Table 5.2-12. Table 5.2-16 presents the combustion turbine 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, Attachment C.

The screening modeling results shown in Table 5.2-16 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.

In all subsequent modeling analyses, emissions from the four natural gas turbines were modeled using the stack parameters of the worst-case operating scenarios discussed above. Specifically, stack parameters corresponding to the 100 percent load operating condition (except for PM_{10}) were conservatively used to represent emissions from each turbine in the refined modeling analyses presented in the following subsections. However, pollutant emission rates corresponding to 100 percent load conditions were assumed in the modeling analyses.

5.2.2.3.7 Refined Modeling. A refined modeling analysis was performed to estimate offsite 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 emergency diesel firewater pump were also included in this analysis. Emission rates and modeling parameters used for the diesel firewater pump are included in Appendix I, Attachment C.

5.2.2.3.8 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) 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. Input and output electronic files for the fumigation modeling analysis are included in the modeling 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

TABLE 5.2-16
CTG SCREENING MODEL RESULTS – ALL SCENARIOS, ALL YEARS (mg/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	8.10/11.77/1.28	8.41/12.38/1.32	8.70/12.80/1.38	8.66/12.73/1.37	7.33/10.61/1.19	7.52/10.97/1.23	7.44/10.84/1.21	5.72/8.24/0.96	5.80/8.64/0.99	5.87/8.45/0.98
	3 hour	SO_2	0.80	0.83	0.87	0.85	0.72	0.75	0.74	0.57	0.59	0.58
	8 hour	CO	4.90	5.15	5.33	5.28	4.42	4.57	4.51	3.49	3.65	3.57
	24 hour	PM_{10}/SO_2	2.43/0.25	2.41/0.26	2.41/0.28	2.41/0.27	2.44/0.22	2.44/0.23	2.44/0.22	2.56/0.18	2.55/0.18	2.56/0.18
	Annual	NO_x/PM_{10}/SO_2	0.12/0.18/0.02	0.12/0.18/0.02	0.13/0.18/0.02	0.13/0.18/0.02	0.10/0.18/0.02	0.10/0.18/0.02	0.10/0.18/0.02	0.08/0.19/0.01	0.08/0.18/0.01	0.08/0.19/0.01
1988	1 hour	NO_x/CO/SO_2	8.18/11.89/1.30	8.50/12.51/1.34	**8.79/12.93/1.39**	8.73/12.83/1.38	7.39/10.70/1.20	7.58/11.06/1.24	7.50/10.92/1.22	5.74/8.27/0.96	5.82/8.68/0.99	5.90/8.48/0.99
	3 hour	SO_2	0.80	0.83	0.86	0.85	0.72	0.75	0.74	0.57	0.59	0.59
	8 hour	CO	4.47	4.75	4.97	4.86	3.87	4.02	3.94	2.92	3.06	2.99
	24 hour	PM_{10}/SO_2	2.09/0.22	2.08/0.23	2.07/0.24	2.08/0.23	2.15/0.19	2.13/0.20	2.15/0.20	2.18/0.15	2.18/0.15	2.18/0.15
	Annual	NO_x/PM_{10}/SO_2	0.14/0.22/0.02	0.15/0.22/0.02	0.16/0.21/0.03	0.15/0.22/0.02	0.12/0.22/0.02	0.13/0.22/0.02	0.12/0.22/0.02	0.09/0.23/0.02	0.09/0.23/0.02	0.10/0.23/0.02
1989	1 hour	NO_x/CO/SO_2	7.81/11.35/1.24	8.14/11.99/1.28	8.45/12.43/1.34	8.36/12.29/1.32	6.97/10.09/1.13	7.18/10.47/1.17	7.07/10.30/1.15	5.47/7.88/0.91	5.55/8.27/0.95	5.62/8.08/0.94
	3 hour	SO_2	0.70	0.73	0.77	0.75	0.62	0.64	0.63	0.50	0.51	0.51
	8 hour	CO	6.46	6.89	**7.20**	7.04	5.62	5.82	5.73	4.36	4.57	4.46
	24 hour	PM_{10}/SO_2	3.29/0.34	3.27/0.36	3.26/**0.37**	3.27/0.37	3.33/0.30	3.33/0.31	3.33/0.31	**3.37**/0.23	3.37/0.24	3.37/0.24
	Annual	NO_x/PM_{10}/SO_2	0.15/0.23/0.02	0.16/0.23/0.03	**0.17**/0.23/**0.03**	0.16/0.23/0.03	0.13/0.23/0.02	0.14/0.23/0.02	0.13/0.23/0.02	0.10/**0.24**/0.02	0.10/0.24/0.02	0.10/0.24/0.02
1990	1 hour	NO_x/CO/SO_2	6.26/9.09/0.99	6.55/9.64/1.03	6.84/10.06/1.08	6.70/9.85/1.06	5.50/7.96/0.89	5.65/8.24/0.92	5.57/8.12/0.91	4.27/6.16/0.71	4.32/6.44/0.74	4.39/6.31/0.73
	3 hour	SO_2	0.96	1.00	**1.04**	1.03	0.88	0.91	0.90	0.70	0.73	0.72
	8 hour	CO	4.65	4.92	5.12	5.05	4.09	4.24	4.16	3.06	3.22	3.13
	24 hour	PM_{10}/SO_2	1.97/0.20	1.95/0.21	1.93/0.22	1.95/0.22	2.07/0.19	2.05/0.19	2.07/0.19	2.15/0.15	2.15/0.15	2.15/0.15
	Annual	NO_x/PM_{10}/SO_2	0.13/0.20/0.02	0.14/0.20/0.02	0.14/0.20/0.02	0.14/0.20/0.02	0.11/0.20/0.02	0.12/0.20/0.02	0.11/0.20/0.02	0.08/0.21/0.01	0.09/0.21/0.02	0.09/0.21/0.01
1991	1 hour	NO_x/CO/SO_2	6.25/9.08/0.99	6.54/9.62/1.03	6.83/10.04/1.08	6.69/9.84/1.06	5.48/7.94/0.89	5.64/8.23/0.92	5.56/8.10/0.91	4.27/6.15/0.71	4.31/6.42/0.74	4.37/6.29/0.73
	3 hour	SO_2	0.86	0.89	0.93	0.92	0.78	0.81	0.80	0.61	0.63	0.63
	8 hour	CO	4.59	4.85	5.06	4.98	4.03	4.18	4.10	3.06	3.21	3.13
	24 hour	PM_{10}/SO_2	2.02/0.21	2.00/0.22	1.98/0.23	2.01/0.23	2.09/0.19	2.08/0.20	2.11/0.19	2.29/0.16	2.26/0.16	2.29/0.16
	Annual	NO_x/PM_{10}/SO_2	0.13/0.19/0.02	0.13/0.19/0.02	0.14/0.19/0.02	0.14/0.19/0.02	0.11/0.20/0.02	0.11/0.20/0.02	0.11/0.20/0.02	0.08/0.20/0.01	0.08/0.20/0.01	0.08/0.20/0.01

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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 1988
	Annual	100 percent load, 63°F, year 1989
CO	1 hour	100 percent load, 63°F, year 1988
	8 hour	100 percent load, 63°F, year 1989
SO_2	1 hour	100 percent load, 63°F, year 1988
	3 hour	100 percent load, 63°F, year 1990
	24 hour	100 percent load, 63°F, year 1989
	Annual	100 percent load, 63°F, year 1989
PM_{10}	24 hour	50 percent load, 114°F, year 1989
	Annual	50 percent load, 114°F, year 1989

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

evaluate both construction and operational impacts. In each case, the ISCST3 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 last 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.

5.2.2.4.1 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 SO_2, and NO_x were predicted to occur along the east boundary of the main construction site close to the laydown area, while the locations of maximum concentrations for other pollutants and averaging times were on or near the west boundary of the 12.8-acre power plant site.

The highest hourly and annual NO_x concentrations predicted by the ISCST3 model for each year of meteorological input data for which ozone data were also available (1988 through 1991) plus the maximum background NO_2 values recorded at the Parlier monitoring station

TABLE 5.2-18
ISCST3 MODELING RESULTS

Pollutant	Averaging Period	Maximum Modeled Impact ($\mu g/m^3$)	Background[2] ($\mu g/m^3$)	Maximum Total Predicted Concentration ($\mu g/m^3$)	PSD Significant Impact Level[1] ($\mu g/m^3$)	Most Stringent AAQS ($\mu g/m^3$)	UTM Coordinates	
							East (m)	North (m)
Construction Impacts								
CO	1 hour	2,926	7,705	10,630	NA	23,000	715,867	4,058,692
	8 hour	1,365	5,156	6,521	NA	10,000	715,865	4,058,740
NO_2	1 hour[3]	188.1	118.44	306.54	NA	470	715,867	4,058,692
	Annual	68.43	24.53	92.96	NA	100	716,713	4,058,652
PM_{10}	24 hour	18.69	193.0 [4]	211.69	NA	50	715,867	4,058,668
	Annual	3.28	43.0 [4]	46.28	NA	20	716,173	4,058,652
SO_2	1 hour	0.37	23.6	23.97	NA	655	715,867	4,058,692
	3 hour	0.22	15.6	15.82	NA	1,300	715,866	4,058,716
	24 hour	0.09	10.5	10.59	NA	105	716,173	4,058,652
	Annual	0.02	5.3	5.32	NA	80	716,173	4,058,652
Routine Plant Operation Impacts								
CO	1 hour[5]	347.9	7,705	8,053	2,000	23,000	710,920	4,053,581
	8 hour[6]	193.9	5,156	5,350	500	10,000	714,620	4,049,781
NO_2	1 hour[5]	210.7	118.44	329.14	NA	470	710,920	4,053,581
	1 hour (normal)	124.3	118.44	242.74	NA	470	715,989	4,058,606
	Annual[7]	0.12	24.53	24.65	1	100	707,770	4,056,655
PM_{10}	24 hour[8]	4.47	193.0[4]	197.47	5	50	707,745	4,056,830
	Annual[7]	0.17	43.0[4]	43.17	1	20	707,845	4,056,705
$PM_{2.5}$	24 hour[8,9]	4.47	110.0	114.47	NA	65	707,745	4,056,830
	Annual[7,9]	0.17	21.6	21.77	NA	12	707,845	4,056,705
SO_2	1 hour[5]	1.43	23.6	25.03	NA	655	710,920	4,053,581

TABLE 5.2-18 (CONTINUED)
ISCST3 MODELING RESULTS

Pollutant	Averaging Period	Maximum Modeled Impact (μg/m³)	Background[2] (μg/m³)	Maximum Total Predicted Concentration (μg/m³)	PSD Significant Impact Level[1] (μg/m³)	Most Stringent AAQS (μg/m³)	UTM Coordinates	
							East (m)	North (m)
	3 hour[10]	1.07	15.6	16.67	25	1,300	711,070	4,053,406
	24 hour[8]	0.38	10.5	10.88	5	105	707,695	4,056,830
	Annual[7]	0.01	5.3	5.31	1	80	707,770	4,056,655

Notes:

μg/m³ = micrograms per cubic meter
CO = carbon monoxide
ISCST3 = USEPA Industrial Source Complex model, Version 02035
m = meters
NA = Not applicable
AAQS = Ambient Air Quality Standard
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 PM emissions during operation assumed to be $PM_{2.5}$
PSD = Prevention of Significant Deterioration
SO_2 = sulfur dioxide
UTM = Universal Transverse Mercator

[1] Source: 40 CFR 52.21.

[2] Background represents the maximum values measured at Fresno First St. (CO, NO_2, PM_{10}, $PM_{2.5}$) or Fresno Fremont School (SO_2) monitoring stations, 2001-2005, depending on pollutant.

[3] Results for 1-hour NO_2 during construction used OLM to estimate NO_2 impacts.

[4] PM_{10} background levels exceed ambient standards.

[5] Maximum hourly impact based on four turbines under commissioning conditions and one hour of diesel fire pump operation.

[6] Maximum 8-hour impact based on four turbines operating for 8 hours under commissioning rate and one hour of diesel fire pump operation.

[7] Annual impact based on 4,734 hours of normal operation, 20 maintenance hours, 365 startups, and 365 shutdowns for all four turbines (total of 5,000 hours), 5,000 hours of cooling tower operation, and 52 hours of diesel fire pump engine operation.

[8] Maximum 24-hour impact based on three startups, three shutdowns and remainder of period at normal operations for four turbines and 1 hour of fire pump engine.

[9] All operational project equipment PM_{10} emissions assumed to be $PM_{2.5}$.

[10] Maximum 3-hour impact based on 3 hours of normal operation for four turbines and one hour of fire pump engine.

in the last 5 years were above the California 1-hour and federal annual NO_2 standards, respectively. 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 ozone limiting method (OLM) was applied to the short-term and long-term NO_2 modeling results to provide a more reasonable characterization of plume chemistry in this area. Hourly ozone data recorded from the Fresno First Street monitoring station for the same years as the input meteorological data were used to identify the ozone concentration for the same hour in each year when the maximum 1-hour NO_x concentrations due to construction activities were predicted to occur and this value was used in the OLM calculation for the hourly NO_2 concentration. Similarly, the annual average ozone concentration was used for the OLM estimate of annual NO_2.

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 Fresno First Street monitoring station from 2001 through 2005, resulted in total concentration of 357.3 $\mu g/m^3$, which is below the 1-hour California standard (470 $\mu g/m^3$), and 92.6 $\mu g/m^3$, which is below the annual federal standard (100 $\mu g/m^3$).

5.2.2.4.2 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, 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 lists two maximum values for the one-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 all four turbines operating with functional control equipment, which is obviously 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.

Note that the refined dispersion modeling presented in this Application used a guaranteed PM_{10} emission rate provided by the CTG vendor (11 pounds per hour per turbine) that is higher than the SJVAPCD Rule 4301 limit of 10 pounds per hour from each combustion emission unit. The CTG vendor has since guaranteed to meet the 10 lb/hr PM_{10} emission rate, and this revised (lower) rate is reflected in the emissions tables throughout this Application. However, the dispersion modeling results for operational PM_{10} impacts in Table 5.2-18 used the higher emission rate of 11 lb/hour/turbine. Predicted maximum pollutant concentrations resulting from operations of the project are spread over a larger area than the corresponding values for the construction phase. Figure 5.2-5 shows the locations of the maximum predicted operational impacts for all pollutants and averaging times.

5.2.2.4.3 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, 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.

5.2.2.4.4 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.

5.2.2.4.5 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 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 all four turbines would be operating at the highest commissioning emission rates for a full one-hour or eight-hour period. Specifically, the maximum 1-hour emission rates of 187.0 lbs/hr/turbine (23.56 g/s/turbine) of NO_x and 309.75 lbs/hr/turbine (39.03 g/s/turbine) of CO were predicted to result in maximum incremental hourly concentrations of 210.6 $\mu g/m^3$ NO_2 and 347.9 $\mu g/m^3$ CO, for all turbines combined.

TABLE 5.2-19
PROJECT OPERATIONS FUMIGATION IMPACT SUMMARY

Polluant	Source	Inversion Impact (µg/m^3)	Distance to Maximum Impact (meters)
NO_2 1 hour[1]	Normal Operation Turbine	1.22	16,547
NO_2 1 hour[2]	Maintenance Turbine	13.65	16,547
	Total NO_2 1 hour	14.87	
CO 1 hour[3]	Turbine	31.37	16,547
SO_2 1 hour[4]	Turbine	0.19	16,547
SO_2 3 hour[5]	Turbine	0.17	16,547

Notes:

1 NO_2 modeled with turbine in normal operation, 1.01 g/s and stack parameters for 100 percent load at 63°F.

2 Maintenance turbine NO_2 emission rate of 11.33 g/s and 100 percent load at 63°F.

3 CO modeled with turbine in maintenance, 26.03 g/s and stack parameters of 100 percent load at 63°F.

4 SO_2 modeled with turbine at 0.16 g/s emissions and 100 percent load at 63°F.

5 SO_2 1-hour results multiplied by 0.9 to convert to 3-hour.

% = percent
µg/m^3 = micrograms per cubic meter
CO = carbon monoxide
NO_2 = nitrogen dioxide
SO_2 = sulfur dioxide

Similarly, the assumed maximum 8-hour CO emission rate of 309.75 lbs/hr (39.03 g/s) resulted in a predicted maximum incremental 8-hour concentration for this pollutant during commissioning of 193.9 µg/m^3 for all turbines combined. In reality, commissioning for the different turbines will mostly be staggered, so the likelihood of even two 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 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 ambient air quality standards for these pollutants are predicted to occur.

5.2.3 Cumulative Impacts

CEC requirements specify that an analysis is required to determine the cumulative impacts of the project and other projects within a 6-mile radius that have received construction permits but are not yet operational or that are in the permitting process or can be expected to do so in the near future. Information requests have been made to SJVAPCD to obtain data on new

TABLE 5.2-20
PROJECT COMMISSIONING MODELING RESULTS

Pollutant	Averaging Period	Maximum Modeled Impact ($\mu g/m^3$)	Background[1] ($\mu g/m^3$)	Total Predicted Concentration ($\mu g/m^3$)	Most Stringent Standard ($\mu g/m^3$)
Commissioning Impacts					
CO	1 hour	347.9	7,705	8,053	23,000
	8 hour	193.9	5,011	5,205	10,000
NO_2	1 hour	210.6	169.8	380	470

Notes:
[1] Background represents the maximum value measured at Fresno First St. monitoring stations, 2001-2005.
NAAQS = Most stringent ambient air quality standard for the averaging period.
$\mu g/m^3$ = micrograms per cubic meter
CO = carbon monoxide
NO_2 = nitrogen dioxide

projects planned within six miles from the proposed site. The resulting list of projects will be submitted to 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 ISCST3 model with the same five-year meteorological input data set used for modeling PEC 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 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 proposed 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 non-attainment pollutants and their precursors. Accordingly, the Applicant will commit to offsetting the full project emissions of NO_x, VOC, PM_{10}, and SO_2.

Panoche Energy Center LLC will purchase emission reduction credits (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 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 or more from the new source, the applicable offset ratio is 1.5 to 1. Note that the PEC 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 pounds per year, whereas offsets for quarterly potential to emit that is not constant throughout the year and seasonal sources are calculated in pounds per quarter. The expected distribution of turbine operating hours for the PEC 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 PEC 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 pounds per quarter.

Table 5.2-21 lists the estimated offset requirements for the operational PEC. Annual project emissions from Table 5.2-15 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 PEC at which the offsetting emission reductions occurred. The ERC requirements in Table 5.2-21 are expressed as ranges, representing assumed distance factors of 1.3 to 1 and 1.5 to 1. Because of the very rural character of the Panoche site and the lack of significant nearby emission sources, 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

TABLE 5.2-21
ESTIMATED EMISSIONS OFFSETS REQUIREMENTS

Calendar Quarter	Project Emissions (tons)	ERCs Required (tons)[1,2]
NO_x		
First	22.05	28.665 – 33.075
Second	22.05	28.665 – 33.075
Third	32.07	41.691 – 48.105
Fourth	24.05	31.265 – 36.075
Max. Annual Total		**150.33 tons**
VOC		
First	6.69	8.697 – 10.035
Second	6.69	8.697 – 10.035
Third	9.73	12.649 – 14.595
Fourth	7.30	9.49 – 10.950
Max. Annual Total		**45.615 tons**
PM_{10}		
First	27.33	35.529 – 40.995
Second	27.33	35.529 – 40.995
Third	39.75	51.675 – 59.625
Fourth	29.81	38.753 – 44.715
Max. Annual Total		**186.33 tons**
SO_x		
First	2.71	2.71
Second	2.71	2.71
Third	3.94	3.94
Fourth	2.95	2.95
Max. Annual Total		**12.31 tons**

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 = nitrogen oxide(s)
PM_{10} = particulate matter less than 10 microns in diameter
SO_x = sulfur oxides
VOC = volatile organic compounds

for which the emissions of the new source will be below the local air district's emissions offsets thresholds.

Panoche Energy Center LLC has been active in pursuing ERCs for the project, and has determined that sufficient credits are available to cover the offset requirements shown in Table 5.2-21. Discussions are ongoing with various ERC owners. The following describes the information developed to date regarding the means by which the applicant intends to meet these requirements and the data obtained to date regarding the availability of credits in the SJVAPCD bank.

NO_x: PEC entered an agreement with Grey K HOLDINGS I, LLC on June 29, 2006 to purchase 100.22 NO_x ERCs (SJVAPCD Certificate #S-2325-2). The final PSA that affects the transfer of these ERCs to PEC is expected to occur in August 2006. To satisfy all CEC NO_x ERC requirements, PEC needs to secure an additional 50.11 tons prior to CEC's Final Decision. The market is long on NO_x ERCs at present, with up to 200 tons available at prices ranging from $19,000-$28,000/tpy.

VOC: According to the applicant's most recent market assessment, up to 90 tons of VOC ERCs in the SJVAPCD are presently available to be purchased. PEC projects that 45.615 tons of VOC ERCs are needed. At the time of this AFC submittal, PEC has not secured any VOC ERCs, but plans to buy or secure option contracts to buy the required credits prior to CEC's Final Decision

PM_{10}: PEC estimates that 186.33 tons of PM_{10} ERCs will be required. The PM_{10} market is shrinking at this time, with only about 50 tons of readily available ERCs currently being offered. PEC will consider using SO_x ERCs as an "inter-pollutant" offset for PM_{10} at an offset ratio acceptable to SJVAPCD and CEC. At the time of this AFC submittal, PEC has not secured any PM_{10} ERCs, but plans to buy or secure option contracts to buy the required PM_{10} (and/or SO_x) credits prior to CEC's Final Decision.

SO_x: According to the applicant's most recent market assessment, the current availability of SO_x ERCs is high, with up to 500 tons that can be purchased. PEC requires 12.31 tons of SO_x ERCs. As noted above, PEC will consider using SO_x ERCs to offset the Project PM_{10} emissions, depending on current market prices and the inter-pollutant offset ratio that is required by SJVAPCD and CEC.. At the time of this AFC submittal, PEC has not secured any SO_x ERCs, but plans to buy or secure option contracts to buy the required ERCs prior to CEC's Final Decision.

5.2.5 LORS

The applicable 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

USEPA, in response to the federal Clean Air Act (CAA) of 1970, established NAAQS in 40 Code of Federal Regulations (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 lead. 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 Clean Air Act, 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 5.2-22.

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 ambient air quality standards are classified as “attainment” areas; areas that do not meet the standards are classified as “nonattainment” areas. Areas that have insufficient air quality data may be identified as unclassifiable areas. These attainment designations are determined on a pollutant-by-pollutant basis. 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 5.2-23 presents the county’s attainment status with respect to both the national and California AAQS.

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 United States 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

TABLE 5.2-22
NATIONAL AND CALIFORNIA AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Time	CAAQS[1,2]	NAAQS[3,2]	
			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)		
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 volatile organic compounds), CO, SO_2 (1-hour), NO_2, and particulate matter (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 ozone and based on annual averages, are not to be exceeded more than once a year. The 8-hour ozone standard is based on a 3-year average of the fourth-highest daily maximum.

4 New federal 8-hour ozone and fine particulate matter ($PM_{2.5}$) standards were promulgated by USEPA on July 18, 1997. The federal 1-hour ozone 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 oxides of nitrogen (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 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
CO = carbon monoxide
mg/m^3 = milligrams per cubic meter
NAAQS = National Ambient Air Quality Standard
NO_2 = nitrogen dioxide
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

TABLE 5.2-23
FEDERAL AND STATE ATTAINMENT STATUS
FOR FRESNO COUNTY

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

Notes:
CO = carbon monoxide
NO_2 = nitrogen dioxide
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

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. This 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 ambient air quality standards described above, the federal PSD program has been established to protect deterioration of air quality in those areas that already meet national ambient air quality standards. Specifically, the PSD program 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 PEC, are shown in Table 5.2-24 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 PEC 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.

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 Code of Federal Regulations (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, PEC will be required to estimate SO_2 and 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 GG. 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 emissions from the project's stationary natural gas turbines will be less than or equal to 2.5 ppmvd at 15 percent O_2, which is significantly more stringent than the NSPS limit.

TABLE 5.2-24
PSD EMISSION THRESHOLD TRIGGERS
FOR NEW STATIONARY SOURCES

Pollutant	Significant Thresholds (tpy)	Project Emissions (tpy)	PSD Triggered by Project?
SO_2	250	12.31	No
NO_x	250	100.21	No
VOC	250	30.42	No
PM_{10}	250	124.22	No
CO	250	193.26	No

Project emissions include all emissions from natural gas turbines, cooling tower, and emergency diesel fire pump driver.

Notes:
CO = carbon monoxide
NO_x = nitrogen oxide(s)
Pb = lead
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

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.

USEPA has proposed Subpart KKKK, a new performance standard which, if promulgated, would apply to the project's stationary natural gas turbines in lieu of Subpart GG and would impose lower limits on NO_x and SO_2. However, 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 proposed Subpart KKKK requirement of 0.39 lb of NO_x per MW-hour. Similarly, the projected maximum SO_2 emissions from the PEC gas turbines will be about 0.011 lb of SO_2 per MW-hour, which is substantially less than the proposed Subpart KKKK requirement of 0.58 lb of SO_2 per MW-hour.

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, the CEC has been charged with assessing the environmental impacts of each new power plant over 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 tons per year are required to submit air toxic "Hot Spots" emissions information. The operational PEC will be required to provide quantitative information to SJVAPCD on the facility's emissions of toxic air contaminants, but this requirement is applicable only after the start of operation. Section 5.16, Public Health and Safety, of this Application demonstrates that the project's emissions of toxic air contaminants will not cause a significant health risk to in 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 Application for Certification (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. 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 national or California AAQS 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.

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

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

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

5.2.5.10.4 Rule 2010, Permits Required. An Authority to Construct and Permit to Operate will be required for the project. Panoche Energy Center, LLC will submit the required Application materials for these permits to SJVAPCD.

5.2.5.10.5 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 ambient air quality standards, 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 lbs 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 website.

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 at a concentration not to exceed 20 percent in water will be used as the reagent for the SCR control system. Ammonia slip will be limited to 10 ppmvd. The BACT levels for the project turbines are shown in Table 5.2-25.

Testing of the planned emergency equipment units, a 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 lbs of any pollutant. Thus, BACT will not be required under Rule 2201 4 for the firewater pump engine.

The proposed 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, Attachment E 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 5.2-26 and describes the methods for determining the quantities of emission reduction credits needed to offset emissions for a new stationary source.

TABLE 5.2-25
PROPOSED BACT FOR SIMPLE CYCLE GAS TURBINES

Pollutant	Control Technology	Concentration ppm @ 15 percent O_2 dry
NO_x	Water injection and SCR with ammonia injection	2.5
CO	Catalytic oxidation	6
VOC	Catalytic oxidation	2
Ammonia Slip	Aqueous ammonia strength not to exceed 20% by weight in water mixture	10
SO_x	Pipeline quality natural gas	NA
PM_{10}	Pipeline quality natural gas	NA

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

TABLE 5.2-26
SJVAPCD OFFSET THRESHOLDS

Pollutant	Pounds per Year
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 = pounds
NO_x = nitrogen oxide(s)
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 PEC operations and on the progress to date in obtaining the required numbers of ERCS is provided in Section 5.2.4, Mitigation Measures – Emissions Offsets.

<u>Section 4.14, Ambient Air Quality Standards</u>. Emissions from a new or modified Stationary Source may not cause or make worse the violation of an AAQS. Modeling used for the purposes of demonstrating compliance with this rule must be consistent with the requirements contained in the most recent edition of EPA'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 California Air Resources Board or the Environmental Protection Agency.

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.

<u>Section 5.8, Power Plants</u>. This section applies to all power plants proposed 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.

<u>Section 6.0, Certification of Conformity</u>**.** 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.

5.2.5.10.6 <u>Rule 2520, Federally Mandated Operating Permits</u>. 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.

5.2.5.10.7 <u>Rule 3010/3020, Permit Fees</u>. 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.

5.2.5.10.8 <u>Rule 3110, Air Toxics Fees</u>. 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) and to facilities subject to National Emission Standards for Hazardous Air Pollutants (NESHAPs) issued pursuant to Section 112 of the federal Clean Air Act.

5.2.5.10.9 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.

5.2.5.10.10 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 ozone.

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

5.2.5.10.12 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.

5.2.5.10.13 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.

5.2.5.10.14 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.

5.2.5.10.15 Rule 4201, Particulate Matter Concentration. This rule applies to the discharge of particulate matter 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 particulate matter, in excess of 0.1 grains per dry standard cubic foot of natural gas as determined by following test methods: Particulate matter concentration – EPA Method 5; Stack gas velocity – EPA Method 2; Stack gas moisture – EPA Method 4. The proposed PEC 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.

5.2.5.10.16 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 lbs per hour of NO_x, calculated as NO_2, 200 lbs 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 lbs per hour of combustion contaminants.

5.2.5.10.17 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.

5.2.5.10.18 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 EPA Method 8 and ARB Method 1-100.

5.2.5.10.19 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.

5.2.5.10.20 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.

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

5.2.5.10.22 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.

5.2.5.10.23 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.

5.2.5.10.24 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 5.2-27 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 5.2-27
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 GG	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
California Health and Safety Code 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

TABLE 5.2-27 (CONTINUED)
APPLICABLE LORS

LORS	Applicability	Section
SJVAPCD Regulation III, Rule 3135	Dust control plan fee	Section 5.2.5.10, SJVAPCD Requirements
SJVAPCD Regulation III, Rule 3170	Federally mandated ozone nonattainment fee	Section 5.2.5.10, SJVAPCD Requirements
SJVAPCD Regulation IV, Rule 4001	New Source Performance Standards	Section 5.2.5.10, SJVAPCD Requirements
SJVAPCD Regulation IV, Rule 4002	National Emission Standards for Hazardous Pollutants	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	Particulate matter 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:
CFR = Code of Federal Regulations
SJVAPCD = San Joaquin Valley Unified Air Pollution Control District
LORS = laws, ordinances, regulations, and standards

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 5.2-28.

TABLE 5.2-28
INVOLVED AGENCIES AND AGENCY CONTACTS

Agency	Contact/Title	Telephone
California Energy Commission	Joe Loyer and Twan Ngo Air Quality Specialists 1516 Ninth Street Sacramento, CA 95814	(916) 654-4287
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 E. 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 PEC. 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 PEC 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.

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.

United States 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.

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 5.2.2.2 - Appendix I, Attachment C		
Appendix B (g) (8) (C)	A description of the control technologies proposed to limit the emission of criteria pollutants.	- Section 5.2.2.2 - 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 5.2.2.2 - 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		

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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:			

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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:			

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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 5.2-29		
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 5.2-29		
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 5.2-30		

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		

5.3 GEOLOGICAL HAZARDS AND RESOURCES

5.3.1 Affected Environment

The Panoche Energy Center (PEC) site is located in the western San Joaquin Valley, which is part of the Central Valley. The Central Valley comprises about 20,000 square miles and extends from near Red Bluff on the north to near Bakersfield on the south, a distance of about 400 miles. The average width of the valley is about 50 miles. Elevations in the Central Valley range from slightly below mean sea level to 400 feet above mean sea level at its north and south ends. The Central Valley is bounded on the north by low-lying hills; on the northeast by a volcanic plateau of the Cascade Range; on the west by the Coast Ranges, which in places rise to elevations of about 4,000 feet above mean sea level; on the east by the Sierra Nevada, which in places rise to elevations of more than 14,000 feet above mean sea level; and on the south by the Coast Ranges and the Tehachapi Mountain elevations. Roughly the northern one-third of the valley is known as the Sacramento Valley and the southern two-thirds as the San Joaquin Valley (Page, 1986; Norris and Webb, 1990).

The Central Valley is also referred to as the Great Valley geomorphic province. The most extensive geomorphic units in the province include dissected uplands, low alluvial plains and fans, river flood plains and channels, and overflow lands and lake bottoms. The valley represents the alluvial, flood, and delta plains of two major rivers (the Sacramento and San Joaquin rivers) and their tributaries. The region persisted as a lowland or shallow marine embayment during the entire Cenozoic and at least the later Mesozoic. In the late Cenozoic, much of the area was occupied by shallow brackish and freshwater lakes, particularly in the San Joaquin Valley which has had interior drainage in its southern third since the Pliocene. Lake Corcoran formerly spread over much of the northern San Joaquin Valley during the middle and late Pleistocene. An associated diatomaceous-lacustrine clay (the Corcoran or E-Clay) covers more than 5,000 square miles of the San Joaquin Valley and is the confining layer for the most extensive confined aquifer in the San Joaquin Valley (Poland and Evenson, 1966; Croft, 1972; Page, 1986; Norris and Webb, 1990).

5.3.1.1 Panoche Energy Center

The PEC site, including the power plant, construction laydown, electrical interconnection lines, natural gas pipelines, and access road are located southeast of Panoche Creek on the Panoche Creek alluvial fan. The fan is one of a belt of coalescing alluvial fans 12 to 19 miles wide, and located on east flank of the Coast Ranges between the flood plains of the San Joaquin River and Fresno Slough in the trough of the valley to the northeast and the foothills of the Coast Range to the southwest. The site is located near the head of the largest of the fans in the region, near its intersection with the smaller Tumey Gulch alluvial fan to the south. Elevations of the alluvial fans range from about 130 feet above mean sea level at the base to as much as 900 feet above mean sea level at their apexes. The slopes of the fans range from about 10 feet per mile near the base of the larger fans to about 150 feet per mile on the upper slopes of some of the smaller fans (Bull, 1964a; 1972). The site elevation is about 420 feet above mean sea level and slopes gently with elevation decreasing to the northeast. The facilities are situated on a thick section of Quaternary surficial sediments and older alluvium underlain by tertiary sediments, cretaceous marine deposits, and pre-tertiary basement rocks.

5.3.1.1.1 Regional Geology. The San Joaquin Valley is an asymmetrical basin defined by the Coast Ranges to the west, the Tehachapi Mountains to the south, the Sierra Nevada to the east, and the delta of the San Joaquin and Sacramento Rivers to the north. The axis of the valley trough is closer to the Coast Ranges than to the Sierra Nevada (Belitz and Heimes, 1990).

The oldest rocks in the area are basement complex rocks that form much of the Tehachapi Mountains, San Emigdio Mountains, and the southern Sierra Nevada which are composed of a mass of plutonic and metamorphic rocks commonly referred to as the Sierra Nevada batholith of pre-Tertiary age (Figure 5.3-1). The basement complex is buried beneath the Tulare Lake bed by more than 14,000 feet of rocks of Cretaceous, Tertiary, and Quaternary age. Marine rocks of Jurassic and Cretaceous age also underlie the site at great depth below the valley floor. Due to their great depth, these rocks are usually not penetrated by water wells. Where they are exposed at the ground surface, they are generally mapped as the Franciscan, Panoche, and Moreno formations (Croft, 1972). Franciscan, Panoche, and Moreno formation rocks are exposed within the Diablo Range (part of the Coast Ranges) west of the site (CDMG, 1959). The Panoche and Moreno formations were formerly mapped as the Great Valley Sequence and are exposed in a 6- to 9-mile-wide belt in the Coast Ranges northwest of the site. Panoche Formation rocks in excess of 1,730 feet thick and Moreno Formation rocks about 1,870 feet thick have been encountered in gas wells in the Chaney Ranch Gas Field located north of the site (DOGGR, 1985).

Younger consolidated marine and nonmarine sedimentary rocks of Tertiary age unconformably overlie the older marine rocks. The Tertiary age section is highly asymmetrical and generally thickens from east to west and from north to south. These rocks have been divided into numerous formations and members with names that vary in the region (Croft, 1972). Locally, the Tertiary age section includes the Laguna Seca and the Lodo formations of Eocene and Paleocene age. Lodo Formation rocks ranging from about 530 to 800 feet thick have been encountered in nearby gas wells. An unconformity separates the overlying Domengine Sandstone and Kreyenhagen Shale of Eocene age from older rocks. The Domengine Sandstone ranges from about 130 to 400 feet thick and the Kreyenhagen Shale is about 470 feet thick in nearby gas wells (DOGGR, 1985). The unconformably overlying Oro Loma Formation is of Pliocene and Miocene age (Bartow, 1996; Bartow and Lettis, 1990).

Earlier work did not recognize the Oro Loma Formation and identified Tertiary age rocks overlying the Kreyenhagen Shale as the Tumey Formation of Oligocene age, marine sedimentary rocks of middle Miocene age that included the Monterey Shale and Temblor Formations, and unnamed nonmarine sediments of Pliocene age (Dibblee, 1975). Rocks identified as the Tumey Formation about 400 feet thick have been encountered in nearby gas wells (DOGGR, 1985).

The Tulare Formation of late Pliocene and early Pleistocene age unconformably overlies the Oro Loma Formation (Bartow and Lettis, 1990). Based on geologic cross sections, Tulare Formation rocks probably exceeded 600 feet in thickness underlying the site. Little if any of the original depositional surface remains. The Tulare Formation is locally divided into a lower unit, the Cororan Clay Member of the upper unit, and the upper unit. Based on geologic cross sections, thicknesses of these units are greater than 275 feet, 130 feet, and 190 feet, respectively immediately to the southeast of the site (Lettis, 1982). It is difficult to delineate the top and bottom of the Tulare Formation because of the thickness and similarity of deposits overlying and underlying the Corcoran Clay (Hotchkiss, 1972). The Corcoran Clay Member of the Tulare Formation is notable because it divides the ground water flow system into a lower confined zone and an upper semiconfined zone. The Corcoran Clay Member of the Tulare Formation is often referred to as the “blue clay” in drillers’ logs (Croft, 1972).

Figure 5.3-3 summarizes the local stratigraphic nomenclature. The underlying basement rocks and marine and nonmarine sedimentary rocks of Tertiary age included in Figure 5.3-3 are of regional significance but are not exposed within a two-mile radius of the site.

5.3.1.1.2 Local Geology – Stratigraphy. The alluvium of the Panoche fan is composed of sediment derived largely from older rocks shed eastward from the Diablo Range towards the valley trough. The sediments comprising the fan were deposited during relatively short-lived water flow and infrequent mudflow events by depositional processes including debris flows, sheet floods, stream channel deposits, and sieve deposits. Debris flows are high viscosity flows that have sufficient matrix strength to support and transport large clasts resulting in poorly-sorted and elongate deposits that lack cross bedding. Sheet floods are low viscosity, shallow channel and unchannelized flows where rapid decreases in flow depth and velocity result in channel filling and lateral shifts in channel location. Stream channel deposits result from filling of entrenched channels and are generally coarse-grained and more poorly-sorted than sheet flood deposits and are characteristically lenticular with basal erosional contacts that truncate stratigraphy. Sieve deposits result from infilling of fine-grained sediments into older, well-sorted, porous gravel deposits during infiltration of surface water. As a result, Panoche Fan sediments generally consist of poorly to moderately sorted subangular to subrounded, gravels, sands, silts, and clays complexly arranged as interfingering layers and lenses of variable thickness (Geomatrix, 1989).

The alluvial sediments of the fan grade eastward into fine-grained alluvial deposits of the flood basin of the San Joaquin River and Fresno Slough in the valley trough. At depth, the arkosic sands are granitic glacial outwash deposits derived primarily from the Sierra Nevada to the east. Alluvial sediments in the Panoche Fan derived from the Diablo Range are referred to as Coast Range alluvium, and the arkosic sands derived from the east are referred to as Sierran sands (Geomatrix, 1989).

The westernmost extent of Sierran sands is well to the east of the site within alluvium above the Corcoran Clay. Thin lenses of Sierran sands may interfinger with Coast Range alluvium underlying the Corcoran Clay at the site, but Sierran sands are generally not encountered in the subsurface west of the California Aqueduct. Based on drilling logs for a well drilled about ½ mile northeast of the site by US Geological Survey (USGS, 1987b) and mapping (Westlands, 2006), there is about 666 feet of alluvium overlying the Corcoran Clay at the site. The Corcoran Clay ranges from 20 to 120 feet thick and is at least 100 feet thick underlying the site (Belitz and Heimes, 1990).

Late Cenozoic age alluvial deposits of the Panoche Fan have been subdivided into a series of geologic units based on tentative correlation with units mapped at the surface in areas north of the fan. The distinctions are based primarily on geomorphic and pedologic indicators of relative age and to a lesser extent on lithologic and absolute age criteria. The units are represent discrete periods of deposition separated by periods of relative stability and minimal sediment accumulation. Stratigraphic units identified in order of decreasing age include the formally recognized Tulare Formation of late Pliocene and Pleistocene age, and the informally named Los Banos alluvium of middle and late Pleistocene age, San Luis Ranch alluvium of late Pleistocene and early Holocene age, and Patterson alluvium and Dos Palos alluvium of Holocene age. In addition, the Los Banos alluvium and San Luis Ranch alluvium have been further divided into three and two members, respectively. Geologic cross sections indicate that the Los Banos alluvium is about 365-feet thick, the San Luis Ranch Alluvium is about 135-feet thick, and the Patterson Alluvium is about 20-feet thick immediately southeast of the site (Lettis, 1982; Geomatrix, 1989).

Published geologic mapping of the site at a 15-minute quadrangle (1:62,500 scale) indicates that geologic materials exposed within a two-mile radius of the site are limited to surficial sediments. The site is located within an area mapped as Quaternary age alluvium composed of clay and sand. The Panoche Creek channel northwest of the site is mapped as Quaternary age gravel and sand of stream channels (Dibblee, 1975).

More detailed published mapping of the alluvial fan deposits of Holocene and Pleistocene age of the Chounet Ranch 7.5-minute quadrangle (1:24,000 scale) describes more detailed stratigraphy of the recent sediments located west of the site. The mapping differentiates between deposits in active channels and in areas of active sedimentation on fan surfaces, deposits on inactive areas of fans, deposits on slightly to moderately dissected older fans, deposits on moderately dissected older fans, deposits on highly dissected older fans, and floodplain deposits. Floodplain deposits are further divided into alluvium found in active channels and on lowest terraces, intermediate terraces, and highest terraces (historic floodplain) (Bartow and Lettis, 1990).

5.3.1.1.3 Local Geology – Groundwater. The Corcoran Clay is an extensive diatomaceous-lacustrine clay deposit of low permeability that divides the ground water flow system into a lower confined zone and an upper semiconfined zone (Davis and Poland, 1957). The Corcoran Clay was encountered in nearby USGS water well at a depth of about 666 feet below ground surface (USGS, 1987b). The Corcoran Clay ranges in thickness from 20 to 120 feet (Belitz and Heimes, 1990) and is estimated to be about 100 feet thick underlying the site.

The deposits of the semiconfined zone above the Corcoran Clay are typically alluvium derived from the Coast Ranges. The deposits can include Sierran-derived sand east of the site. Sierran sands do not generally extend very far to the west of the axis of the valley trough, and the semiconfined zone underlying the site is dominated by Coast Range alluvium. These hydrogeologic units differ in texture, hydrologic properties, and oxidation state. In contrast to Coast Ranges alluvium, the Sierran sand is reduced in the valley trough. The Sierran deposits are highly permeable and historically have been tapped by wells as a source of irrigation water (Belitz and Heimes, 1990). Groundwater within the Coast Ranges alluvium is generally of sulfate or bicarbonate type with relatively high dissolved mineral concentration and is generally considered to be of relatively low quality (Davis et al., 1959; Bull and Miller, 1975; Gilliom et al., 1989).

The deposits of the confined zone below the Corcoran Clay used as aquifers for ground water production consist of poorly consolidated floodplain, deltatic, alluvial fan, and lacustrine deposits of the Tulare Formation. In general, groundwater in the confined zone generally contains smaller quantities of dissolved minerals and a higher concentration of sodium than groundwater in the overlying semiconfined zone (Davis et al., 1959). Many of the agricultural production wells in the study area are perforated below the Corcoran Clay (Belitz and Heimes, 1990). About 75 to 80 percent of the ground water pumped for irrigation was from the confined lower aquifer (Davis and Poland, 1957; Bull and Miller, 1975).

Most agricultural wells in the area are perforated both above and below the Corcoran Clay. The sound of falling water in idle irrigation wells in heavily pumped areas of the western San Joaquin Valley has long been recognized as evidence that ground water has been circulating downward through the casings of active and abandoned wells from the upper to lower aquifers (Davis et al., 1964). Due to the design of most agricultural wells in the area, groundwater used for irrigation includes water produced from both the semiconfined and confined aquifers.

Groundwater withdrawal from the confined zone generated extensive ground subsidence prior to delivery of surface water for agricultural water supply replacement beginning in the 1960's (Poland et al., 1975). Local maximum compaction due to ground water withdrawal from the confined lower aquifer was concentrated a few miles northeast of the site near Pilibos Ranch (Bull and Poland, 1975). Today, ground subsidence has decreased because agricultural use of ground water is limited except in times of drought when surface water supplies are curtailed. Subsequent to the initial compaction of the lower confined aquifer, heavy pumping of the ground water reservoir during the 1976-77 drought caused artesian head declines that were 10 to 20 times faster than the first cycle of long-term drawdown that ended in the late 1960's (Ireland, et al., 1984).

Based on December 2005 data, the depth to the confined zone piezometric ground water surface at the site is expected to be about 400 feet below ground surface. The elevation of the base of fresh ground water is approximately 1,200 feet below mean sea level in the confined zone below the Corcoran Clay. Locally, the base of fresh ground water is defined as ground water with total dissolved solids exceeding 2,000 parts per million total dissolved solids, which is too high for irrigating crops (Westlands, 2006).

Depth to the semiconfined ground water surface is poorly constrained because few wells in the area are completed solely in aquifers located above the Corcoran Clay. In addition, ground water elevations appear to vary significantly depending on the completion depth of the well. A relatively shallow USGS water well drilled close to the site was perforated between 285 and 295 feet below ground surface and the standing water level after well completion was 195 below ground surface. The following year, a standing water level of 290 feet below ground surface after well completion was reported for an adjacent USGS well perforated between 623 to 633 feet below ground surface (USGS, 1987a; 1988). Significant variations within the hydrologic unit depending on well completion depth indicate that perched aquifers may be present within the semiconfined aquifer.

Groundwater is also discussed in Section 5.5, Water Resources.

5.3.1.1.4 Local Geology – Structure. The San Joaquin Valley is synclinal structure between the tilted block of the Sierra Nevada on the east and the complexly folded and faulted Coast Ranges on the west. The Sierra Nevada is uplifted along its eastern flank and depressed along its western flank where it is overlain by sedimentary deposits of the San Joaquin Valley. Beneath the San Joaquin Valley, a westwardly thickening wedge of sediments overlies crystalline basement rocks similar to those exposed in the Sierra Nevada. Indirect evidence suggests that the Sierra Nevada block extents westward to the flanks of the Coast Ranges (Miller, et al., 1971).

The large northwest-trending syncline between the Sierra Nevada and the Coast Ranges is the principal late Cenozoic structure in the San Joaquin Valley. The axial part of the syncline has subsided at a minimum rate of 0.7 to 1 foot per 1,000 years during the past 600,000 years. The structural axis 3 to 6 miles east of the western valley margin has remained stationary during the late Quaternary and governs the general location and orientation of the valley. The topographic axis (trough) of the valley, approximated by the interface of Sierran sands and Coast Range alluvium in the valley subsurface, has rarely coincided with the structural axis, suggesting that rates of sedimentation have equaled or exceeded rates of subsidence (Lettis, 1982).

The Diablo Range (the most easterly of the Coast Ranges) forms the western border of the San Joaquin Valley. The structure of this range is a broad anticline with an eastern monoclinal limb dipping beneath the valley. The exposed core of the range is formed by complexly folded and contorted sedimentary and igneous rocks of the Franciscan Formation. Lesser folds pass beneath the valley and trend obliquely to the range. Structural complexity along the west flank of the Coast Ranges generally increases in a southward direction. Less deformed sedimentary strata exposed along the western border of the valley and folded during the uplift of the Coast Ranges range in age from Late Cretaceous to Quaternary in age (Miller, et al., 1971).

Within the foothills, the principal Quaternary folds west of the site include the Tumey Hills, Panoche Hills, Wisenor Hills, and Laguna Seca Hills anticlines and the Little Panoche Valley, and Carrisalito Flat synclines. These structures are much smaller than the San Joaquin Valley syncline, and typically have northeast or east-trending axes. The domed Panoche Hills anticline is the largest foothill structure in the region and has risen at a minimum rate of 1 to 1.3 feet per 1,000 years during the late Quaternary. Minimum rates of uplift for the smaller Laguna Seca Hills and Wisenor Hills anticlines approximate 0.7 feet per 1,000 years during the same period (Lettis, 1982).

5.3.1.1.5 <u>Plate Tectonic Setting</u>. Persistent tectonic activity affected much of the Central Valley during the Cenozoic and is shown by the numerous unconformities that occur in the deposits that underlie the valley margins. At least four or five erosional events separate Cenozoic deposits from one another and indicate that deposition in the central parts of the valleys continued with little interruption during most of the Cenozoic, but deposition was frequently separated by tectonism and erosion along the margins of the bordering mountain ranges (Norris and Webb, 1990).

The boundary between the North American and Pacific tectonic plates lies within 30 miles southwest of the site. The site is located on the North American tectonic plate, which is separated from the Pacific tectonic plate by the San Andreas fault. The relative motion between these two plates has been determined from paleomagnetic lineations in the Gulf of California, from global solutions to known slip rates along plate boundaries, from geology, and from geodesy (Minster and Jordan, 1978; DeMets et al., 1987; Wallace, 1990) to be primarily horizontal at a rate of about 50 millimeters a year (DeMets et al., 1987). On a broad scale, the North American – Pacific tectonic plate boundary in California is a transform fault that extends from the Gulf of California to Cape Mendocino. The San Andreas fault and the transform plate boundary end to the north at the Mendocino Triple Junction in northernmost California. North of Cape Mendocino, the spreading center and subduction zone of the Juan de Fuca plate lie between the North American and Pacific tectonic plates. At the southern end, another spreading center lies in the Gulf of California, creating parts of the Pacific and Rivera tectonic plates. The transform faults of that spreading center merge into the San Andreas fault system near the Imperial Valley and the Salton Sea (Hutton et al., 1991).

5.3.1.1.6 Seismicity and Seismotectonics. Figure 5.3-4 and Table 5.3-1 summarize the historic seismicity in the region between 1800 and 2000. EQSEARCH Version 3.00 software was used to search an abbreviated and modified version of the published California Division of Mines and Geology (CDMG) earthquake catalog for California (Blake, 2006b). The site latitudes inputs were 36.6512 degrees 120.5845 degrees, respectively. The search radius used was 100 miles. The attenuation relationship used was Abrahamson and Silva 1995b/1997 horizontal for soil. The 2004 magnitude 6.0 Parkfield earthquake is not included in the catalog but is similar in size and location to the June 8, 1934 magnitude 6.0 Parkfield earthquake and is expected to have generated similar site accelerations.

The site was subjected to an estimated historic peak site acceleration of 0.088g during the 1983 magnitude 6.70 Coalinga earthquake. This acceleration is estimated to be the maximum ground acceleration experienced by the site between 1800 and 2000. The 1983 magnitude 6.70 Coalinga earthquake was centered approximately 34 miles from the site. Additional estimated peak site accelerations for other significant historic earthquakes in the region are provided in Table 5.3-1.

5.3.1.1.7 Significant Quaternary Faults. The three most significant Quaternary faults in the Panoche Fan region are the Ortigalita, San Andreas, and Nunez faults. An “active fault” is defined by the CDMG as one that has had surface displacement within the last 11,000 years. Faults with no evidence of surface displacement with the last 11,000 years (i.e., Holocene age) are not necessarily inactive. Potentially active faults have shown displacement within the last 1.6 million years (Quaternary age). “Inactive faults” show no evidence of movement in historic or recent geologic time, suggesting that the faults are dormant (Fresno County, 2000).

The Alquist-Priolo Earthquake Fault Zoning Act of 1994 (formerly known as the Alquist-Priolo Special Studies Zone Act of 1972) stipulates that no structure for human occupancy may be built within an Earthquake Fault Zone until geologic investigations demonstrate that the site is free of fault traces that are likely to rupture with surface displacement (Fresno County, 2000). The Ortigalita fault zone, the San Andreas fault zone, and the Nunez fault are described because they are the closest designated Earthquake Fault Zones to the site. The

TABLE 5.3-1
MAGNITUDE 5.8 AND GREATER EARTHQUAKES OCCURRING BETWEEN 1800 AND 2000 WITHIN 100 MILES OF THE SITE

Catalog	Latitude (North)	Longitude (West)	Date	Time (UTC)	Depth (km)	Magnitude	Site Acceleration (g)	Approximate Distance (mi [km])	Location (USGS Earthquake Catalog)
DMG	36.4000	121.0000	04/12/1885	4:05:00	0.0	6.20	0.081	28.8 (46.4)	S. Diablo Range
BRK	36.2200	120.4000	7/22/1983	23:42:00	0.0	6.00	0.067	31.5 (50.7)	Coalinga
BRK	36.2200	120.2900	5/2/1983	23:42:39	0.0	6.70	0.088	34.0 (54.7)	Coalinga
PAS	36.1510	120.0490	8/4/1985	12:01:56	6.0	5.80	0.041	45.6 (73.4)	North Kettleman Hills
T-A	36.8300	121.5700	10/18/1800	0:00:00	0.0	7.00	0.065	55.9 (90.0)	-
DMG	37.0000	121.5000	06/20/1897	20:14:00	0.0	6.20	0.042	56.0 (90.2)	Gilroy
DMG	36.9000	121.6000	04/24/1890	11:36:00	0.0	6.00	0.035	58.7 (94.5)	Pajaro Gap
BRK	37.1000	121.5000	8/6/1979	17:05:22	0.0	5.80	0.031	59.3 (95.4)	Coyote Lake
DMG	35.8000	120.3300	6/8/1934	4:47:00	0.0	6.00	0.034	60.5 (97.3)	Parkfield
DMG	37.2000	121.5000	07/06/1899	20:10:00	0.0	5.80	0.028	63.2 (101.6)	Morgan Hill
DMG	35.7500	120.2500	3/10/1922	11:21:20	0.0	6.50	0.043	65.0 (104.5)	Parkfield
DMG	37.4000	121.4000	04/10/1881	10:00:00	0.0	5.90	0.028	68.5 (110.2)	W. San Joaquin Valley
DMG	37.1000	121.7000	02/26/1864	13:47:00	0.0	5.90	0.028	69.0 (111.0)	S. Santa Cruz Mountains
DMG	37.5000	121.3000	07/15/1866	6:30:00	0.0	5.80	0.025	70.6 (113.7)	W. San Joaquin Valley
DMG	35.7300	121.2000	11/22/1952	7:46:37	0.0	6.00	0.028	72.3 (116.3)	Bryson
DMG	37.2500	121.7500	7/1/1911	22:00:00	0.0	6.60	0.039	76.4 (123.0)	Calaveras fault
GSB	37.0360	121.8830	10/18/1989	0:04:15	18.5	7.00	0.049	76.5 (123.1)	Loma Prieta
GSB	37.3200	121.6980	4/24/1984	21:15:19	8.0	6.20	0.030	76.8 (123.6)	Morgan Hill
DMG	37.3000	121.9000	10/08/1865	20:46:00	0.0	6.30	0.029	85.3 (137.2)	S. Santa Cruz Mountains
DMG	36.5700	122.1700	10/22/1926	13:35:22	0.0	6.10	0.024	88.0 (141.7)	Monterey Bay

TABLE 5.3-1 (CONTINUED)
MAGNITUDE 5.8 AND GREATER EARTHQUAKES OCCURRING BETWEEN 1800 AND 2000 WITHIN 100 MILES OF THE SITE

Catalog	Latitude (North)	Longitude (West)	Date	Time (UTC)	Depth (km)	Magnitude	Site Acceleration (g)	Approximate Distance (mi [km])	Location (USGS Earthquake Catalog)
DMG	37.2000	122.1000	02/17/1870	20:12:00	0.0	5.80	0.019	91.8 (147.8)	Los Gatos
DMG	37.5000	121.9000	11/26/1858	8:35:00	0.0	6.10	0.023	93.2 (150.0)	San Jose Region
MGI	35.3000	120.7000	12/7/1906	6:40:00	0.0	5.90	0.020	93.5 (150.5)	-
DMG	37.1000	122.2000	03/26/1884	4:00:00	0.0	5.90	0.019	94.5 (152.0)	Santa Cruz Mountains
DMG	36.6100	122.3500	10/22/1926	12:35:07	0.0	6.10	0.022	97.9 (157.5)	Monterey Bay

Great Valley thrust faults are also described due to their proximity to the site and potential for activity. The site is not located within an Earthquake Fault Zone.

***Ortigalita Fault Zone*.** The Otigalita fault zone is approximately 50 miles long, originating near Crow Creek in western Stanislaus County and extending southeast to a few miles north of Panoche in western Fresno County. Most of the fault is considered active due to displacement during Holocene time (Fresno County, 2000).

The Ortigalita fault zone is a major Holocene dextral strike-slip fault in the central Coast Ranges that is an eastern part of the lager San Andreas fault system. The Ortigalita fault zone is about 19.4 miles from the site at its closest point. The Ortigalita fault zone extends from about 12.4 miles northwest of San Luis Reservoir southeast to the vicinity of Panoche Valley. The Ortigalita fault zone is characterized by echelon fault traces separated by pull-apart basins. The fault zone is divided into 4 sections. The Little Panoche Valley section is the southern most section and is closest to the site. The Little Panoche Valley section is late Holocene active. Late Quaternary slip rates and recurrence intervals are unknown, although the recurrence interval for the entire Ortigalita fault zone is about 2,000 to 5,000 years. The vertical slip rate is at least 0.01-0.04 millimeters per year. The dextral slip component is probably greater than the vertical component and is estimated to be 0.5 to 1.5 millimeters per year (USGS, 2006b).

***San Andreas Fault Zone*.** The San Andreas fault lies to the west and southwest of the site. The fault is considered active and is of primary concern in evaluating seismic hazards throughout western Fresno County (Fresno County, 2000). The 684-mile-long San Andreas fault zone is the principal element of the San Andreas fault system, a network of faults with predominantly dextral strike-slip displacement that collectively accommodates the majority of relative north-south motion between the North American and Pacific plates. The San Andreas fault zone is the most extensively studied fault in California, and perhaps the world. The creeping section of the San Andreas fault is about 28.2 miles from the site at its closest point. The San Andreas fault zone is considered to be the Holocene and historically active dextral strike-slip fault that extends along most of coastal California from its complex junction with the Mendocino fault zone on the north, southeast to the northern Transverse Range and inland to the Salton Sea, where a well-defined zone of seismicity transfers the slip to the Imperial fault along a right-releasing step (USGS, 2006b).

Two major surface-rupturing earthquakes have occurred on the San Andreas fault in historic time: the 1857 Fort Tejon and 1906 San Francisco earthquakes. Additional historic surface rupturing earthquakes include the unnamed 1812 earthquake along the Mojave section and the northern part of the San Bernardino Mountains section, and a large earthquake in the San Francisco Bay area that occurred in 1838 that was probably on the Peninsula section. Historic fault creep rates are as high as 32 millimeters per year for the 82-mile-long creeping section in central California with creep rates gradually tapering to zero at the northwestern and southeastern ends of the section. Average slip rates for the San Andreas fault zone exceed 5.0 millimeters per year (USGS, 2006b).

***Nunez Fault*.** The Nunez fault is located approximately 6 to 7 miles northwest of Coalinga and is about 30 miles from the site at its closest point. The fault is about 2.6 miles long and is considered active based on surface rupture associated with the 1983 Coalinga earthquake. The fault is divided into two north and south trending segments. About 2.1 miles of right-reverse surface rupture occurred on the segments. Total displacement and timing of past fault movements are poorly constrained (Rymer and Ellsworth, 1990; Fresno County, 2000).

***Great Valley Thrust Faults*.** The Great Valley thrust faults have been divided into at least 14 segments extending over 300 miles in cumulative length based on geomorphic interpretation of the range front bordering the western edge of the Central Valley (USGS, 2006a). The closest Great Valley thrust fault is about 5.3 miles from the site at its closest point. Recent evidence suggests that the faults located along the western boundary of the San Joaquin Valley may be more active than once believed. Asymmetrical folds identified on the eastern slopes of the Coast Ranges can hide faults that show no surface rupture. The faults and folds along the Coast Range-Sierran Block Boundary (Great Valley thrust faults) are similar or include the faults and folds that were the source of the 1983 Coalinga earthquake. The Great Valley thrust faults are now believed to be active and capable of generating large magnitude earthquakes (Rymer and Ellsworth, 1990; Fresno County, 2000). The Great Valley thrust faults are not identified as Earthquake Fault Zones.

5.3.1.1.8 Ground Shaking. Ground shaking is the most significant geologic hazard at the site. Although most of Fresno County is situated within an area of relatively low seismic activity, the southern Coast Ranges have been the most tectonically active area within the county (Fresno County, 2000).

The California Energy Commission (CEC, 1989) recommends that non-nuclear power plants be designed to the level of conservatism implied by the Uniform Building Code (ICBO, 1997). Chapter 15.08.020 CC of the Fresno County Building Code defines the site within Seismic Zone Number 4 as defined in the 1998 Edition of the California Building Code. The Seismic Zone definitions of the 1998 Edition of the California Building Code are based on the 1997 Edition of the UBC. Seismic Zone 4 of the UBC is the highest earthquake hazard zone recognized by the code. However, estimated peak site accelerations are relatively low for a site included in Seismic Zone 4. The closest type A fault to the site is the San Andreas fault, which is about 28.2 miles from the site at its closest point. The closest type B fault to the site is a segment of the Great Valley thrust faults, which is about 5.3 miles from the site at its closest point.

Estimates of potential seismic ground motion generated using the software EQFAULT indicate that peak site accelerations are not expected to exceed 0.363g at the site. EQFAULT is a computer program for the deterministic estimation of peak site acceleration using three-dimensional articulated planar elements (faults) to model seismogenic sources (Blake, 2006a). The faults used are shown in Figure 5.3-5. Additional deterministic peak site accelerations are provided in Table 5.3-2. The site latitudes inputs were 36.6512 degrees 120.5845 degrees, respectively. The search radius used was 100 miles. The attenuation relationship used was Abrahamson and Silva 1995b/1997 horizontal for soil. The seismogenic sources used included those in the abbreviated and modified version of the published California Division of Mines and Geology earthquake catalog for California (see Section 5.3.1.1.6).

Based on a deterministic seismic hazard analysis, the site could be subjected to an estimated peak site acceleration of 0.363g by the maximum earthquake. This value is significantly higher than the estimated peak site acceleration of 0.088g the site was subjected to during the 1983 magnitude 6.70 Coalinga earthquake which appears to be the maximum ground acceleration experienced by the site between 1800 and 2000.

5.3.1.1.9 Ground Rupture. No faults were identified within 2 miles of the site (Dibblee, 1975; Fresno County, 2000). The nearest Earthquake Fault Zone as defined by the Alquist-Priolo Earthquake Fault Zoning Act of 1994 is the Ortigalita fault zone, which is about 19.4 miles from the site at its closest point. Earthquake Fault Zones include faults considered to have been active during Holocene time and to have a relatively high potential for surface rupture (CDMG, 2000). Ground rupture is not likely at the site.

5.3.1.1.10 Liquefaction. Liquefaction is a phenomenon whereby loose, saturated, granular soils lose their inherent shear strength due to excess pore water pressure build-up such as that generated during repeated cyclic loading from an earthquake. A low relative density of the granular materials, shallow ground water table, long duration, and high acceleration of seismic shaking are some of the factors favorable to cause liquefaction. Presence of predominantly cohesive or fine-grained materials and/or absence of saturated conditions can preclude liquefaction. Liquefaction hazards are usually manifested in the form of buoyancy forces during liquefaction, increase in lateral earth pressures due to liquefaction, horizontal and vertical movements resulting from lateral spreading, and post-earthquake settlement of the liquefied materials.

No specific countywide assessments to identify liquefaction hazards have been performed. Ground accelerations must approach 0.3g before liquefaction occurs in a sandy soil with relative densities typical of San Joaquin alluvial deposits. Areas subject to 0.3g acceleration or greater are located along the Coast Range foothills, but depth to ground water in these areas is typically great enough to minimize liquefaction potential (Fresno County, 2000). Recent soil borings drilled at the site did not encounter ground water to the maximum depths explored of 65 feet below ground surface. As discussed in Section 5.3.1.1.3, the depth to

TABLE 5.3-2
FAULTS CONSIDERED TO SIGNIFICANT SEISMIC SOURCES FOR THE SITE

Abbreviated Fault Name	Approximate Distance (mi [km])	Maximum EQ Magnitude (Mw)	Peak Site Acceleration (g)	Est. Site Intensity (Mod. Merc.)
Great Valley 11	5.3 (8.5)	6.4	0.363	IX
Great Valley 10	5.7 (9.2)	6.4	0.345	IX
Great Valley 9	14.9 (23.9)	6.6	0.174	VIII
Great Valley 12	15.0 (24.1)	6.3	0.156	VIII
Ortigalita	19.4 (31.2)	6.9	0.125	VII
Great Valley 13	24.8 (39.9)	6.5	0.107	VII
San Andreas (creeping)	28.2 (45.4)	6.5	0.077	VII
Calaveras (south of Calaveras Res)	33.1 (53.2)	6.2	0.051	VI
Quien Sabe	35.7 (57.4)	6.4	0.059	VI
Great Valley 8	38.1 (61.3)	6.6	0.075	VII
Great Valley 14	43.1 (69.3)	6.4	0.061	VI
San Andreas - Parkfield Segment	44.9 (72.2)	6.7	0.054	VI
San Andreas - 1857 Rupture	44.9 (72.2)	7.8	0.094	VII
Rinconada	47.5 (76.4)	7.3	0.070	VI
Zayante-Vergeles	49.7 (80.0)	6.8	0.052	VI
Sargent	50.2 (80.8)	6.8	0.052	VI
Foothills Fault System	52.3 (84.2)	6.5	0.053	VI
San Andreas (1906)	52.4 (84.4)	7.9	0.088	VII
San Andreas (Pajaro)	52.4 (84.4)	6.8	0.050	VI
Monterey Bay - Tularcitos	55.7 (89.6)	7.1	0.069	VI
Great Valley 7	62.9 (101.3)	6.7	0.050	VI
San Andreas - Cholame	64.4 (103.7)	6.9	0.043	VI
San Andreas (Santa Cruz Mountain)	64.9 (104.5)	7.0	0.045	VI
San Juan	69.0 (111.1)	7.0	0.043	VI
Hosgri	71.0 (114.3)	7.3	0.050	VI
Palo Colorado - Sur	71.9 (115.7)	7.0	0.041	V
Greenville	73.7 (118.6)	6.9	0.038	V
Hayward (southeast extension)	76.2 (122.6)	6.4	0.027	V
Monte Vista - Shannon	78.9 (126.9)	6.8	0.042	VI
San Andreas (peninsula)	86.7 (139.5)	7.1	0.037	V
San Gregorio	86.7 (139.5)	7.3	0.042	VI

TABLE 5.3-2 (CONTINUED)
FAULTS CONSIDERED TO SIGNIFICANT
SEISMIC SOURCES FOR THE SITE

Abbreviated Fault Name	Approximate Distance (mi [km])	Maximum EQ Magnitude (Mw)	Peak Site Acceleration (g)	Est. Site Intensity (Mod. Merc.)
Calaveras (north of Calaveras Res)	87.2 (140.3)	6.8	0.031	V
Hayward (total length)	87.2 (140.3)	7.1	0.037	V
Hayward (South)	87.2 (140.3)	6.9	0.033	V
Great Valley 6	90.6 (145.8)	6.7	0.035	V
Los Osos	94.0 (151.3)	6.8	0.036	V
San Luis Range (S. Margin)	96.3 (154.9)	7.0	0.040	V

The existing topography at the site does not provide sufficient relief that would cause concern due to potential landslides. There are no topographic features of significant relief that could present a landslide hazard to the facility within 2 miles of the site. The channel of Panoche Creek is located approximately 1.7 miles northwest of the site but is too shallow and too distant to pose a landslide hazard to the site. An unlined agricultural pond located northwest of the site and an unlined drainage ditch located between the site and Panoche Road are too shallow to pose a landslide hazard. Slope stability associated with any cut slopes required for site development of the project are discussed in Appendix L.

Based on general screening criteria, the site topography does not meet the categories for geologic environments likely to produce earthquake-induced landslides. Cut slopes and fills constructed for the planned site facilities would consider stability against landslides.

5.3.1.1.11 Subsidence and Settlement. Subsidence occurs when a large portion of land is displaced vertically, usually due to the withdrawal of ground water, oil, or natural gas. Soils that are particularly susceptible to subsidence include those with high silt or clay contents. Subsidence caused by ground water withdrawal can affect large areas (Fresno County, 2000).

Four types of subsidence occur in the San Joaquin Valley. In order of decreasing magnitude, they are: 1) subsidence caused by water-level decline produced by ground water withdrawal and consequent compaction of aquifer systems; 2) subsidence related to the hydrocompaction of moisture-deficient deposits above the water table; 3) subsidence related to withdrawal from oil and gas fields; and 4) subsidence caused by deep-seated tectonic movements. The primary causes of subsidence in the San Joaquin Valley are aquifer-system compaction due to ground water withdrawal and near-surface hydrocompaction. Hydrocompaction is the process of volume decrease and density increase that occurs when moisture-deficient deposits compact as they are wetted for the first time since burial (Poland et al., 1972; Ireland, 1986).

By 1966, withdrawal of ground water for agriculture caused more than 2,000 square miles of the western San Joaquin Valley to subside more than 1 foot. The area that had subsided by more than 10 feet was 70 miles long. Maximum subsidence was 26 feet. Subsidence rates increased until the mid-1950s when the maximum observed rate was 1.8 feet per year (Bull, 1975). Much of the subsidence was produced by water-level declines due to ground water pumping that exceeded 400 feet in some locations. The large-scale fluid withdrawal for irrigation resulted in the largest known volume of land subsidence in the world (Williamson et al., 1989). Beginning in 1967, surface water imported via the California Aqueduct began to replace ground water as the primary source of irrigation supply in the area south of Mendota (Gilliom et al., 1989; Belitz and Heimes, 1990). By 1983, land subsidence due to ground water withdrawal appeared to have slowed considerably or stopped in most of the San Joaquin Valley (Ireland, 1986). Increased reliance on surface water and generally lower irrigation water demands in the area due to microirrigation techniques and land retirements lessen the likelihood of subsidence due to ground water withdrawal at the site.

About 120 square miles adjacent to the Diablo Range is susceptible to near-surface subsidence, where compaction due to wetting of moisture-deficient alluvial-fan deposits has caused as much as 15 feet of subsidence. Subsidence of 3 to 10 feet is common for soils in this area (Bull, 1975). Small pockets of moisture deficient deposits within alluvial fan soils are the result of erratic prehistoric percolation from streams. New wetting of previously unirrigated land on the Panoche Creek fan southwest of the California Aqueduct underlain by pockets of moisture-deficient deposits could produce as much as 5 to 10 feet of near-surface subsidence (Bull, 1972). Near-surface subsidence in the region has destroyed or damaged ditches, canals, roads, pipelines, electric transmission towers, and buildings and has made the irrigation of crops difficult (Bull, 1964b). The site is located close to or within areas of historic near-surface subsidence (Ireland et al., 1984). The site has been irrigated for agricultural use for many years which lessens the likelihood of near-surface subsidence following construction of the PEC.

Settlement can occur in poorly consolidated soils during groundshaking. Earthquake induced settlement can cause distress to structures supported on shallow foundations, damage to utilities that serve pile-supported structures, and damage to lifelines that are commonly buried at shallow depths (Kramer, 1996). During settlement, the soil materials are physically rearranged by the shaking to result in a less stable alignment of the individual minerals. Settlement of sufficient magnitude to cause significant structural damage is normally associated with rapidly deposited alluvial soils, or improperly founded or poorly compacted fill (Fresno County, 2000). Soils encountered during the geotechnical investigation of the site were relatively loose, however, peak site accelerations at the site are unlikely to be high enough to produce settlement (URS, 2006).

5.3.1.1.12 Expansive Soils. Expansive soils are those that greatly increase in volume when they absorb water and shrink when they dry out. Expansion is measured by shrink-swell potential, which is relative volume change in soil with a gain in moisture. Soils with moderate to high shrink-swell potential may damage buildings, roads, and other structures built on them. No area wide assessments of expansive soil have been published, but local investigations prepared for the Westlands Water District identified two soil associations (Tachi-Armona-Gepford and Ciervo-Cerini-Lillis) east of the site near Tranquility and San Joaquin that are considered to have a high expansion potential. Regionally important soils with moderately high to high expansion potential are generally located east of the Fresno Slough (Fresno County, 2000). Based on geotechnical assessment, unusual expansive soil concerns are not likely at the site (URS, 2006).

Soils are discussed more completely in Section 5.4.1.1.

5.3.1.1.13 Flooding. Small streams, which are usually dry except during winter and spring runoff, drain the foothills of the Coast Range. Streams draining the Coast Range foothills frequently flood much valuable agricultural land, roads, and communities including Mendota and Firebaugh (Fresno County, 2000). All streams in the mapped area are intermittent or ephemeral, flowing only during storm water runoff events.

A shallow unlined ditch is located between the site and Panoche Road. The ditch is included within the special flood hazard area (Zone A) inundated by the 100-year flood with no base flood elevation determined on the FEMA Flood Insurance Rate Map. The remainder of the site is located outside the 500-year floodplain (Zone X) (FEMA, 2001). The boundaries of the 100-year floodplain are delineated by FEMA on the basis of hydrology, topography, and modeling of flow during predicted rainstorms. The analysis of predicted flooding does not account for the effects of continued land subsidence or increases in sea level (Fresno County, 2000).

The Panoche Fan area is ultimately drained by the San Joaquin River into the Sacramento River Delta. The drainage of the site is toward the northeast and consists of overland sheet flow. The topography slopes northeast at less than one percent grade (USGS, 1971). Major flooding is not expected at the site but sheet overland flow and pooling in low areas is probable during heavy or prolonged storms.

Seiches are standing waves produced in a body of water such as a reservoir, lake, or harbor by wind, atmospheric changes, or earthquakes. Several small agricultural water reservoirs less than an acre in size are located within 2 miles of the site. Earthquake induced seiches are not considered a risk in Fresno County. The effects from a seiche would be similar to the flood hazard for a particular area, and the risk of occurrence is perceived as considerably less than that risk of flooding (Fresno County, 2000).

5.3.2 Environmental Consequences

No adverse effect on geological resources is expected from construction or operation of the PEC and associated linear components.

The southern extent of the Chaney Ranch gas field is located about 0.5 mile north of the site. Originally, the field was classified as an oil field with two producers. The last production from the field was during 1951, and the field was officially abandoned in 1964. The field was reactivated in 1972 as a gas field but has since been abandoned (DOGGR, 1985 and 2006).

There are no known mines or aggregate borrow operations in the immediate vicinity of the plant site. The site is located outside of the Fresno aggregate materials production-consumption region (CDMG, 1988). The region includes urban and urbanizing parts of Fresno and Madera counties. No imports of aggregate into the region were identified until 1998 when one company in the region began to import about ½ million tons per year of aggregate from the Coalinga area. The importation of aggregate into the region is a departure from previous market patterns (CDMG, 1999). Construction sand and gravel production within Fresno County is limited to the Fresno and Coalinga areas in the 2004 California State Minerals Yearbook (USGS, 2004).

No collectable or marketable minerals are known to be present within two miles of the site. Marly magnesian limestone was mined from the Tulare Formation in the Panoche Hills several miles west of the site between 1947 and 1953 for use in soil conditioning. Future value of the deposit and similar marl deposits of the Panoche Hills appears limited to agricultural uses, as the material is considered too impure to be of value for most limestone or dolomite uses (CDMG, 1978).

5.3.3 LORS Compliance

The Fresno County Ordinance Code indicates building codes that are currently in use for an “industrial facility” constructed at the site.

Fresno County presently uses the California Building Code, including the appendices as referenced in the 2001 California Building Standards Code and the Uniform Building Code Standards adopted by reference to govern the design of buildings. Exceptions and superseding provisions include adoption of the Seismic Zone definitions of the 1998 California Building Code, which are based on the 1997 Uniform Building Code. It also uses the 2001 Edition of the California Mechanical Code, including Appendices A, B, and C, and the 2001 Edition of the California Electrical Code, including Administrative Chapters 1, 2, and 3.

Applicable LORS are discussed below and are summarized in Table 5.3-3.

TABLE 5.3-3
LORS APPLICABLE TO GEOLOGIC HAZARDS AND RESOURCES

LORS	Applicability	Conformance (Section)
Federal	No Federal LORS are applicable	See Section 3.12
State		
Cal PRC S25523(a), Alquist-Priolo Earthquake Fault Zoning Act of 1994	Not Applicable	5.3.1.1.9
Local		
California Building Code, Chapters 16 and 33	Codes address excavation, grading and earthwork construction, including construction applicable to earthquake safety and seismic activity hazards	5.3.3

5.3.3.1 Federal

No federal LORS are applicable.

5.3.3.2 State

5.3.3.2.1 California Public Resources Code Section 25523(a): 20 CCR Section 1752(b) and (c). The project site is not within an Earthquake Fault Zone as defined by the Alquist-Priolo Earthquake Fault Zone Act.

5.3.3.3 Local

5.3.3.3.1 California Building Code (CBC), Appendix Chapter 33. This element sets forth rules and regulations to control excavation, grading, and earthwork construction, including fills and embankments. It establishes basic policies to safeguard life, limb, property, and public welfare by regulating grading on private property.

The geotechnical engineer and engineering geologist will certify the placement of fills and adequacy of the site for structural improvements in accordance with the CBC, Appendix Chapter 33.

The geotechnical engineer will address Sections 3309 (Grading Permit Requirements), 3312 (Cuts), 3315 (Drainage and Terracing), 3316 (Erosion Control), 3317 (Grading Inspection), and 3318 (Completion of Work) of the CBC, Appendix Chapter 33.

5.3.3.3.2 California Building Code 1998, Volume 2, Chapter 16. This element sets forth rules and regulations that address potential seismic hazards.

The administering agency for the above authority is the Fresno County Building Department.

The project site is located in an unincorporated area. The site lies outside of the boundaries of the closest town, which is Firebaugh.

5.3.3.4 Agencies and Agency Contacts

Agencies with jurisdiction to issue applicable permits and/or enforce LORS related to geologic hazards and resources, and the appropriate contact person are shown in Table 5.3-4.

TABLE 5.3-4
APPLICABLE AGENCIES AND AGENCY CONTACTS

Agency	Contact/Title	Telephone
California Energy Commission	Robert Anderson, Geologist	916-654-3836
State of California, Division of Mines and Geology	Library, Dale Stickney	916-327-1850
State of California, Division of Mines and Geology	Lena Dida	916-654-5076
County of Fresno, Planning Department	Briza Sholavs	559-443-5342

5.3.3.5 Applicable Permits

Grading permits are issued by Fresno County based on a review of the grading plan and the Geotechnical Investigation Report.

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Adequacy Issue: Adequate ____ Inadequate ____ DATA ADEQUACY WORKSHEET Revision No. 0 Date ____

Technical Area: **Geological Hazards** 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.	5.3		
Appendix B (g) (17) (A)	A summary of the geology, seismicity, and geologic resources of the project site and related facilities;	5.3.1, 5.3.2		
Appendix B (g) (17) (B)	A map at a scale of 1:24,000 and description of all recognized stratigraphic units, geologic structures, and geomorphic features within 2 miles of the project site. Include an analysis of the likelihood of ground rupture, seismic shaking, mass wasting and slope stability, liquefaction, subsidence, and expansion or collapse of soil structures.	5.3.1.1, 5.3.1.1.8, 5.3.1.1.9, 5.3.1.1.10, 5.3.1.1.13, 5.3.1.1.14		
Appendix B (g) (17) (C)	A map and description of geologic resources of recreational, commercial, or scientific value which may be affected by the project. Include a discussion of the techniques used to identify and evaluate these resources.	5.3.1		
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;	5.3.3		

Adequacy Issue: Adequate ____ Inadequate ____

DATA ADEQUACY WORKSHEET

Revision No. 0 Date ____

Technical Area: **Geological Hazards** 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) (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.	5.3.3		
Appendix B (h) (2)	A discussion of the conformity of the project with the requirements listed in subsection (h)(1)(A).	5.3.3		
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.	5.3.3.4		

5.4 AGRICULTURE AND SOILS

This section describes the affected environment and the environmental effects of the Panoche Energy Center (PEC) on agriculture and soils in accordance with California Energy Commission (CEC) requirements. Impacts are assessed for the construction and operations of the proposed new generating plant structures. As appropriate, agriculture and soils-related mitigation measures are also included in this section.

5.4.1 Affected Environment

The PEC involves the installation of four (4) General Electric LMS100 natural gas-fired combustion turbine generators (CTGs), emissions control equipment, one cooling tower, process water treatment equipment, and other associated equipment, in conjunction with a Pacific Gas & Electric (PG&E) Substation expansion project. A 300-foot span of transmission line as well as 2,400 linear feet of pipeline to supply natural gas to the site will be required. A new access road will be constructed off of West Panoche Road.

The nature of the site, including being located adjacent to the PG&E substation site and on current agricultural land, will allow the PEC to be constructed and operated with minimal environmental impacts. No new offsite transmission lines or pipelines will be required. The new gas line proposed for the PEC is located within the 128 acre parcel. The surrounding properties consist of agriculture, zoned AE-20. The land uses are generally agricultural or agriculturally based, with two residential dwelling units, the PG&E substation, a Wellhead power generation project, and a CalPeak power generation project within a 1-mile radius.

The PEC is located southeast of the intersection of West Panoche Road and Davidson Avenue, approximately 2.2 miles east of Interstate 5 and 14 miles west of Highway 33. The PEC site is located in the Southwest Quarter of Section 5 Township 15 South, Range 13 East, on the United States Geological Survey (USGS) Quadrangle Map. The assessors parcel number (APN) is 027-060-78S.

PG&E has determined the need to expand the Panoche Substation to interconnect to this project. The existing 230kV system is a double-bus, single-breaker configuration and currently has 11 230kV line circuits without bus sectionalizing breakers. The modifications include the installation of a pair of bus sectionalizing breakers to split the busses into double-bus sections, the addition of one bus parallel breaker and one new gen-tie line breaker position. Because there is limited land within the existing substation, approximately 320 feet by 150 feet of land on the south side of the existing substation must be used to accommodate the expansion. This land is part of the agricultural operation of the 128 acre parcel.

The affected environments for the soils resource and agriculture are described in the Sections 5.4.1.1 and 5.4.1.2, respectively. Environmental impacts are discussed in Section 5.4.2. The project's consistency with applicable laws, ordinances, regulations, and standards (LORS) is discussed in Section 5.4.4.

5.4.1.1 Soil Resources

Soils are mapped and described as "soil series." The locations and properties of the soil series were identified from data and maps prepared by the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Web Soil Survey (WSS). A list of soil types is included in Table 5.4-1. The WSS Database contains official USDA soil survey information as viewable maps and tables for more than 2,300 soil surveys in the United States and its territories. The entire PEC site has been previously disturbed with agriculture production. Refer to Section 5.3 (Geological Hazards and Resources) and the associated geotechnical report for the characteristics of the subsurface soils.

TABLE 5.4-1
SOIL TYPES IN THE WESTERN PART OF FRESNO COUNTY
(IN PROXIMITY TO PANOCHE ENERGY CENTER)

Map Unit Symbol	Map Unit Name
406	Guijarral Sandy Loam, 2 to 5 Percent Slopes
442	Panoche Clay Loam, 0 to 2 Percent Slopes
445	Excelsior Sandy Loam, 0 to 2 Percent Slopes
447	Excelsior Sandy Loam, Sandy Substratum, 0 to 2 Percent Slopes
477	Westhaven Clay Loam, 0 to 2 Percent Slopes
478	Cerini Sandy Loam, 0 to 2 Percent Slopes
479	Cerini Clay Loam, 0 to 2 Percent Slopes
491	Cerini Clay Loam, Subsided, 0 to 5 Percent Slopes
492	Panoche Loam, Subsided, 0 to 5 Percent Slopes
493	Panoche Clay Loam, Subsided, 0 to 5 Percent Slopes
590	Cerini-Anela-Fluvaquents, Saline-Sodic, Association, 0 to 2 Percent Slopes
960	Excelsior, Sandy Substratum-Westhaven Association, Flooded, 0 to 2 Percent Slopes
982	Water

The site is located close to or within areas adjacent to the Diablo Range susceptible to near-surface subsidence due to hydrocompaction of soils. Near-surface subsidence produced by initial wetting of these soils has destroyed or damaged ditches, canals, roads, wells, pipelines, electric transmission towers, and buildings and has made the irrigation of crops difficult. The site has been irrigated for agricultural use for many years which lessens the likelihood of near-surface subsidence following construction of the PEC.

Settlement can occur in poorly consolidated soils during groundshaking. Earthquake induced settlement can cause distress to structures supported on shallow foundations, damage to utilities that serve pile-supported structures, and damage to lifelines that are commonly buried at shallow depths. The presence of loose, unsaturated granular soil layers at the site could result in some seismic-induced settlement that would need to be taken into account during foundation design.

5.4.1.1.1 Power Plant Site. The native soils present at the PEC facility site consist of the Panoche Series (refer to Figure 5.4-1). The Panoche Series soil typically slope at zero (0) to two (2) percent, with medium runoff. The Panoche Series soils in this area are made up of about 85 percent Panoche clay loam, 5 percent Cerini clay loam, 4 percent Calflax clay loam, 2 percent Ciervo clay loam, 2 percent Posochanet clay loam, saline-sodic, and 2 percent Kimberlina sand loam.

Panoche clay loam soils are Capability Unit Classification I, with Capability Subclass VIIc. There are no major limitations and few overall limitations for this soil. Permeability of this Panoche soil is moderate, with an available water capacity that is high or very high. Effective rooting depth is 60 inches or more. As stated, runoff is medium, and the hazard of water erosion is slight.

The surface layer is light brownish gray clay loam about 7 inches thick. The upper 9 inches of the subsoil is light brownish gray loam. The next 27 inches is light gray loam over 14 inches of light brownish gray loam. The lower part to a depth of 72 inches is light brownish gray sandy loam. The soil is calcareous throughout. In some areas the surface layer is clay, sandy clay loam, or loam.

As stated above, the site has been disturbed with agriculture production, and is currently developed as a pomegranate orchard. The Panoche Series soil identified and discussed above represents the soil conditions in the construction zones.

The PEC site is relatively flat, unpaved, and does not have existing unnatural runoff drainage (refer to Figure 5.4-2 for a depiction of paved/unpaved surface areas at the PEC site). Results of the current geotechnical investigation presenting detailed description of soils at the PEC site are included in Appendix L.

5.4.1.1.2 Transmission Lines. No offsite transmission lines are associated with the PEC.

5.4.1.1.3 Offsite Pipelines. No offsite pipelines are associated with the PEC.

5.4.1.1.4 Worker Parking and Equipment Staging Sites. There will not be any offsite locations for worker parking and equipment staging. There will be a separate, but adjacent 8-acre tract of land used for this purpose, but its soil series are identical to the construction area.

5.4.1.2 Agriculture and Prime Farmland

The project site and adjacent land are Prime agricultural lands if irrigated and are designated as Farmlands of Statewide Importance. Prime farmland, as defined by the USDA and California Department of Conservation (CDC), is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. The PEC's impact on Prime agricultural lands is described in Section 5.9 Land Use.

5.4.2 Environmental Consequences

5.4.2.1 Construction Related Impacts

Significance criteria have been selected based on CEQA Guidelines, as well as performance standards adopted by responsible agencies. An impact may be considered significant from an agriculture and soil standpoint if the project results in:

- Substantial soil erosion or loss of topsoil
- Degradation or loss of available agricultural land, agricultural activities, or agricultural land productivity in the project area
- Alteration of agricultural land characteristics due to plant air emissions
- Conversion of Prime or Unique Farmland, or Farmland of Statewide Importance, to non-agricultural use

Construction impacts on soil resources can include increased soil erosion and soil compaction. Soil erosion causes the loss of topsoil and can increase the sediment load in the surface receiving waters downstream of the construction site. The magnitude, extent, and durations of this construction-related impact depends on the erodibility of the soil (slight, as discussed above), the proximity of the construction activity to a receiving water, the degree of contamination of the excavated soil stockpiles, and the construction methodologies, duration, and the season.

5.4.2.2 Power Plant Site

Project construction activities (including site preparation) at the PEC site are estimated to be conducted during a 13-month period which will be followed by three months of commissioning activities before the facility is operational. Land disturbances related to development activities will be conducted on approximately a 12.8-acre plant site, and an 8-acre laydown site. Site grading will be minimal, as the final grade at the site will be similar to the relatively flat existing grade. Excavation work will consist of the removal, storage, and/or disposal of sand, gravel, vegetation, organic matter, loose rock, and debris to the lines and grades necessary for construction. Material suitable for backfill will be stored in stockpiles at designated locations using proper erosion protection methods. Excess material will be removed from the site and disposed of at an acceptable location. During the construction phase of the project, erosion and sediment control measures, such as mulching, jute netting, culverts, sediment detention basins, etc., will be temporarily installed as required by local regulations.

Areas to be backfilled will be prepared by removing unsuitable material and rocks. The bottom of an excavation will be examined for loose or soft areas. Such areas will be excavated fully and will be backfilled with compacted fill.

Backfilling will be done in layers of uniform, specified thickness. Soil in each layer will be properly moistened to facilitate compaction to achieve specified density. To verify compaction, representative field density and moisture-content tests will be made during compaction. Structural fill supporting foundations, roads, parking areas, etc., will be compacted to at least 95 percent of the maximum dry density as determined by the ASTM D1557. Embankment, dikes, bedding for buried piping, and backfill-surrounding structures will be compacted to at least 90 percent of the maximum dry density. General backfill placed in remote and/or unsurfaced areas will be compacted to at least 85 percent of the maximum dry density.

Short-term increases in soil erosion are expected to occur during the construction phase. The erosion characteristics of the Panoche Series mapped at the location of the PEC are slight.

Project-related soil erosion will be minimized through implementation of erosion control measures described in Sections 3.5 (Facility Civil/Structural Features) and 5.4.3. Therefore, impacts from soil erosion are expected to be insignificant.

Construction of the proposed power plant will result in soil compaction due to the erection of foundations and paving. Soil compaction will also result from vehicle traffic along temporary access roads and in equipment staging areas. Compaction makes the soil more dense, reducing pore space and impeding water and gas movement through this medium. This can result in increased runoff, erosion, and sedimentation. The incorporation of erosion control measures described in Sections 3.5 (Facility Civil/Structural Features) and 5.4.3 during project construction will result in less than significant impacts from soil compaction.

Site preparation and construction of the project may potentially involve excavation of contaminated soils. Contaminated excavated soils, if encountered will be stored temporarily in construction zones and removed for disposal or treatment and recycling. Management of contaminated excavated materials will be conducted in accordance with applicable federal, state, and local regulations, as described in Section 5.14 (Waste Management). Therefore, the impact to the potential receiving waters will be less than significant. As applicable, the engineering fill will be imported to replace excavated materials that are not suitable for replacement.

Following construction, wind and water erosion on developed portions of the site will be reduced because the plant site will be compacted, covered with asphalt, concrete, and/or gravel, and drainage will be controlled through a storm drainage system. Implementation of the Applicant-committed mitigation measures discussed in Section 5.4.3 is expected to limit impacts to the soils resource at the generating plant to acceptable levels. Operation of the generating plant will expose soils and vegetation to increased levels of air pollutants as discussed in Section 5.2 (Air Quality). However, impacts to vegetation associated with deposition of air pollutants are expected to be less than significant.

5.4.2.3 Transmission Lines

The proposed project will not require alteration of existing offsite transmission lines but will connect new onsite transmission lines to existing transmission lines currently connected to the existing, adjacent PG&E Panoche Substation. Given the proximity of the existing transmission line (perpendicular to the northeast corner of the project site), the impacts on native soils are expected to be insignificant.

5.4.2.4 Offsite Pipelines

The proposed project will not include alteration of existing offsite pipelines but will consist of new construction of 2,400 feet of a pipeline to supply natural gas. A new water well will service the site and connections to this will need to be established. However, given the close proximity of the proposed water well and new gas pipeline to the proposed project site, the soil impact will be insignificant.

5.4.2.5 Worker Parking and Equipment Staging Site

The proposed worker parking and equipment staging sites are not paved, and therefore, will have exposed soils. Consequently, graveling will have to occur. Erosion control measures (more fully described in Section 5.4.3.1) will be implemented during grading to help maintain water quality, protect property from erosion damage, and prevent accelerated soil erosion or dust generation. No significant impacts to native soils, receiving waters, or area agricultural lands are anticipated at or near the site.

5.4.2.6 Cumulative Impacts

Soil erosion and sedimentation impacts associated with the PEC will not be significant; thus, cumulative impacts will be negligible. In addition, the location is not expected to have an effect on revegetation potential. The project is going to be constructed on previously disturbed land, a pomegranate orchard, which will be paved over. Agricultural impacts are described in Section 5.9 Land Use. The temporary laydown site will be converted back to a pomegranate orchard after the construction period. Impacts related to the potential excavation of contaminated soils will not be significant because all excavated materials will be handled in accordance with the procedures described in Section 3.8 (Project Construction) and Section 5.14 (Waste Management).

5.4.3 Mitigation Measures

The project site and surrounding areas are currently in agricultural production. Anticipated impacts to the surrounding area from the construction of the PEC will be minimized by the implementation of erosion control plans and storm water pollution prevention plans. No mitigation is proposed as impacts to soils during construction and operation are minimal.

5.4.3.1 Temporary Erosion Control Measures

Typically, temporary erosion control measures include revegetation, slope stabilizers, dust suppression, construction of berms and ditches, and sediment barriers. Vegetation is the most desirable form of erosion control because it stabilizes the soil and maintains the landscape, and implementation of vegetation is feasible due to the quality of soil and the rural environment.

During construction of the proposed project, employment of control measures will minimize the wind-blown erosion of soil form the site. Spraying clean water on the soil in construction areas will help to suppress dust.

Sediment barriers such as straw bales or silt fences, slow runoff and trap sediment. Generally, placement of barriers will occur at the base of exposed slopes below disturbed areas. Placing barriers around the proposed project and the property boundary serves as prevention against sediment leaving the site. Because the PEC site is relatively level, standard surface erosion control techniques should be effective. Runoff retention basins, drainage diversions, and other large-scale sediment traps are not expected to be needed because of the level topography. Soil stockpiles generated during construction will be covered and protected from rainfall if left onsite for extended periods of time.

5.4.3.2 Permanent Erosion Control Measures

Due to the site's flatness, runoff collection, and drainage system, additional long-term measures are neither warranted nor necessary.

5.4.4 Applicable Laws, Ordinances, Regulations, and Standards

The following laws, ordinances, regulations, and standards (LORS) are applicable to protection of soils resource and protection of surface water quality from project-induced erosion impacts. Table 5.4-2 provides a summary of these applicable LORS. As discussed below, the proposed project will be constructed and operated in accordance with applicable LORS and permit conditions.

5.4.4.1 Federal

5.4.4.1.1 The Federal Water Pollution Control Act of 1972; Clean Water Act of 1977 (including its 1987 amendments). These authorities establish requirements for any facility or activity that has or will discharge waste (including sediment due to accelerated erosion) that may interfere with the beneficial uses of receiving waters.

***Administering Agencies*.** The administering agency for the above authority is the Regional Water Quality Control Board (RWQCB), Central Valley Region (5), under the direction of the State Water Resources Control Board (SWRCB).

5.4.4.1.2 U.S. Department of Agriculture, Soil Conservation Service (SCS). *National Engineering Handbook (1983)*, Sections 2 and 3. The U.S. Department of Agriculture prescribes standards of technical excellence for the SCS, now called the Natural Resources Conservation Service (NRCS) for the planning, design, and construction of soil conservation practices.

***Administering Agency*.** The administering agency for the above authority is the NRCS.

5.4.4.2 State

5.4.4.2.1 Cal. Public Resources Code * 25523(a): CCR 1752, 1752.5, 2300-2309, and Chapter 2, Subchapter 5, Article 1, Appendix B, Part (i).** The Act provides for protection of environmental quality. With respect to the PEC, the Act requires submittal of information to the CEC concerning potential environmental impacts, and the CEC's decision on the Application for Certification (AFC) must include consideration of environmental protection.

***Administering Agency*.** The administering agency for the above authority is the CEC.

TABLE 5.4-2
LORS APPLICABLE TO SOILS RESOURCES AND AGRICULTURE

LORS	Applicability	Conformance
Federal		
The Federal Water Pollution Control Act of 1972; Clean Water Act of 1977	Establishes requirements for any facility or activity that has or will discharge waste (including sediment due to accelerated erosion) that may interfere with the beneficial uses of receiving waters	Sections 5.4.2, 5.4.5.1
U.S. Department of Agriculture, Soil Conservation Service (SCS). *National Engineering Handbook (1983)*, Sections 2 and 3	Planning, design, and construction of soil conservation practices	Sections 5.4.2, 5.4.5.1
State		
Cal. Public Resources Code * 25523(a): CCR** 1752, 1752.5, 2300-2309, and Chapter 2, Subchapter 5, Article 1, Appendix B, Part (i)	Protection of Environmental Quality	Sections 5.4.2, 5.4.5.2
California Environmental Quality Act, Cal. Public Resources Code * 21000 *et seq*.; Guidelines for Implementation of the California Environmental Quality Act of 1970, 14 CCR * 15000-15387, Appendix G	Substantial soil erosion or loss of topsoil, degradation or loss of available agricultural land, agricultural activities, or agricultural land productivity in the project area, alteration of agricultural land characteristics due to plant air emissions, or conversion of prime or unique farmland, or farmland of statewide importance, to no-agricultural use	Sections 5.4.2, 5.4.5.2
The California Porter-Cologne Water Quality Control Act of 1952; Cal. Water Code, * 13260 – 13269; 23 CCR Chapter 9	Requires adequate protection of water quality by appropriate design, sizing, and construction of erosion and sediment controls	Sections 5.4.2, 5.4.5.2
Local		
Fresno County Building and Construction Code, Title 15: Chapter 15.28	Establishes grading and excavation requirements during the construction phase of the project	Sections 5.4.2, 5.4.5.3

5.4.4.2.2 California Environmental Quality Act, Cal. Public Resources Code * 21000 *et seq*.; Guidelines for Implementation of the California Environmental Quality Act of 1970, 14 CCR * 15000-15387, Appendix G. The CEQA guidelines specify that an impact may be considered significant from an agriculture and soil standpoint if the project results in: substantial soil erosion or loss of topsoil, degradation or loss of available agricultural land, agricultural activities, or agricultural land productivity in the project area, alteration of agricultural land characteristics due to plant air emissions, or conversion of prime or unique farmland, or farmland of statewide importance, to no-agricultural use.

***Administering Agency*.** The administering agency for the above authority is the CEC.

5.4.4.2.3 The California Porter-Cologne Water Quality Control Act of 1952; Cal. Water Code, * 13260 – 13269; 23 CCR Chapter 9. The code requires adequate protection of water quality by appropriate design, sizing and construction of erosion and sediment controls. Discharge of waste earthen material into surface waters resulting from land disturbance may require filing of a report of waste discharge (Water Code * 13260(a)) and provides for issuance of waste discharge requirements with the respect to the discharge of any waste that can affect the quality of the waters of the state. Concerning potential surface water pollution from project area runoff, the waste discharge requirements may incorporate requirements based on the following source of recommended methods or procedures: California Regional Water Quality Control Board, 1996, Erosion and Sediment Control Field Manual.

***Administering Agencies*.** The administering agency for the above authority is the CEC, the RWQCB, and the SWRCB.

5.4.4.3 Local

5.4.4.3.1 Fresno County Building and Construction Code, Title 15: Chapter 15.28. This section of the Municipal Code establishes grading and excavation requirements during the construction phase of the project.

***Administering Agency*.** The administering agency for the above authority is Fresno County.

5.4.4.4 Agencies and Agency Contacts

Agencies with jurisdiction to issue applicable permits and/or enforce LORS related to soils resources and agriculture are shown in Table 5.4-3.

TABLE 5.4-3
AGENCY CONTACTS

Agency	Contact	Telephone
Fresno County Department of Planning & Public Works	Briza Sholars	559.443.5342

5.4.4.5 Applicable Permits

Table 5.4-4 lists all applicable permits for the PEC in the area of Agriculture and Soils.

TABLE 5.4-4
APPLICABLE PERMITS

Jurisdiction	Potential Permit Requirements
Federal	No federal permits were identified
State	No state permits were identified
Local	Grading Permit from Fresno County

5.4.5 References

United States Department of Agriculture, Natural Resources Conservation Service; Web Soil Survey. 2006. http://websoilsurvey.nrcs.usda.gov/app/.

Adequacy Issue:	Adequate ____	Inadequate ____	DATA ADEQUACY WORKSHEET	Revision No. ____	Date ____
Technical Area:	Soils		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.	5.4.1, 5.4.2 and 5.4.3		
Appendix B (g) (15) (A)	A map at a scale of 1:24,000 and written description of soil types and all agricultural land uses that will be affected by the proposed project. The description shall include:	Figure 5.4-1 and 5.4-2		
Appendix B (g) (15) (A) (i)	The depth, texture, permeability, drainage, erosion hazard rating, and land capability class of the soil; and	Table 5.4-1 5.4.1.1		
Appendix B (g) (15) (A) (ii)	An identification of other physical and chemical characteristics of the soil necessary to allow an evaluation of soil erodibility, permeability, re-vegetation potential, and cycling of pollutants in the soil-vegetation system.	5.4.1.1.1- 5.4.1.1.4		
Appendix B (g) (15) (C)	An assessment of the effects of the proposed project on soil resources and agricultural land uses. This discussion shall include:	5.4.2		
Appendix B (g) (15) (C) (i)	The quantification of accelerated soil loss due to wind and water erosion;	5.4.2.2 - 5.4.2.6		
Appendix B (g) (15) (C) (iii)	The effect of power plant emissions on surrounding soil-vegetation systems.	5.4.2.2		
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;	Table 5.4-2		

Adequacy Issue:	Adequate ____	Inadequate ____	DATA ADEQUACY WORKSHEET	Revision No. ____	Date ____
Technical Area:	**Soils**	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) (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.	Table 5.4-2		
Appendix B (h) (2)	A discussion of the conformity of the project with the requirements listed in subsection (h)(1)(A).	5.4.2, 5.4.5.1, 5.4.5.2, 5.4.5.3		
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.	Table 5.4-3		
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.	Table 5.4-4		

5.5 WATER RESOURCES

The existing conditions in the project area and the water demands for the Panoche Energy Center (PEC) have been evaluated and are presented in this section. The water resources data and information for the area, and the water demand data, were used to identify and evaluate the potential effects of the project on local water resources, and to identify mitigation measures that would reduce potential significant impacts (if any) to a level of insignificance. Details of this evaluation are presented below and in Appendix P and R.

5.5.1 Existing Site Conditions

5.5.1.1 Site Location

The PEC is located in the unincorporated area of western Fresno County, southeast of the intersection of West Panoche Road and Davidson Avenue, off the alignment of Davidson Avenue, as shown on Figure 5.5-1

Figure 3.4-3 shows the topography at the boundaries of the PEC site, and a detailed view of roads and community boundaries in the vicinity. The elevation at the site is approximately 420 feet above mean sea level (msl). The project area is a 12.8-acre area located on a gently sloping alluvial fan surface. The ground surface of the site slopes generally downward from southwest to northeast. The location of the proposed PEC water wells are shown on Figure 3.4-3.

5.5.1.2 Physiographic Setting

The PEC site is located in the western San Joaquin Valley, which is part of the Central Valley. The Central Valley comprises about 20,000 square miles and extends from near Red Bluff on the north to near Bakersfield on the south, a distance of about 400 miles.

5.5.1.3 Climate

The climate of the Central Valley in the vicinity of the PEC can be characterized as semi-arid. The valley experiences long, hot, dry summers and relatively mild winters. Monthly average, maximum, and minimum temperature data based on a 128-year record for the Fresno weather station, located approximately 35 miles east of the PEC site, are presented in Table 5.5-1. Based on 128 years of record, the average annual temperature for Fresno is 63.2°F. The Five Points 5 SSW weather station (No. 043083), located approximately 35 miles south of the PEC, has a 58-year record of temperature that is summarized in Table 5.5-2.

TABLE 5.5-1
MONTHLY TEMPERATURE DATA (°F) FOR FRESNO, CALIFORNIA

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Max	53.6	61.3	66.1	74.0	82.7	90.9	96.6	94.8	88.8	78.1	63.0	53.4
Mean	46	51.4	55.5	61.2	68.8	76.1	81.4	79.9	74.6	65.0	52.7	45.2
Min	38.4	41.4	44.9	48.4	54.9	61.2	66.1	64.9	60.4	51.9	42.3	37.0

TABLE 5.5-2
MONTHLY TEMPERATURE DATA (°F) FOR FIVE POINTS, CALIFORNIA

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Max	55.1	62.6	68.5	75.4	84.1	91.6	97.4	95.2	90.2	80.2	66.3	55.5
Mean	45.9	51.3	55.4	60.6	67.6	74.4	80.1	78.4	76.6	65.2	53.4	46.0
Min	36.6	40.0	42.3	45.8	51.1	57.3	62.9	61.6	58.0	50.2	41.6	36.5

Precipitation in the area is characterized by long dry summers and intermittent wet periods. The Fresno weather station (No. 043257), located approximately 55 miles east of the PEC, has a 128-year record of precipitation. Based on this record, the average annual precipitation is 11.23 inches. See Table 5.5-3.

TABLE 5.5-3
FRESNO AVERAGE MONTHLY PRECIPITATION (INCHES)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
2.11	1.91	1.89	1.00	0.37	0.15	0.01	0.01	0.17	0.53	1.17	1.58

The Five Points 5 SSW weather station (No. 043083), located approximately 35 miles south of the PEC, has a 58-year record of precipitation. Based on this record, the average annual precipitation is 6.92 inches. See Table 5.5-4.

TABLE 5.5-4
FIVE POINTS AVERAGE MONTHLY PRECIPITATION (INCHES)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
1.47	1.3	1.04	0.51	0.27	0.09	0.01	0.02	0.19	0.36	0.70	0.96

Panoche Creek is the main drainage into the area, flowing from the northeast approximately two miles north of the project site, which can be seen on Figure 5.5-1.

5.5.1.4 Demographics and Land Use

The PEC is located in an area used extensively for irrigated agriculture. An electric substation operated by Pacific Gas and Electric (PG&E) is located adjacent to the southeast portion of the plant site. The nearest communities are Mendota and Firebaugh, located 18 and 25 miles northeast of the PEC. There are a few scattered residences within 0.5 mile of the site, primarily to the north and east.

5.5.1.5 Geology

The San Joaquin Valley is an asymmetrical basin defined by the Coast Ranges to the west, the Tehachapi Mountains to the south, the Sierra Nevada to the east, and the delta of the San Joaquin and Sacramento rivers to the north. The axis of the valley trough is closer to the Coast Ranges than to the Sierra Nevada (Belitz and Heimes, 1990). The oldest rocks in the area are basement complex rocks underlying the basin that form much of the Tehachapi Mountains, San Emigdio Mountains, and the southern Sierra Nevada. The basement rocks are composed of a mass of plutonic and metamorphic rocks commonly referred to as the Sierra Nevada batholith of pre-Tertiary age. The basin is filled with more than 14,000 feet of rocks of Jurassic, Cretaceous, Tertiary, and Quaternary age (Croft, 1972).

5.5.1.6 Hydrogeology

The hydrogeology of the San Joaquin Valley is described in California Groundwater Bulletin 118 (California Department of Water Resources [DWR], 2004) and the Annual Deep Groundwater Conditions Report issued by the Westlands Water District (Westlands, 2006). Refer to Figure 5.5-2 for a schematic showing the cross-section of the San Joaquin Valley's hydrogeologic formations.

The Tulare Formation is included in undifferentiated non-marine strata approximately 2,580 feet thick encountered in the upper portion of nearby gas wells (DOGGR, 1985). The Tulare Formation is late Pliocene and early Pleistocene in age, and includes the Corcoran Clay, which is an extensive lacustrine deposit of low permeability that divides the groundwater flow system into a lower confined zone and an upper semiconfined zone. The Corcoran Clay was encountered in a nearby United States Geological Survey (USGS) observation well cluster site at a depth of about 666 feet below ground surface (USGS, 1987). The Corcoran Clay ranges in thickness from 20 to 120 feet (Belitz and Heimes, 1990).

The deposits of the semiconfined zone above the Corcoran Clay can include alluvium derived from the Coast Ranges and Sierran-derived sand. These hydrogeologic units differ in texture, hydrologic properties, and oxidation state. In contrast to Coast Ranges alluvium, the Sierran sand is reduced in the valley trough. The Sierran deposits are highly permeable and historically have been tapped by wells as a source of irrigation water (Belitz and Heimes, 1990). Sierran sands do not generally extend very far to the west of the axis of the valley trough, and the semiconfined zone underlying the site is dominated by Coast Range alluvium. Groundwater within the Coast Ranges alluvium is generally considered to be of relatively low quality due to the presence of water-soluble deleterious minerals within the parent rocks (Gilliom et al., 1989).

The deposits of the confined zone below the Corcoran Clay used as aquifers for groundwater production consist of poorly consolidated floodplain, deltatic, alluvial fan, and lacustrine deposits of the Tulare Formation. Many of the agricultural production wells in the study area are perforated below the Corcoran Clay (Belitz and Heimes, 1990). Groundwater withdrawal from the confined zone generated large-scale ground subsidence prior to delivery of surface water for agricultural water supply replacement beginning in the 1960s (Poland et al., 1975). Today, agricultural use of groundwater is limited except in times of drought when surface water supplies are curtailed.

5.5.1.6.1 Groundwater Sub-basins. The PEC is located in the Westside Sub-basin (DWR No. 5-22-09) of the San Joaquin Valley Groundwater Basin. The Westside Sub-basin consists mainly of the lands in Westlands Water District. It is located between the Coast Range foothills on the west and the San Joaquin River drainage and Fresno Slough on the east. The sub-basin is bordered on the southwest by the Pleasant Valley Groundwater Sub-basin and on the west by Tertiary marine sediments of the Coast Ranges, on the north and northeast by the Delta-Mendota Groundwater Sub-basin, and on the east and southeast by the Kings and Tulare Lake groundwater sub-basins.

5.5.1.6.2 Aquifer Characteristics. The aquifer system comprising the Westside Sub-basin consists of unconsolidated continental deposits of Tertiary and Quaternary age. These deposits form an unconfined to semi-confined upper aquifer and a confined lower aquifer. These aquifers are separated by an aquitard named Corcoran Clay (E-Clay), a member of the Tulare Formation. These water-bearing zones are recharged by subsurface inflow from the west, east and northeast and by percolation of precipitation and irrigation water.

The unconfined to semi-confined aquifer (upper zone) above the Corcoran Clay includes younger alluvium, older alluvium, and part of the Tulare Formation. These deposits consist of highly lenticular, poorly sorted clay, silt, and sand incercalated with occasional beds of well-sorted sand. Brackish water underlies the usable groundwater in the lower zone.

5.5.1.6.3 Groundwater Occurrence and Flow. The development of irrigated agriculture in the western San Joaquin Valley including the Panoche Fan area has significantly altered the groundwater flow system. Percolation of irrigation water past crop roots has caused a rise in the altitude of the water table in midfan and distal fan areas. Pumpage of groundwater from wells has caused a lowering of the potentiometric surface of the confined zone over much of the western valley. Percolation of irrigation water has replaced infiltration of intermittent streamflow as the primary mechanism of recharge. Pumpage of groundwater from wells and crop evapotranspiration have replaced natural evapotranspiration and seepage to streams in the valley trough as the primary mechanisms of discharge. The combination of percolation and pumpage has resulted in development of a large downward hydraulic-head gradient in the semiconfined zone and has created a groundwater divide. Decreases in groundwater pumping following delivery of surface-water have allowed consequent recovery in hydraulic head throughout the groundwater flow system. The present-day groundwater flow system is in a transient state and is adjusting to the stresses placed upon it in both the past and present (Belitz and Heimes, 1990).

5.5.1.6.4 Basin Water Balance. The Westlands Water District has determined that the perennial yield of groundwater is the Westside Sub-basin is 200,000 acre-feet.

5.5.1.6.5 Groundwater in Storage. The storage capacity of the upper semi-confined aquifer is approximately 36.5 million acre-feet. This estimate is based on an average thickness of 675 feet from the ground surface to the top of the Corcoran Clay, an area of 600,000 acres, and a specific yield of 9 percent (DWR, 2004). Specific yield is the ratio of the volume of water a rock or soil will yield by gravity drainage (Fetter, 1994).

The storage capacity of the lower confined aquifer is approximately 65 million acre-feet. This estimate is based on an average thickness of 1,200 feet from the base of the Corcoran Clay to the base of fresh groundwater, an area of 600,000 acres, and a specific yield of 9 percent (DWR, 2004).

Groundwater in storage in the sub-basin was estimated by the USGS to be about 52 million acre-feet at a depth of less than or equal to 1,000 feet in 1961. The available storage in the sub-basin is estimated to be 6 million acre-feet. This estimate is based on an average depth to groundwater in October 1984 of 111 feet, an area of 600,000 acres, and a specific yield of 9 percent (DWR, 2004).

5.5.1.6.6 Groundwater Quality. Groundwater in the Westside Sub-basin is generally of the sulfate or bicarbonate type. The waters of the upper aquifer are generally high in calcium and magnesium sulfate. Groundwater below 300 feet and above the Corcoran Clay shows a tendency of decreased dissolved solids with increased depth. Most of the groundwater of the lower aquifer is of the sodium sulfate type. The difference in quality between the upper and lower aquifers is that the confined zone contains less dissolved solids. Groundwater in the Westside Sub-basin can have an upper range of dissolved solids concentrations between 2,000 and 3,000 mg/L. Dissolved solids concentrations in shallow groundwater can be greater than 10,000 mg/L at some locations.

Groundwater quality estimates for the site (see Section 5.5.3.2) are based on historic data for water wells surrounding the site because no water wells are located within the site boundaries. While locations of the historic groundwater sampling locations are not precise, distances from the PEC range from about 500 feet to about 24,300 feet. Sampling data were reported between 1951 and 1995. Historic groundwater sampling data from approximately 20 wells surrounding the site are summarized in Appendix R.

5.5.1.7 Water Supply History and Future Projections

5.5.1.7.1 Water Supply History. Early farmers in the Westlands Sub-basin made use of groundwater for irrigation. In 1968, the delivery of surface water with low levels of dissolved solids from the San Luis Unit of the federal Central Valley Project (CVP) largely replaced the use of groundwater containing elevated levels of dissolved solids for irrigation. However, in response to drought conditions and other surface water shortfalls beginning in 1988, farmers reactivated old wells and constructed new wells in order to pump groundwater to irrigate their crops. Surface water delivered by the Westlands Water District is generally used rather than groundwater wells, and many wells in the area have collapsed or are abandoned.

5.5.1.7.2 Future Water Supply. In any given year the availability of surface water supplies imported from the Sacramento delta is a function of the amount of precipitation received in northern California, quantities of water carried over from prior years in reservoirs and the imposition of regulatory operational constraints in the delta. The amount of groundwater pumping is generally inversely proportional to the availability of surface water supplies.

5.5.1.8 Effects of Current Groundwater Pumping on Groundwater Basin

From 1987 though 1994 California, and much of the western United States, experienced the second worst drought of the 20th century. Prior to this period following construction of its distribution system in the mid 1960’s, Westlands Water District received full water service contract entitlements (1,150,000 acre-feet) in all but two years (1976 and 1977) and usually received additional (Interim) water supplies that would, in the future, be delivered to other CVP contractors once their delivery facilities were constructed.

During the 1987-94 drought Westlands Water District received an average supply of 61 percent of contract entitlement, and during 1991 and 1992 allocations of only 25 percent were received. It was during this period that the conveyance facilities were completed to the San Felipe Unit, the final element within the CVP delta export service area, thus making Interim water no longer available to Westlands and others.

Beginning in 1992 a series of state and federal regulatory actions were initiated that have had a significant long term effect on agricultural water supplies for both state and federal water service contractors relying on delta export water supplies. These regulatory actions include the listing of five fish species under the Endangered Species Act (ESA), increased delta outflow standards under the federal Clean Water Act (CWA) and establishment of more stringent water quality standards by the State Water Resources Control Board. In other actions the CVP was required to provide approximately 400,000 acre-feet per year to wildlife refuges, and up to an additional 800,000 acre-feet per year for restoration of fisheries. One of the most significant resulting operational changes was a reduction in delta export pumping for a minimum of 30 days in the spring for protection of out-migrant San Joaquin River salmon smolts and delta smelt.

Year-to-year surface water allocations and ground water pumpage varied significantly between 1976 and 2006. During this period, groundwater pumpage ranged from a low of 15,000 acre-feet to a maximum of 600,000 acre-feet in 1991 and 1992. Ground water levels show maximum annual variations of up to -97 ft/yr (declining) to positive (increasing) levels of up to 89 ft/yr. Known surface water deliveries and groundwater pumping in the Westlands Water District between 1976 and 2006 are summarized in Appendix R.

5.5.1.9 Effects of Future Use on Groundwater Basin by Others

Since its inception, the Westlands Water District has been faced with shallow groundwater drainage problems over an area of up to 200,000 acres that the federal Bureau of Reclamation (BOR) was obligated to remedy. Following passage of the CVP Improvement Act, BOR initiated a land retirement program in which drainage-impacted lands were purchased and taken out of irrigated production. As of 2006, a total of nearly 100,000 acres has been retired. The BOR recently released a San Luis Drainage Features Re-evaluation Report and EIR/EIS in which the recommended alternative is additional land retirement in lieu of providing drainage service. Ultimately the total acreage retired in the Westlands Water District may reach 200,000 acres or more, reducing total annual District demand by up to 500,000 acre-feet.

As a part of the land retirement program, CVP contract water supplies associated with the retired land will remain with Westlands Water District. This will increase the water supplies available to remaining lands and reduce the year-to-year variability in surface water supplies and groundwater pumpage. In the long term this can be expected to stabilize or increase groundwater levels throughout the basin.

5.5.2 Project Water and Wastewater Needs

The water balance diagrams (Figure 3.4-8 and 3.4-9) show the potable and process water flow streams for the maximum use day and the average day. Table 5.5-5 shows the maximum daily, average daily, and average annual water supply and disposal flows. Water needs at the PEC are limited primarily by the use of simple-cycle combustion generation technology and rather than more water-intensive steam generation technology.

TABLE 5.5-5
DAILY AND ANNUAL WATER FLOWS

	Maximum Daily (gal/day)	Average Daily (gal/day)	Average Annual (Acre-ft/year)
Production Well Supply			
Cooling Tower Makeup	1,647,000	1,238,000	793,000
Demineralizer System	534,000	511,000	328,000
Evap Cooler Makeup	62,000	14,000	9,000
Plant Service Water	7,000	7,000	5,000
Total Process Water	2,250,000	1,770,000	1,135,000
Wastewater Injection			
Cooling Tower Blowdown	514,000	388,000	248,000
RO System Rejects	133,000	128,000	82,000
Evap Cooler Blowdown	31,000	7,000	4,000
Plant Drains	14,000	14,000	9,000
Intercooler Condensation	48,000	3,000	2,000
Total	740,000	540,000	345,000
Water Well (Safety use only)	375	250	280
Septic System (Sanitary drains only)	375	50	280

Notes:
The maximum daily use is based on 24 hours of full load operation during the design hottest day (114ºF day/80ºF night).
The average daily use is 24 hours of the average of the full load use at the average monthly temperatures for every month.
The average annual use is based on 5,000 hours/year at the average daily rate, corresponding to the maximum plant capacity factor of 57 percent.

5.5.2.1 Alternative Water Supplies

Following is a summary of the alternative water supplies that are discussed in greater detail in the Alternatives presented in Section 4 of this document:

- Surface Water – Water present in lakes, streams and rivers.
- State Water Project – California Aqueduct located approximately 2 miles east of the project site.
- Federal CVP Water – Though structurally the same facility as the California Aqueduct, the CVP share of the joint use canal facilities is named the San Luis Canal.
- Reclaimed Water – Wastewater treatment plant effluent that has received tertiary treatment.
- Agricultural Wastewater – Drainage water from irrigation practices.

- Upper aquifer groundwater – Groundwater located in the semi-confined uppermost aquifer beneath the project site.
- Lower aquifer groundwater – Groundwater located in the confined aquifer below the Corcoran clay formation that separates this aquifer from the upper aquifer beneath the project site.
- Ocean water – Water from the Pacific Ocean.

5.5.2.1.1 Water Supply Alternatives Decision Analysis. – The following hierarchy of "tests" was applied to each alternative:

Test 1 – Is the alternative water supply feasibly available at the PEC? (If not, then disregard this alternative. If yes, proceed to Test 2.)

Test 2 – Will the subject alternative satisfy California Water Policy? (If not, then disregard this alternative. If yes, proceed to Test 3.)

Test 3 – Is the subject alternative technologically sufficient (quantity and quality) to guarantee high safety and reliability (98 percent availability?) (If no, then disregard this alternative. If yes, proceed to Test 4.)

For alternatives passing tests 1 – 3, apply tests 4 – 6:

Test 4 – Rate other impacts, including transportation, biological, energy, health & safety, etc. (50 to 100, with lowest impact alternative rated 100)

Test 5 – Rate relative capital costs of each remaining alternative. (50 to 100, with lowest cost rated 100)

Test 6 – Rate relative operations and maintenance (O&M) costs of each remaining alternatives. (50 to 100, with lowest cost rated 100)

The scores from application of tests 4 – 6 were weighted and totaled for each alternative, with the highest scoring alternative selected.

5.5.2.1.2 Surface Water. This source failed to pass Test 1 as sources of surface water are not located in sufficient proximity to the PEC for consideration as a source of water supply. In addition, as surface waters generally are identified as having municipal supply as a beneficial use, it is anticipated that this source would fail to pass Test 2 due to conflict with the California Water Policy.

5.5.2.1.3 State Water Project (SWP) Water. The California Aqueduct, which is the State share of the State/Federal Joint Use Facilities, is located approximately two miles east of the

PEC. This source failed to pass Test 2 as use of the potable water available from the California Aqueduct for project water supply was determined to be inconsistent with the State Water Policy. In addition the PEC site does not lie within the State permitted place of use for SWP water, thereby barring delivery of SWP water to the PEC site. This alternative was dropped from further consideration.

5.5.2.1.4 Federal CVP Water. Though structurally the same facility as the California Aqueduct, the CVP shares of the joint use canal facilities is named the San Luis Canal. This source failed to pass Test 2 as use of the potable water available from the California Aqueduct for project water supply was determined to be inconsistent with the State Water Policy. The PEC site lies within Westlands Water District and within the permitted place of use for CVP water. However, in approximately 2002, based on concerns over increasing demands within the District, the Westlands Water District Board of Directors made a determination that no new nonagricultural service connections would be served if average annual water use was going to be more then 5 acre-feet. This alternative was dropped from further consideration.

5.5.2.1.5 Reclaimed Wastewater. Reclaimed wastewater is wastewater treatment plant effluent that has received tertiary treatment. The nearest source of reclaimed water is in Firebaugh, which is located approximately 25 miles from the PEC site. This source failed to pass Test 1 as reclaimed water is not available in the vicinity of the project. This alternative was dropped from further consideration

5.5.2.1.6 Agricultural Wastewater. Agricultural wastewater is drainage water from irrigation practices. This source failed to pass Test 3 as drainage water from irrigation practices is not available in sufficient quantities nor is it sufficiently reliable for use at PEC due to the general use of drip irrigation by agriculture in the vicinity of the project site. This alternative was dropped from further consideration

5.5.2.1.7 Upper Aquifer Groundwater. Groundwater is located in the semi-confined uppermost aquifer beneath the project site. Although this source passed Tests 1 and 2, it failed to pass Test 3 as the high concentration of dissolved solids in the upper aquifer groundwater renders this source of water as unsuitable for the planned uses of process water at the PEC. This alternative was dropped from further consideration

5.5.2.1.8 Lower Aquifer Groundwater. Groundwater is located in the confined aquifer below the Corcoran Clay formation that separates this aquifer from the upper aquifer beneath the project site. This source passed Tests 1 – 3 based on volume. Although this is a brackish groundwater supply, it is of sufficient quality to meet the process water supply requirements of the PEC.

5.5.2.1.9 <u>Ocean Water</u>. This source failed to pass Test 1 due to the distance of the PEC from the Pacific Ocean. This source also failed to pass Test 3 as the high concentration of dissolved solids renders this source of water as unsuitable for the planned uses of production water at the PEC. This alternative was dropped from further consideration

5.5.2.2 <u>Wastewater Disposal Alternatives</u>

Following is a summary of the alternative wastewater disposal alternatives that are discussed in greater detail in the Alternatives presented in Section 4 of this document:

- Zero liquid discharge system – A mechanical system utilizing membrane technology and heat to effectively reduce liquid wastes to a dry waste for landfill disposal
- Evaporation pond – Large, lined surface impoundment for disposal of wastewater via atmospheric drying, resulting in a sludge that must be disposed in a landfill system
- Deep injection well – Disposal of wastewater via well discharge to a geologic formation that is unsuitable for potable water production and isolated from aquifers
- Disposal to Wastewater Treatment Plant – Discharge to a sanitary sewer discharging to a publicly owned treatment works
- Surface Discharge – Discharge of wastewater to the ground or receiving waters, including lakes, rivers and streams
- Offsite Treatment – Hauling of the wastewater to a facility in another location employing one or more of several technologies by a contracted service company

5.5.2.2.1 <u>Wastewater Disposal Alternatives Decision Analysis</u>. – The following hierarchy of "tests" was applied to each alternative:

<u>Test 1</u> – Is the wastewater disposal alternative feasibly available at the PEC? (If not, then disregard this alternative. If yes, proceed to Test 2.)

<u>Test 2</u> – Will the subject alternative satisfy applicable laws, ordinances, regulations, and standards (LORS)? (If not, then disregard this alternative. If yes, proceed to Test 3.)

<u>Test 3</u> – Is the subject alternative technologically sufficient to guarantee high safety and reliability (98 percent availability? If no, then disregard this alternative. If yes, proceed to Test 4 – 6.)

For alternatives passing tests 1 – 3, tests 4 – 6 were applied and scored:

<u>Test 4</u> – Rate other environmental impacts, including transportation, biological, energy, health and safety, etc.

Test 5 – Rate relative capital costs of each remaining alternative.

Test 6 – Rate relative O&M costs of each remaining alternatives.

The scores from application of tests 4 – 6 were weighted and totaled for each alternative, with the highest scoring alternative selected.

5.5.2.2.2 Zero Liquid Discharge System. A mechanical system utilizing membrane technology and heat to effectively reduce liquid wastes to a dry waste for landfill disposal. This alternative passed Tests 1 – 2, but failed Test 3 due to low reliability and energy efficiency ratings. In addition, this alternative has high capital and operation and maintenance costs and requires landfill disposal of produced wastes. This alternative was dropped from further consideration.

5.5.2.2.3 Evaporation Pond. Large, lined surface impoundment for disposal of wastewater via atmospheric drying, resulting in a sludge that must be disposed in a landfill system. Although this wastewater disposal alternative passed Tests 1 and 3, it failed to pass Test 2 due to the high concentrations of selenium present in the groundwater that are expected to preclude permitting of such a facility. Evaporation ponds also have high installation costs and land requirements and may result in significant environmental impacts. This alternative was dropped from further consideration.

5.5.2.2.4 Deep Injection Well. Disposal of wastewater via well discharge to a geologic formation that is unsuitable for potable water production and is isolated from aquifers. This alternative passed Tests 1 – 3.

5.5.2.2.5 Disposal to Wastewater Treatment Plant. Discharge to a sanitary sewer discharging to a publicly owned treatment works. This alternative failed to pass Test 1 as a sanitary sewer is not available in the vicinity of the PEC. This alternative was dropped from further consideration.

5.5.2.2.6 Surface Discharge. Discharge of wastewater to the ground or receiving waters including lakes, rivers and streams. This alternative failed to pass Test 2 as the quality of the wastewater would not meet state and federal discharge limitations. This alternative was dropped from further consideration.

5.5.2.2.7 Offsite Treatment. Hauling of the wastewater to a facility in another location employing one or more of several technologies by a contracted service company. This alternative provisionally passed Tests 1 – 3, pending identification of a feasibly accessible facility. Potential problems associated with this alternative may include transportation and operations costs.

The scores from application of tests 4 – 6 were totaled for each alternative, with the highest scoring alternative selected. Wastewater disposal options are evaluated in Table 5.5-6.

TABLE 5.5-6
EVALUATION OF WASTEWATER DISPOSAL OPTIONS

Wastewater Option	Test #1 Availability (pass?)	Test # 2 Satisfy LORS? (pass?)	Test #3 Technologically Feasible? (pass?)	Test #4 Environmental Impacts	Test #5 Relative Capital costs	Test #6 Relative O&M costs	Relative Ranking
Zero Liquid Discharge	Yes	Yes	No	NA	High	High	NA
Evaporation Pond	Yes	No	Yes	High	High	Low	NA
Deep Injection Well	Yes	Yes	Yes	Low	High	Medium	1st choice
Wastewater Treatment Plant	No	No	No	NA	NA	NA	NA
Surface Discharge	Yes	No	Yes	NA	NA	NA	NA
Offsite Treatment Facility	Yes (Provisional)	Yes	Yes	High	Low	High	2nd choice

NA = not applicable.

5.5.3 Water Resources and Wastewater Management

5.5.3.1 Project Water Resources Plan

5.5.3.1.1 Source of Project Water Supply. Brackish lower aquifer groundwater was selected to meet the PEC process water needs as it is the only alternative water source that meets Tests 1 – 3 of the decision analysis described in section 5.5.2.1. Production water for the PEC will be supplied via two onsite supply wells connected to the lower aquifer.

The safety water will be supplied by the production wells and will be treated as necessary to meet federal, state, and local requirements. The production well locations are shown on the site layout drawing, Figure 3.4-3.

The typical brackish production well water quality is presented in Table 5.5-7.

TABLE 5.5-7
EXPECTED PRODUCTION WELL WATER QUALITY

General	Units		Chemicals, mg/l		As Such
Conductivity	µS/cm	2150	Arsenic	As	.012
pH		7.7	Boron	B	3.1
Total Suspended Solids	ppm	0	Fluoride	F	0.6
Total Dissolved Solids	ppm	1550	Silica	SiO_2	42
Ion Chemistry, mg/l	as $CaCO_3$				
Total Alkalinity		174			
Hardness		194			
Calcium	Ca	95			
Magnesium	Mg	99			
Sodium	Na	929			
Potassium	K	5			
Bicarbonate	HCO_3	174			
Sulfate	SO_4	781			
Chloride	Cl	171			
Nitrate-Nitrite	NO_3	2.1			

5.5.3.1.2 Process Water Uses. Uses of the process well water include fire protection water, plant service water, cooling tower makeup, combustion turbine generator (CTG) NO_x injection (after treatment) and combustion turbine inlet air evaporative cooler makeup (partly from treated water). The CTG injection water will be treated using a reverse osmosis (RO) system, followed by a mixed-bed deionizer. The amounts of water used for each purpose is summarized in Table 5.5-5.

5.5.3.1.3 Project Water Supply Facilities. Process water for the PEC will be supplied via two onsite production wells connected to the lower brackish aquifer. The safety water will also be supplied by these wells and will be treated as necessary to meet federal, state, and local requirements.

5.5.3.1.4 Project Water Treatment.

***Cooling Tower Makeup Water*.** There will be one cooling tower for the facility. The tower will provide heat rejection for the intercooler and lube oil coolers connected to each of the facility's four LMS100 CTGs.

The makeup water will be brackish well water and is expected to have a total dissolved solids content of approximately 1,550 mg/L as fed to the cooling tower. The circulating water will be continuously treated and controlled in order to achieve approximately 3.2 cycles of concentration. Because cooling towers experience fouling as silica concentrations exceed 150 ppm, the number of cycles of concentration is limited by the concentration of silica in the process supply.

Makeup water will be pumped from the raw water storage tank to the cooling tower basin as required to replace water lost from evaporation, drift, and blowdown. A chemical feed system will supply water conditioning chemicals to the circulating water to minimize corrosion and control the formation of mineral scale and bio-fouling. Sulfuric acid will be fed into the circulating water system in proportion to makeup water flow for alkalinity reduction to control the scaling tendency of the circulating water. The acid feed equipment will consist of a bulk sulfuric acid storage tank and two full-capacity sulfuric acid metering pumps. The cooling tower operating characteristics are summarized in Table 5.5-8.

TABLE 5.5-8
COOLING TOWER OPERATING CHARACTERISTICS

Parameter	Cooling Tower[1] Average	Evaporative Coolers
Circulating Water, gpm	27,600	1,500
Number of Cells	5	--
Makeup, gpm	1,300	120
Blowdown, gpm	410	30
Drift, gpm	0.14	--
Evaporation, gpm	900	90

[1] All numbers are estimates for full load at 114º F dry bulb, 74º F wet bulb
gpm = gallons per minute.

To further inhibit scale formation, a polyacrylate solution will be fed into the circulating water system as a sequestering agent in an amount proportional to the circulating water blowdown flow. The scale inhibitor feed equipment will consist of a chemical solution bulk storage tank and two full-capacity scale inhibitor metering pumps.

To prevent bio-fouling in the circulating water system, sodium hypochlorite will be fed into the system. The hypochlorite feed equipment will consist of a bulk storage tank and two full-capacity hypochlorite metering pumps. Two full-capacity metering pumps will be provided for the feeding of either stabilized bromine or sodium bromide as alternate biocides.

In general, the cooling tower water treatment system will be used to maintain the circulating water quality within the requirements of the cooling tower vendor, as shown in Table 5.5-9.

5.5.3.1.5 <u>Demineralized Water</u>. The water injected into the CTG for NO_x control must be free of contaminants. A demineralized water system utilizing trailer-mounted exchangers that

TABLE 5.5-9
CIRCULATING WATER QUALITY LIMITS, PPM

Parameter	Concentration, Parts per Million (PPM)
Alkalinity, as $CaCO_3$	100 to 500
Silica, as SiO_2	<150
Iron	<3.0
Manganese	<0.1
Sulfides	<1.0
Ammonia	<50
Total dissolved solids (TDS)	<5000
Calcium as $CaCO_3$	<800
Chlorides, as Cl	<450
Nitrates, as NO_3	<300

will be regenerated offsite will provide high-purity water to be used for evaporation in the turbine inlet evaporator coolers and injection water into the turbine combustor for NO_x control. Raw well water will be filtered and sent through an RO system to remove all of the suspended solids and most of the dissolved solids from the water. The demineralized water system will consist of two 60 percent capacity RO mixed-bed demineralizer trains. The RO system rejects approximately 25 percent of the feed water, along with the impurities that were removed. The product water from the RO system is sent through a mixed-bed demineralizer and then to a 240,000 gallon demineralized water storage tank. Makeup water to the demineralized water system will be from a 500,000-gallon raw water/firewater storage tank. In addition to being used for CTG NO_x control, the demineralized water will also be used for CTG compressor washing and for CTG inlet air evaporative cooler makeup water.

5.5.3.1.6 <u>CTG Inlet Air Evaporative Coolers Makeup Water</u>. The makeup water to the CTG evaporative coolers will consist of approximately one-third raw water and two-thirds from the demineralized water. This will allow the coolers to operate at 4 to 6 cycles of concentration.

The fraction of demineralized water that is fed to the coolers will be adjusted to meet the manufacturers recommended makeup water quality, as shown in Table 5.5-10.

5.5.3.2 Project Wastewater Management Plan

5.5.3.2.1 <u>Selected Wastewater Disposal Alternative</u>. Based on the evaluation described in section 5.5.2.2, use of deep injection wells was identified as the superior alternative for disposal of wastewater. The deep well injection system was determined to be the least expensive alternative to install, operate and maintain and could also be more easily be expanded. Deep well injection is a common accepted practice in the Central Valley as hydrogeologic conditions can be ascertained by researching the data provided by numerous

TABLE 5.5-10
EVAPORATIVE COOLER MAKEUP WATER

Parameter	Concentration (mg/L)
Calcium Hardness, as $CaCO_3$	50 - 150
Alkalinity, as $CaCO_3$	50 - 150
Chlorides, as Cl	<40
Silica, as SiO_2	<150
Iron	<0.2
Vanadium	<1.0
Lead	<1.0
TDS	<500
TSS	<5

oil and gas well records. The Cheney Ranch Gas Field, located from 1.3 to 4.6 miles north of the Panoche Site, has eighteen abandoned gas wells. The well logs and records of these gas wells provide substantial applicable information to characterize the hydrogeology beneath the PEC project area.

Given the significant cost differential and regulatory certainty, the deep well injection system was selected as the best option for disposal of process wastewater from the PEC facility. Under this alternative, wastewater collected in the proposed plant's wastewater collection tank(s) will be conveyed by a six-inch-diameter pipeline and disposed of by injection into new disposal wells. The disposal wells will be located on the PEC site.

5.5.3.2.2 Project Wastewater Streams. The combined industrial wastewater discharge from the plant will consist of cooling tower blowdown, RO rejects, evaporative cooler blowdown, and water effluent from the oil-water separator.

Table 5.5-5 shows the major wastewater streams and the resultant wastewater for disposal. Refer to the water balances, Figures 3.4-8 and 3.4-9 for flow rates.

Wastewater from the PEC will consist mainly of cooling tower blowdown, which is non-hazardous (see Tables 5.5-9 and 5.5-11). The volumes of process wastewaters to be injected into the deep well are summarized in Table 5.5-12. The expected wastewater composition is shown in Table 5.5-13.

Process wastewater will be temporarily stored in a cooling tower washwater drain tank and a blowdown tank located at the PEC site. The wastewater will then be pumped to the underground injection well(s) located on the PEC site. The average process wastewater

TABLE 5.5-11
PROCESS WASTE CHARACTERIZATION

	Units	Cooling Twr Blowdown	Evap Cooler Blowdown	RO System Rejects	Combined Wastewater
General					
pH		7 - 8	7 - 8	7 - 8	7 - 8
Total Suspended Solids	ppm				
Total Dissolved Solids	ppm	4,940	3,100	5,150	5,000
Ion Chemistry, mg/l as $CaCO_3$					
Total Alkalinity		560	350	580	560
Hardness		620	390	650	630
Calcium	Ca	300	200	320	310
Magnesium	Mg	320	200	330	320
Sodium	Na	3,000	1,860	3,100	3,000
Potassium	K	16	10	17	16
Bicarbonate	HCO_3	550	350	580	560
Carbonate	CO_3				
Sulfate	SO_4	2,500	1,560	2,600	2,520
Chloride	Cl	550	340	570	560
Nitrate-Nitrite	NO_3	7	4	8	7
Chemicals, mg/l	As Such				
Arsenic	As	.038	.024	.040	.040
Boron	B	10	6	10	10
Fluoride	F	2	2	2	2
Silica	SiO_2	135	85	140	135

TABLE 5.5-12
ESTIMATED WASTEWATER VOLUMES TO BE INJECTED

Waste Stream	Daily Average	Daily Maximum
Cooling Tower Blowdown	430,000 gpd	537,500 gpd
Floor Drains	58,000 gpd	72,500 gpd
Demineralization Wastes	15,000 gpd	18,500 gpd
Total Injection Well	503,000 gpd	628,500 gpd

TABLE 5.5-13
ESTIMATED WASTEWATER CHARACTERISTICS

	Waste Stream Characteristics – mg/l			
Stream	Cooling Tower Blowdown	Demin. Regen. Waste	Floor/Interim. Storm Drains	Combined Waste
Calcium	97.1	164.0	16.4	94.7
Magnesium	4.1	7.0	0.7	4.0
Sodium	336.5	1985.0	56.8	461.2
Potassium	14.2	24.0	2.4	13.9
Barium	0.0	0.0	0.0	0.0
Strontium	1.2	2.0	0.2	1.2
Iron	1.3	2.0	0.2	1.2
Boron	2.4	4.0	0.4	2.3
Bicarbonate	100.0	803.0	80.3	163.9
Chloride	257.0	434.0	43.4	250.7
Sulfate	285.5	3290.0	0.4	536.8
Silica	128.5	217.0	21.7	125.4
Borate	12.4	21.0	2.1	12.1
Phosphate	0.8	1.0	0.1	0.8
PH	7.6	6.0-8.5	7.5	6.0-8.5
TDS	1241.1	6954.0	225.1	1668.2
TSS	75.0	25.	75.0	70.3
Oil and Grease	0.0	0.0	11.0	1.2

generation rate that will require disposal is expected to be 540,000 gallons per day (gpd), or approximately 388 gallons per minute (gpm). A provisional estimate of the potential injection rate of wastewater via an injection well at the PEC is 500 gpm.

Incorrect disposal of process wastewater can degrade soil, surface water and groundwater. Sanitary waste will be disposed to a septic system. All other non-hazardous liquid wastes generated by PEC will be disposed through the use of deep injection wells.

5.5.3.2.3 Domestic/Sanitary Wastewater. The sanitary sewer system will consist of a septic system and leach field designed to handle the sanitary sewer flow from the administration and control building and other restrooms, if any, located on the site. The septic tank and leach field will be located directly south of the administration and control building. The septic tank and leach field will be constructed in ground that has been determined to be acceptable by a percolation test.

5.5.3.2.4 Storm Water Runoff. According to the Federal Emergency Management Agency (FEMA), a portion of the site is within the 100-year flood plain. The site will be raised in conformance with the Fresno County ordinance Title 15, Flood Hazard Areas to ensure that in the event of a 100-year storm, the site and equipment is not subjected to any flood damage. Storm water from the portions of the project site containing industrial activities will be conveyed by overland flow and swales to an infiltration basin located at the southeast corner of the proposed site. Storm water runoff from areas of the PEC not containing industrial activities (employee parking areas, switchyards, administration buildings, open space) are not required to be permitted or managed and will run off the site as sheet flow. The infiltration basin will prevent discharges of storm water runoff from the industrial areas of the proposed site. The infiltration basin is sized to capture 85 percent of the annual storm water runoff from the industrial areas of the proposed site according to standards set in the "California Storm Water BMP Handbook" (California Stormwater Quality Association, 2003). The infiltration basin will also serve to manage peak storm water runoff during the 100-year 24-hour storm event. The peak runoff for the developed conditions will not exceed the peak runoff rate of the existing conditions. Appendix S contains the storm water calculations.

A Storm Water Pollution Prevention Plan (SWPPP) will be prepared prior to construction of the PEC. This plan will be implemented at the PEC site to control and minimize contamination of storm water during the construction of the facility. The plan will employ best management practices such as stabilized construction entrances, silt fencing, berms, hay bales, and detention basins to control runoff from all construction areas.

5.5.4 Effect of Proposed Project on Water Resources

5.5.4.1 Effect on Sub-Basin Water Balance

The project will have an insignificant effect on the sub-basin water balance due to the annual water demands relative to the volume of groundwater storage in the Westside Sub-basin.

5.5.4.2 Water Level Drawdown Effects

The project will have an insignificant effect on the water level drawdown in the Westside Sub-basin due to the annual water demands relative to the volume of groundwater storage.

5.5.4.3 Water Quality Effects

The withdrawal of brackish water will provide a net removal of dissolved solids from the Westside Sub-basin. Dissolved solids in wastewater from the project will be removed from the Westside Sub-basin by deep well injection to a formation not utilized for potable purposes.

PEC's proposed wastewater injection operations will affect formation water within the Laguna Seca and Moreno formations of Paleocene Age (Figure 5.3-3). Based on the depth of the proposed injection zones (approximately 5,000 feet bgs), and high TDS of the formation water (TDS > 10,000 mg/L), the groundwater is expected to be exempted as an underground source of drinking water.

The proposed injection zones for the wells would be permeable sands with a total thickness of approximately 560 feet. The proposed injection zone sands are located beneath approximately 900 feet of relatively impervious Kreyenhagen Shale (Figure 5.3-3).

Process wastewater will be temporarily stored in a blowdown tank located at the PEC site. The wastewater will then be pumped to the underground injection well(s) located on the PEC site. The average process wastewater generation rate which will require disposal is expected to be 540,000 gpd, or approximately 388 gpm.

5.5.4.4 Cumulative Effects

The safe perennial yield of groundwater in the Westside Sub-basin is approximately 200,000 acre-feet. The maximum annual groundwater demand from the PEC is estimated to be 1,154 acre-feet. To the extent that cumulative groundwater pumping is less than 200,000 acre-feet, groundwater pumping by the PEC will not have an impact on groundwater levels in the Westside Sub-basin. However, PEC pumping during periods when pumping exceeds 200,000 acre-feet, water use by the PEC will provide a minor contribution (approximately 0.5 percent) to lowering of groundwater levels.

5.5.5 Available Documents and Information

The geology and hydrogeology of the groundwater basins and sub-basins in the Central Valley have been studied by the United States Geological Survey (USGS), California Department of Water Resources (DWR), the United States Bureau of Reclamation and the Westlands Water District. The project is located within the service area of the Westlands Water District, the largest agricultural water agency in the United States with a service area of nearly 1,000 square miles. Westlands Water District also monitors well facilities in the project area, and has performed and commissioned groundwater studies within its boundaries the most recent of which were performed in the year 2005. The Westlands Water District annually collects water quality and water level data and other water-related information for the project area and develops estimates of groundwater pumpage and depth and elevation contour maps. The available historic records document long-term hydrologic and water-related conditions in the area.

Overall, data and information have been developed over an extended period of time, through available published and unpublished reports, that provide a base of detailed information related to local hydrogeologic conditions. Reviews and assessments of the data and information available indicated that there is sufficient data to evaluate the water resources of the project area and to assess the effects of the PEC proposed groundwater pumping.

The available data regarding important water resource factors include: historical groundwater levels and estimates of pumpage, surface water and groundwater characteristics, historical and projected groundwater production, surface water flows, well construction logs, production well-specific capacities, surface topography, historical precipitation, temperature, land use, geophysical surveys, geologic reports and maps, hydrogeologic reports, and groundwater modeling studies. These data provide a reliable foundation for decision-making related to the proposed project and its potential effects on area water resources. These data are fully adequate as a basis to evaluate the potential effects of the PEC on local groundwater resources and users near the site, to assess the significance of the effects, and to identify and evaluate mitigation methods that can reduce potential significant impacts (if any) to a level of insignificance.

5.5.6 Stipulated Conditions

The analysis of the effect of the PEC on water resources indicates that the project will have no significant effect on the water resources in the Westside Sub-Basin. Implementation of the following Conditions of Certification (COC) will help ensure that the project conforms with the applicable laws, ordinances, regulations and standards (LORS) as identified in Section 5.5.8.

5.5.6.1 Soil and Water 1: General Industrial Activity Storm Water Permit

As the project will be constructed such that runoff from industrial activities will be contained in a retention basin and infiltrated on the project site, the facility will not be required to obtain coverage under the General Industrial Activity Storm Water Permit and a Storm Water Pollution Prevention Plan (SWPPP) will not be required.

5.5.6.2 Soil and Water 2: Storm Water Pollution Prevention Plan

Prior to beginning any clearing, grading or excavating activities associated with project construction, and as required by the General Construction Activity Stormwater Permit, the Applicant will develop and implement a SWPPP prepared under the requirements of the General Construction Activity Storm Water Permit.

5.5.6.2.1 Verification. At least 30 days prior to the start of construction, the Applicant will submit a draft SWPPP to the Compliance Project Manager (CPM) for review and comment. Two weeks prior to the start of construction, the Applicant will submit to the CPM a copy of the final SWPPP for review and approval. The final SWPPP shall contain all the elements of the draft plan with changes made to address staff comments and the final design of the project. Approval of the plan by the CPM must be received prior to the initiation of any clearing, grading or excavation activities associated with project construction.

5.5.6.3 Soil and Water 3: Erosion Control and Revegetation Plan

Prior to beginning clearing, grading or excavation activities associated with project construction, the Applicant shall submit an Erosion Control and Revegetation Plan to the CPM for approval. The final plan shall contain all the elements of the draft plan with changes made to address the final design of the project.

5.5.6.3.1 Verification. Two weeks prior to the initiation of any clearing, grading or excavation activities associated with project construction, the Applicant will submit the final Erosion Control and Revegetation Plan to the CPM for review and approval. Approval of the plan by the CPM must be received prior to the initiation of any clearing, grading or excavation activities associated with project construction.

5.5.6.4 Soil and Water 4: Waste Discharge Requirements and Deep Injection Well Permit

PEC intends to file an application for four (4) Class I Non-hazardous Deep Injection Wells with the U.S. Environmental Protection Agency (USEPA). The proposed wells will be located approximately 2 miles south of the abandoned Cheney Gas Well Field (Figure 3.2-A). A Draft Underground Injection Control (UIC) Class 1 Permit to drill and construct the wells is expected to be approved by the USEPA approximately 9 months after receipt of the permit application. The USEPA Class I UIC Permit will contain specific conditions regarding the construction and operation of the injection wells.

The Applicant will obtain final Waste Discharge Requirements (WDRs) issued by the Regional Water Quality Control Board (RWQCB), Central Valley Region and a Deep Injection Well Permit issued by the USEPA, Region IX for the construction and operation of the deep injection wells to be used for the project’s wastewater discharge. The WDRs and the Deep Injection Well Permit will include water quality objectives for wastewater, sampling and analysis requirements and monitoring requirements for the deep injection wells.

5.5.6.4.1 Verification. Thirty days prior to the deep injection wells receiving any wastewater discharge, the Applicant will obtain and submit to the CPM a copy of final WDRs issued by the RWQCB and the UIC Class 1 Permit issued by USEPA Region IX for the construction and operation of the deep injection well. Changes to the design, construction or operation of the deep injection wells permitted by the WDRs and UIC Class 1 Permit during either construction or operation will be noticed in writing to the CPM, RWQCB and USEPA Region IX. During the life of the project, the Applicant will provide the CPM with the annual monitoring report summary required by the WDRs and UIC Class 1 Permit, and will fully explain violations, exceedances, enforcement actions or corrective actions. The Applicant will notify the CPM in writing of changes to the WDRs or UIC Class 1 Permit that are instituted by either the Applicant, RWQCB or USEPA Region IX, including permit renewals.

5.5.6.5 Soil and Water 5: Well and Aquifer Testing

The Applicant shall conduct well tests in each of the new project wells to determine the drawdown-discharge characteristics of each well. Each well shall be tested separately. The Applicant shall also conduct an aquifer test in the project area of each groundwater sub-basin from which groundwater is produced using the new wells to determine the site-specific aquifer parameters of transmissivity and storativity for each sub-basin. The aquifer test(s) will use one of the new wells as the pumping well and the other new wells in that sub-basin as observation wells. The test period shall be long enough to produce stable, measurable drawdown in the observation wells.

5.5.6.5.1 Verification. Thirty days prior to conducting the well or aquifer testing, the Applicant will submit to the CPM a work plan for well and aquifer testing for review and approval. Following approval of the work plan by the CPM, the Applicant will conduct well tests on each of the new project wells and will conduct an aquifer test on each groundwater sub-basin from which groundwater is produced. All tests will be in accordance with the protocols established in the work plan. Sixty days following completion of the well and aquifer tests, the Applicant shall submit to the CPM a Well and Aquifer Test report for review and approval. The report will include all of the data collected during the testing, include the analyses of data, and describe the results of testing, the drawdown-discharge characteristics of each of the new project wells, and the calculated values for transmissivity and storativity for the project area for each groundwater sub-basin from which groundwater is produced. The report shall include a description of the results of the test, the test procedure, the raw data and the calculation of aquifer parameters.

5.5.6.6 Soil and Water 6: Report of Monthly Groundwater Pumpage

The Applicant will record the amount of groundwater pumped each month by the project from each groundwater sub-basin from which groundwater is produced. The amounts of groundwater pumped will be summarized in a Report of Monthly Groundwater Pumpage that will be submitted by the Applicant to the CPM and to the Westlands Water District.

5.5.6.6.1 Verification. Four weeks following the end of each month of commercial operation, the Applicant will submit to the CPM and to the Westlands Water District a copy of the Report of Monthly Groundwater Pumpage showing the previous month's pumpage and historical pumpage from each groundwater sub-basin from which groundwater is produced.

5.5.6.7 Soil and Water 7: Report of Groundwater Level Monitoring

The Applicant shall measure and record static, non-pumping groundwater levels in the onsite project wells on a monthly basis for the first six months following project start up, and thereafter on a quarterly basis. The groundwater levels will be summarized in a Report of Monthly Groundwater Pumpage that will be submitted by the Applicant to the CPM and to the Westlands Water District.

5.5.6.7.1 Verification. Sixty days following project start up and on a quarterly basis thereafter, the Applicant shall submit a quarterly Report of Groundwater Level Monitoring to the CMP and to the Westlands Water District.

5.5.6.8 Soil and Water 8: Report of Groundwater Quality Monitoring

The Applicant will provide the results of annual chemical analyses of groundwater from at least one of the project wells in each groundwater sub-basin from which water is pumped. The analytes will include primary and secondary general minerals and physical parameters, volatile organic compounds, and semi-volatile organic compounds. If a comparison of analyses from one sampling period to the next indicates that there is a significant increase in the concentration of one or more of the chemical compounds in the groundwater, the need for additional pretreatment of water will be reassessed. The need for pretreatment of groundwater prior to use by the project will be based on incompatibility with the WDRs or deep injection well permit, exceedances of air emissions standards, worker safety standards, or standards of exposure of downwind receptors.

5.5.6.8.1 Verification. Sixty days following project start up, and annually thereafter for a total of five years, the Applicant will submit a Report of Groundwater Quality Monitoring to the CPM that presents the results of the required analyses in a summary format. The need for additional pretreatment of water will be assessed on an ongoing basis. The need for continued monitoring will be reassessed at the end of the five-year period.

5.5.7 Mitigation Measures

In relation to water resources, mitigation measures for the proposed project would be applied in situations where the project has or would have an unmitigated significant impact. As discussed above, the evaluation of water resources impacts considered both the occurrence and the quality of water in the area. For the occurrence of groundwater in the area, the project will have no significant impact on the depth to water in the aquifer, or water resources in the area as a result of the drawdown caused by pumping. Furthermore, the project will not have any effect on the quality of groundwater in the area. Thus, no mitigation is required for water resources.

5.5.8 Water-related Laws, Ordinances, Regulations and Standards (LORS)

The construction and operation of the PEC will be in accordance with all federal, state, county and local laws, ordinances, regulations and standards (LORS) applicable to water resources. Applicable LORS are discussed in this section and are summarized in Table 5.5-14.

5.5.8.1 Federal Authorities and Administering Agencies

5.5.8.1.1 Clean Water Act of 1977 (including 1987 amendments) § 402; 33 USC § 1342; 40 CFR Parts 122 – 136. The CWA requires a National Pollutant Discharge Elimination System (NPDES) permit for any discharge of pollutants from a point source to waters of the United States. This law and its regulations apply to storm water and other discharges into waters of the United States. The CWA requires compliance with a general construction activities permit for the discharge of storm water from construction sites disturbing one acre or more. This federal permit requirement is administered by the State of California Water Resources Control Board (SWRCB).

Construction activities at the project site will be performed in accordance with a SWPPP and associated monitoring plan that is required in accordance with the NPDES General Permit for Storm Water Discharges Associated with Construction Activities issued by the SWRCB. The SWPPP will include control measures including Best Management Practices (BMP) to reduce erosion and sedimentation as well as other pollutants associated with vehicle maintenance, material storage and handling, and other activities occurring at the project site. The administering agencies for the above authority are the Central Valley RWQCB.

5.5.8.1.2 Clean Water Act § 311; 33 USC § 1342; 40 CFR Parts 122 – 136. This portion of the CWA requires reporting of any prohibited discharge of oil or hazardous substance. The project will conform by proper management of oils and hazardous materials both during construction and operation. The administering agency is the Central Valley RWQCB and the California Department of Toxic Substances Control.

5.5.8.1.3 Code of Federal Regulations (CFR), Title 40, Parts 124, 144 to 147. This portion of the federal code requires protection of underground water resources. The project will comply with this requirement through the submittal of a UIC injection well application to the USEPA. The injection wells will be reviewed and permitted prior to well construction.

5.5.8.2 State Authorities and Administering Agencies

5.5.8.2.1 Water Code Section 13552.6. This portion of the California Water Code (CWC) relates to the use of potable domestic water for cooling towers. Use of potable domestic water for cooling towers is unreasonable if suitable recycled water or brackish groundwater is available. No recycled water is available in the project area. Project will use brackish

TABLE 5.5-14
LORS RELATED TO WATER RESOURCES

LORS	Applicability	Conformance and Timing
Federal		
CWA § 402; 33 USC § 1342; 40 CFR Parts 110, 112, 116	Requires NPDES Permits for construction and industrial storm water discharges. Requires preparation of a SWPPP and Monitoring Program.	No industrial stormwater discharges, so no coverage under NPDES industrial storm water permit required. NOI for coverage under NPDES construction storm water permit will be filed prior to construction and plant operation. A SWPPP will also be prepared for construction activity.
CWA § 311; 33 USC § 1342; 40 CFR Parts 122-136	Requires reporting of any prohibited discharge of oil or hazardous substance.	The project will conform by proper management of oils and hazardous substances both during construction and operation.
Code of Federal Regulations (CFR), Title 40, Parts 124, 144 to 147	Requires protection of underground water resources.	PEC will submit UIC injection well application to USEPA for construction and operation of injection wells.
State		
CWC § 13552.6	Use of potable domestic water for cooling towers is unreasonable use if suitable recycled water is available.	Project has determined that recycled water is not available in the vicinity of the project site.
California Constitution Article 10 § 2	Avoid the waste or unreasonable uses of water. Regulates methods of use and diversion of water.	Project includes appropriate water conservation measures, both during construction and operation. The project will comply with this as well as State Water Resources Control Board Resolution 75-58.
State Water Resources Control Board, Resolution No. 75-58	Addresses sources and use of cooling water supplies for power plants which depend on inland waters for cooling and in areas subject to general water shortages.	Project has determined that recycled water is not available at this site. However, availability of brackish water has been identified and will be used for industrial water supply.
Porter-Cologne Water Quality Act of 1972; CWC § 13000-14957, Division 7, Water Quality	Requires State and Regional Water Quality Control Boards to adopt water quality initiatives to protect state waters. Those criteria include identification of beneficial uses, narrative and numerical water quality standards.	Project will conform to applicable state water standards, both qualitative and quantitative, prior to plant operation. Applicable permits will be obtained for deep injection well from Regional Water Quality Control Board.
Title 22, CCR	Addresses the use of recycled water for cooling equipment.	Project has investigated the technical and economic feasibility of using reclaimed water and determined that this resource is not available.
The Safe Drinking Water and Toxic Enforcement Act of 1986 (proposition 65), Health and Safety Code 25241.5 *et seq.*	Prohibits the discharge or release of chemicals known to cause cancer or reproductive toxicity into drinking water sources.	Project will conform to all state water quality standards, both qualitative and quantitative.

TABLE 5.5-14 (CONTINUED)
LORS RELATED TO WATER RESOURCES

LORS	Applicability	Conformance and Timing
CWC Section 461	Encourages the conservation of water resources and the maximum reuse of wastewater, particularly in areas where water is in short supply.	Project has investigated the technical and economic feasibility of using reclaimed water and determined that it is not available. However, project will use non-potable brackish groundwater.
CWC Section 5002	Requires a "Notice of Extraction and Diversion of Water" to be filed with the State Water Resources Control Board on or before March 1st of the succeeding year.	Notice will be filed as required by state law.
CWC Section 13751	Requires a "Report of Completion" to be filed with the State Water Resources Control Board within 60 days of well construction.	Report of Completion will be filed for all wells constructed in association with this project.
California Public Resources Code § 25523(a); 20 CCR §§ 1752, 1752.5, 2300 – 2309, and Chapter 2 Subchapter 5, Article 1, Appendix B, Part (1)	The code provides for the inclusion of requirements in the CEC's decision on an AFC to assure protection of environmental quality and requires submission of information to the CEC concerning proposed water resources and water quality protection.	The PEC will comply with the requirements of the CEC to assure protection of water resources.
CWC §§ 13271 – 13272; 23 CCR §§ 2250 – 2260	Reporting of releases of reportable quantities of hazardous substances or sewage and releases of specified quantities of oil or petroleum products.	Project will conform to all State water quality standards, both qualitative and quantitative.
CWC §13260 – 13269; 23 CCR Chapter 9	Requires the filing of a Report of Waste Discharge (ROWD) and provides for the issuance of WDRs with respect to the discharge of any waste that can affect the quality of the waters of the state.	A ROWD will be filed for the deep injection well. The deep injection well will be constructed and monitored in accordance with RWQCB requirements.
CEQA, Public Resources Code § 21000 *et seq.*; CEQA Guidelines, 14 CCR § 15000 *et seq.*; Appendix G	The CEQA Guidelines (Appendix G) contain definitions of projects which can be considered to cause significant impacts to water resources.	The PEC will comply with the requirements of the CEC to assure protection of water resources.
Local		
Fresno County Department of Community Health, Environmental Health System, California Well Standards Ordinance and California Well Standards, Bulletins 74-81 and 74-90	Regulates construction of new water wells, reconstruction, repair or deepening of existing wells and destruction of abandoned wells.	Project will conform to all Fresno County water well construction standards.

**TABLE 5.5-14 (CONTINUED)
LORS RELATED TO WATER RESOURCES**

LORS	Applicability	Conformance and Timing
Fresno County General Plan		
Water Quality Policies and Programs	Non-point sources of water pollution, such as runoff from urban areas, grading, construction, and agricultural activities shall be recognized as potentially significant impacts of development.	Project will conform to all water quality policies and programs, and will have zero discharge off-site from industrial activities. Grading and erosion control plans will prevent construction impacts.

groundwater. SWRCB Resolution 75-58 addresses this issue and the administering agency is the Central Valley RWQCB.

5.5.8.2.2 State Water Resources Control Board, Resolution 75-58 (June 18, 1975). The SWRCB prescribes state water policy on the use and disposal of inland water used for power plant cooling. A discussion of this resolution as it applies to the project is presented in Section 5.5.3.2 of this report. The administering agencies for this resolution are the SWRCB and the Central Valley RWQCB.

5.5.8.2.3 California Porter-Cologne Water Quality Control Act 1998; California Water Code § 13000 – 14957; Division 7, Water Quality. The Porter-Cologne Water Quality Control Act authorizes the state to develop and implement a statewide program for the control of the quality of all waters of the state. The Act establishes the SWRCB and the nine RWQCBs as the principal state agencies with primary responsibility for the coordination and control of water quality. Under § 13172, siting, operation, and closure of waste disposal sites are regulated. The SWRCB requires classification of the waste and the disposal site. Discharges of waste must comply with the groundwater protection and monitoring requirements of the Resource Conservation and Recovery Act of 1976 (RCRA), as amended (42 USC Sec. 6901 *et seq.*), and any federal acts which amend or supplement RCRA, together with any more stringent requirements necessary to implement this revision or Article 9.5 (commencing with Section 25208) of Chapter 6.5 of Division 20 of the Health and Safety Code. The project will comply with the regulations set forth in this Act.

The administering agencies for the above authority are the CEC, SWRCB and the Central Valley RWQCB.

5.5.8.2.4 Title 22, CCR Division 4, Chapter 3. This regulation requires maximum use of reclaimed water in the satisfaction of requirements for beneficial uses of water. The project satisfies this requirement in that it complies with the Central Valley Region Basin Plan's designated beneficial uses for local groundwater. It also meets this requirement as it relates to SWRCB Resolution 75-58. The administering agency is the Central Valley RWQCB.

5.5.8.2.5 <u>California Water Code, Section 5002</u>. This requirement relates to the extraction of groundwater and requires that a Notice of Extraction and Diversion of Water be filed with the SWRCB. This requirement applies for extractions greater than 25 AFY. The project will comply with this requirement by filing the required notice once project pumping begins. The administering agency is the Central Valley RWQCB.

5.5.8.2.6 <u>California Water Code, Section 13751</u>. This is a requirement for a Report of Well Completion to be filed with the Central Valley RWQCB within 60 days of well completion. Reports will be filed for the two wells planned for the Panoche project.

5.5.8.2.7 <u>California Public Resources Code § 25523(a); 20 CCR §§ 1752, 1752.5, 2300 – 2309 and Chapter 2 Subchapter 5 Article 1, Appendix B, Part (1)</u>. The code provides for the inclusion of requirements in the CEC's decision on an AFC to assure protection of environmental quality and requires submission of information to the CEC concerning proposed water resources and water quality protection. The administering agency for the above authority is the CEC.

5.5.8.2.8 <u>California Water Code §§ 13271 – 13272; 23 CCR §§ 2250 – 2260</u>. These code sections require reporting of releases of specified reportable quantities of hazardous substances or sewage (§ 13272), when the release is into, or where it will likely discharge into, waters of the state. For releases into or threatening surface waters, a "hazardous substance" and its reportable quantities are those specified at 40 CFR § 116.5, pursuant to § 311(b)(2) of the CWA, 33 USC § 1321(b)(2). For releases into or threatening ground water, a "hazardous substance" and its reportable quantities are those specified at 40 CFR § 116.5, pursuant to § 311(b)(2) of the CWA, 33 USC § 1321(b)(2). For releases into or threatening ground water, a "hazardous substance" is any material listed as hazardous pursuant to the California Hazardous Waste Control Act, Health & Safety Code §§ 25100 – 2520.24, and the reportable quantities are those specified at 40 CFR Part 302. Although such releases are not anticipated, the project would comply with the reporting requirements.

The administering agencies for the above authority are the Central Valley RWQCB and the California Office of Emergency Services.

5.5.8.2.9 <u>California Water Code § 13260 – 13269; 23 CCR Chapter 9</u>. The code requires the filing of a ROWD and provides for the issuance of WDRs with respect to the discharge of any waste that can affect the quality of the waters of the state. The WDRs will serve to enforce the relevant water quality protection objectives of the Central Valley Region Basin Plan and federal technology-based effluent standards applicable to the proposed project. With respect to potential water pollution from construction activities, the WDRs may incorporate requirements based on the CWA § 402(p) and implementing regulations at 40 CFR Parts 122 seq., as administered by the Central Valley RWQCB. The administering agency for the above authority is the Central Valley RWQCB.

5.5.8.2.10 <u>California Environmental Quality Act, Public Resources Code § 21000 *et seq.*; CEQA Guidelines, 14 CCR § 15000 *et seq.*; Appendix G</u>. The CEQA Guidelines (Appendix G) contain definitions of projects that can be considered to cause significant unmitigated impacts to water resources. The project is not expected to cause significant impacts to water resources, as described in Section 5.5.2. The administering agency of the above authority is the CEC.

5.5.8.3 Local Authorities and Administering Agencies

5.5.8.3.1 <u>Fresno County Department of Community Health, Environmental Health System, California Well Standards Ordinance and California Well Standards, Bulletins 74-81 and 74-90</u>. The Fresno County Environmental Health System regulates the construction of new water wells, the reconstruction, repair or deepening of existing wells and the destruction of abandoned wells in unincorporated Fresno County. The Environmental Health System regulates these activities through the provisions of the California Well Standards Ordinance and the construction standards set forth in the California Well Standards, Bulletins 74-81 and 74-90. Water supply wells constructed for the project will be constructed in accordance with this ordinance and these bulletins. The administering agency is the Fresno County Department of Community Health, Environmental Health System.

5.5.8.3.2 <u>Fresno County General Plan, Water Quality Policies OS-A.23 through OS-A.30 and Programs OS-A.A through OS-AD</u>. The purpose of these policies and programs is to help control potentially significant impacts of development, including non-point sources of water pollution, such as runoff from urban areas, grading, construction, and agricultural activities. Project compliance with other LORS, such as the CWA, will result in general compliance with this objective.

5.5.8.4 Industry Codes and Standards

With regards to water resources and the related project facilities, including wells, pumps, piping, deep injection wells, and other facilities, all construction will be in compliance with the LORS mentioned in this report section or state and local building codes.

5.5.8.5 Agency Contacts and Permits

See Table 5.5-15 for agency contacts.

The water-related permits that are required for the project are identified in Table 5.5-14. The timing for the preparation of each permit is noted in the table. These permits include:

General Construction Activity Storm Water Permit. Notice of Intent to comply with this general permit to be prepared and submitted to the SWRCB at least two weeks prior to the start of project operation. Draft of SWPPP to be prepared and submitted to CPM at

TABLE 5.5-15
AGENCY CONTACTS

Agency	Contact	Title	Telephone
United States Environmental Protection Agency, Region IX	George Robin	Director, Underground Injection Control Program	(415) 972-3532
California Regional Water Quality Control Board, Central Valley Region	W. Dale Harvey	Senior Water Resource Control Engineer	(559) 445-6190
Fresno County Health Department			(559) 445-3200
Westlands Water District	Susan Ramos	Deputy General Manager - Resources	(559) 224-1523

- least 30 days prior to the start of construction for review and comment. A final plan to be submitted to the CPM no later than two weeks prior to the start of construction.
- WDRs/UIC Class 1 Permit. Thirty days prior to the deep injection well receiving any wastewater discharge, a copy of the final WDRs and UIC Class 1 Permit will be submitted to the CPM.
- Well Construction Permits. Well construction permits will be obtained from the Fresno County Health Department prior to drilling the two water supply wells for the project. Permits will be obtained at least one week prior to initiation of drilling.

5.5.9 References

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Adequacy Issue: Adequate ____ Inadequate ____ **DATA ADEQUACY WORKSHEET** Revision No. ____ Date ____________

Technical Area: **Water Resources** 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.	3-2; 3.3		
Appendix B (g) (14) (A)	All information required by the Regional Water Quality Control Board in the region where the project will be located to apply for:	5.5-28; 5.5.8		
Appendix B (g) (14) (A) (i)	Waste Discharge Requirements; and	5.5-27; 5.5.8.2.1		
Appendix B (g) (14) (A) (ii)	a National Pollutant Discharge Elimination System Permit.	5.5-28; 5.5-8		
Appendix B (g) (14) (B)	A description of the hydrologic setting of the project. The information shall describe, in writing and on maps at a scale of 1:24,000, the chemical and physical characteristics of the following water bodies that may be affected by the proposed project:	5.5-3; 5.5.1.6		
Appendix B (g) (14) (B) (i)	Ground water bodies and related geologic structures;	5.5-3; 5.5.1.6		
Appendix B (g) (14) (B) (ii)	Surface water bodies; and	3-3; 3.3.3.1		
Appendix B (g) (14) (B) (iii)	Water inundation zones, such as the 100-year flood plain and tsunami run-up zones.	5.5.3.2.4		
Appendix B (g) (14) (C)	A description of the water to be used and discharged by the project. This information shall include:	3-13; 3.4.7 5.5-13; 5.5.3.1.1 5.5-18; 5.5.3.2.2		

Adequacy Issue: Adequate ____ Inadequate ____

DATA ADEQUACY WORKSHEET

Revision No. ____ Date ____

Technical Area: **Water Resources** 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) (14) (C) (i)	Source of the water and the rationale for its selection, and if fresh water is to be used for power plant cooling purposes, a discussion of all other potential sources and an explanation why these sources were not feasible;	3-13; 3.4.7 5.5-13; 5.5.3.1.1 5.5-8; 5.5.2.1		
Appendix B (g) (14) (C) (ii)	The physical and chemical characteristics of the source and discharge water;	5.5-14; 5.5.3.1.2 5.5-18; 5.5.3.2		
Appendix B (g) (14) (C) (iii)	Average and maximum daily and annual water demand and waste water discharge for both the construction and operation phases of the project; and	3-14; 3.4.7.1 5.5-8, 5.5.2 5.5.3.2.4		
Appendix B (g) (14) (C) (iv)	A description of all facilities to be used in water conveyance, treatment, and discharge. Include a water mass balance diagram.	5.5-14; 5.5.3.1.4 5.5-17; 5.5.3.2.1		
Appendix B (g) (14) (D)	A description of pre-, and post-construction runoff and drainage patterns, including:	5.5-1; 5.5.1.1 5.5-20; 5.5.3.2.4		
Appendix B (g) (14) (D) (i)	Precipitation and storm runoff patterns; and	3-3; 3.3.3.1 5.5-1; 5.5.1.1		
Appendix B (g) (14) (D) (ii)	Drainage facilities and design criteria.	5.5-20; 5.5.3.2.4		
Appendix B (g) (14) (E)	An assessment of the effects of the proposed project on water resources. This discussion shall include:	5.5-21; 5.5.4		
Appendix B (g) (14) (E) (i)	The effects of project demand on the water supply and other users of this source;	5.5-21; 5.5.4.4		
Appendix B (g) (14) (E) (ii)	The effects of construction activities and plant operation on water quality; and	5.5-21; 5.5.4.3		
Appendix B (g) (14) (iii)	The effects of the project on the 100-year flood plain or other water inundation zones.	5.5.3.2.4		

Adequacy Issue: Adequate ____ Inadequate ____ **DATA ADEQUACY WORKSHEET** Revision No. ____ Date ____

Technical Area: **Water Resources** 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) (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;	5.5-28; 5.5.8.2.2		
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.	5.5-28; 5.5.8.2.2		
Appendix B (h) (2)	A discussion of the conformity of the project with the requirements listed in subsection (h)(1)(A).	5.5-28; 5.5.8.2.2		
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.	5.5-33; 5.5.8.5		
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.	5.5-28; 5.5.8.2.2		

5.6 BIOLOGICAL RESOURCES

The PEC is a proposed nominal 400-megawatt (MW) peaking facility consisting of four (4) General Electric LMS100 natural gas-fired combustion turbine generators, emissions control equipment, one cooling tower, and process water treatment equipment and other associated equipment. The PEC site is to be located in a pomegranate orchard adjacent to the southwest corner of the existing Panoche Substation in Fresno County (refer to Figure 5.6-1). The plant site is approximately 12.8 acres and the laydown area is approximately 8 acres adjacent to the south side of the PEC site. The site is approximately 2 miles east of Interstate 5, southeast of the intersection of West Panoche Road and Davidson Avenue, off the alignment of Davidson Avenue. Facilities associated with the project include the electric transmission line, natural gas supply line, water supply and discharge wells, access road improvements, and site drainage improvements. The electric transmission line will connect to the 230kV bus at the adjacent PG&E Panoche Substation. The natural gas supply line is an approximately 2,400-foot branch from the main north-south PG&E Line 2 that parallels Interstate 5.

The existing biological resources within the study area and within a 1-mile radius around the plant site are the subject of this section. In addition, the potential impacts to biological resources as a result of the proposed project are assessed. Refer to Figure 5.6-2 for a map of the project site and vicinity with identification of any biological resources within a 1-mile radius of the site.

5.6.1 Affected Environment

The proposed project site was historically a sagebrush and native grass covered arid landscape. Dense riparian vegetation grew only along the banks of the area’s few creeks (JRP Historical Consulting, 2006). As a result of heavy agricultural and industrial use in the area, no native vegetation is present within the study area or vicinity. The plant site and laydown area are located within an active pomegranate orchard. The existing Panoche Substation is adjacent to the northern corner of the PEC site. Panoche Road is to the north and the remainder of the site is surrounded by agriculture primarily consisting of apricot and pomegranate trees.

5.6.1.1 Survey Methods

Biological field surveys were conducted by a URS biologist on April 21, 2006 according to the CEC regulations (CEC, 2000). The “project area” is defined as the area that could potentially be directly disturbed during project construction, and includes the power plant site, construction laydown and parking areas, electric transmission line, access road, substation expansion, and natural gas line. The “project survey area” includes the project area and a buffer of a 1-mile radius surrounding the PEC where field surveys were conducted for botanical and wildlife resources.

Prior to conducting field surveys a review of literature was performed including a search of the California Native Plant Society (CNPS) Inventory of Rare Plants Database and California Natural Diversity Database (CNDDB) in order to determine special-status species known to occur or that could potentially occur within the project survey area. The following USGS 7.5-minute quadrangles were searched for records of special-status species: Hammonds Ranch, Broadview Farms, Firebaugh, Chounet Ranch, Chaney Ranch, Coit Ranch, Tumey Hills, Monocline Ridge, and Levis quadrangle. The project survey area is within the Chaney Ranch, and all of the surrounding quadrangles were searched (see Figure 5.6-1).

The reconnaissance field survey included walking transects through the proposed plant site and construction laydown and parking areas and visually scanning areas within the 1-mile buffer (see Figure 5.6-2). All botanical and wildlife species observed were documented, and all plant communities and habitat that could support potentially occurring special-status species listed in Table 5.6-1 were described. All plant and wildlife species observed during the survey within the project and buffer areas are listed in Table 5.6-2. Plant nomenclature follows Hickman (1993). The survey was conducted by URS biologist Johanna LaClaire under the supervision of URS senior biologist Dr. Patrick Mock. Appendix N includes copies of the biologists' resumes.

5.6.1.2 Plant Communities

No native plant communities are present within the project survey area. The only vegetation present was pomegranate trees and scattered ruderal vegetation (covering less than 5 percent of the area) in the understory of the pomegranate trees. The only native plant species observed was miner's lettuce (*Claytonia perfoliata*). Vegetation within the buffer area was similar except some areas had apricot trees instead of pomegranate trees. Personnel tending the orchards regularly apply herbicide to manage weeds. Vegetation present within the proposed power plant site is similar to the construction laydown and parking areas.

5.6.1.3 Wetlands

No wetlands are present within the project study area. There is an east west trending drainage ditch just outside of the northeast portion of the project area between the project area and Panoche substation that was dry during the field survey. Another drainage containing water runs north-south parallel to the east side of Davidson Avenue. Only ruderal vegetation was present along these drainages. These drainages were created for agricultural use and are not jurisdictional waters of the U.S. according to Army Corp of Engineers (USACOE) or California Department of Fish and Game (CDFG). Panoche Creek is 2 miles north of the project area. The California Aqueduct is approximately 2.7 miles to the east of the project area. The nearest blue line stream is 1.66 miles to the southwest with headwaters at the Tumey Hills.

TABLE 5.6-1
SPECIAL-STATUS SPECIES POTENTIALLY OCCURRING AT THE PEC SITE

Common Name	Scientific Name	Status[1]	Occurrence
Wildlife			
Blunt-nosed leopard lizard	*Gambelia sila*	FE, SE	Last documented in the area in 1993
Swainson's hawk	*Buteo swainsonii*	FT	Last official documentation in the area in 2005
Short-eared owl	*Aseo flammeus*	CSC	Last official documentation in the area in 1993, however this species often goes undocumented by observers
Horned lark	*Eremophila alpestris*	CSC	Last official documentation in the area in 1992, however this species often goes undocumented by observers
Tulare grasshopper mouse	*Onychomys torridus tularensis*	FSC	Last documented in the area in 1955
San Joaquin kit fox	*Vulpes macrotis mutica*	FE, SE	Last documented in the area in 1999

[1] U.S. Fish and Wildlife Service (Federal)
FE = Endangered (In danger of becoming extinct throughout all or a significant portion of its range.)
FT = Threatened (Likely to become endangered in the foreseeable future in the absence of special protection.)
FC = Federal Candidate (Candidate for FT or FE listing.)
FSC = Species of Concern (Sufficient information exists which warrants concern over that species' status and warrants study.)

California Department of Fish and Game (State)
SE = Endangered (In danger of becoming extant throughout all or a significant portion of its range.)
SC = State Candidate (Candidate for SE or State Threatened [likely to become endangered in the foreseeable future in the absence of special protection.])
CSC = Species of Concern (Information exists which warrants concern over that species' status and warrants study.)

5.6.1.4 Wildlife Community

The PEC and adjacent areas provide limited habitat for few wildlife species due to high agricultural use in the area. Sixteen species of birds were observed during the field survey. Typical species observed include western kingbird (*Tyrannus verticalis*), red-tailed hawk (*Buteo jamaicensis*), American goldfinch (*Carduelis tristis*), and American pipit (*Anthus rubescens*), but none of the birds detected are sensitive at a state or federal level. Raptors are protected by CDFG. Most of the species detected, such as house finch (*Carpodacus mexicanus*), brown-headed cowbird (*Molothrus ater*), killdeer (*Charadrius vociferus*), European starling (*Sturnus vulgaris*), house sparrow (*Passer domesticus*), American crow (*Corvus brachyrhynchos*), morning dove (*Zenaida macroura*), cliff swallow (*Petrochelidon fulva*), Brewer's blackbird (*Euphagus cyanocephalus*), and Northern mockingbird (*Mimus polyglottus*), are typically found in disturbed/developed areas. Some breeding activity was observed, including morning doves that were breeding in the pomegranate trees, cliff swallows with nests at the top of the water tank at the southeast corner of the orchard outside of the project area, and an active red-tailed hawk nest in the transformer towers at the

TABLE 5.6-2
PLANT AND WILDLIFE SPECIES OBSERVED
DURING FIELD SURVEY

Common Name	Scientific Name
BIRDS	
Turkey vulture	*Cathartes aura*
Red-tailed hawk	*Buteo jamaicensis*
Killdeer	*Charadrius vociferus*
Mourning dove	*Zenaida macroura*
Western kingbird	*Tyrannus verticalis*
American crow	*Corvus brachyrhynchos*
European starling	*Sturnus vulgaris**
Northern mockingbird	*Mimus polyglottos*
Cliff swallow	*Petrochelidon pyrrhonota*
House sparrow	*Passer domesticus**
American pipit	*Anthus rubescens*
American goldfinch	*Carduelis tristis*
House finch	*Carpodacus mexicanus*
Brewer's blackbird	*Euphagus cyanocephalus*
Brown-headed cowbird	*Molothrus ater*
PLANTS	
Amaranth	*Amaranthus* sp.*
Foxtail chess	*Bromus madritensis**
Pigweed, Lamb's quarters	*Chenopodium album**
	*Chenopodium murale**
Miner's lettuce	*Claytonia perfoliata*
Bind weed	*Convolvulus arvensis**
	Conyza sp.*
	Cyperus sp.*
Redstem filaree	*Erodium cicutarium**
Everlasting	*Gnaphalium luteo-album**
Hare barley	*Hordeum murinum**
Lettuce	*Lactuca* sp.*
Cheeseweed	*Malva parviflora**
Yellow sweetclover	*Melilotus officinalis**
Annual bluegrass	*Poa annua**
Pomegranate tree	*Punica granatum**

TABLE 5.6-2 (CONTINUED)
PLANT SPECIES AND WILDLIFE OBSERVED DURING FIELD SURVEY

Common Name	Scientific Name
Common groundsel	*Senecio vulgaris**
Prickly sow-thistle	*Sonchus asper**
Common sow-thistle	*Sonchus oleraceus**
Common chickweed	*Stellaria media**
Slender fescue	*Vulpia bromoides**

*Non-native species.

Panoche Substation. A coyote (*Canis latrans*) was observed moving through the orchard within the project area and two western toads (*Bufo boreas*) were observed in burrows just outside of the project area to the northwest. A few gopher (*Thomomys bottae*) burrows were observed, but rodent activity was minimal.

5.6.1.5 Special-Status Species

5.6.1.5.1 Plants. No special-status plant species were observed during the field survey and there are no records in the CNDDB within the project survey area. The CNDDB lists the following 11 special-status plant species as historically or potentially present within the project vicinity: Lost Hills crownscale (*Atriplex vallicola*), hispid bird's-beak (*Cordylanthus mollis* ssp. *hispidus*), Hall's tarplant (*Deinandra halliana*), recurved larkspur (*Delphinium recurvatum*), Temblor buckwheat (*Eriogonum temblorense*), round-leaved filaree (*Erodium macrophyllum*), Munz's tidy-tips (*Layia munzii*), Panoche pepper-grass (*Lepidium jaredii* ssp. *album*), showy madia (*Madia radiate*), San Joaquin woollythreads (*Monolopia congdonii*), and Sanford's arrowhead (*Sagittaria sanfordii*). In addition, CNPS lists pale-yellow layia (*Layia heterotricha*). These species are likely to have been extirpated from the project survey area due to the conversion of native vegetation to intensive agriculture. Few native plant species were observed within the project area and these species are not expected to occur in the project study area.

5.6.1.5.2 Wildlife. No special-status wildlife species were observed during the field survey and there are no records in the CNDDB within the project survey area. The CNDDB lists the following 22 sensitive wildlife species as historically present and potentially occurring in the project vicinity: Ciervo aegilian scarab beetle (*Aegialia concinna),* tricolored blackbird (*Agelaius tricolor),* San Joaquin antelope squirrel (*Ammospermophilus nelsoni),* silvery legless lizard (*Anniella pulchra pulchra),* short-eared owl (*Asio flammeus),* burrowing owl (*Athene cunicularia),* Swainson's hawk (*Buteo swainsoni),* western yellow-billed cuckoo (*Coccyzus americanus occidentalis),* San Joaquin dune beetle (*Coelus gracilis),* giant kangaroo rat (*Dipodomys ingens),* western pond turtle (*Emys (=Clemmys) marmorata),* California horned lark (*Eremophila alpestris actia)*, western mastiff bat (*Eumops perotis californicus)*, blunt-nosed leopard lizard *(Gambelia sila)*, Morrison's blister beetle *(Lytta morrisoni)*, Tulare grasshopper mouse *(Onychomys torridus tularensis)*, San Joaquin pocket mouse *(Perognathus inornatus inornatus)*, California horned lizard *(Phrynosoma coronatum frontale*), bank swallow *(Riparia riparia)*, American badger *(Taxidea taxus)*, giant garter snake *(Thamnophis gigas)*, and San Joaquin kit fox, *(Vulpes macrotis mutica)*. Most of these sensitive species records are located within the special environmental areas discussed in the next section and are not expected to occur in the project study area due to lack of suitable habitat. Only a few sensitive wildlife records are located within agricultural areas in the project vicinity and thus have a low potential to occur in the project area. These sensitive species include Swainson's hawk, San Joaquin kit fox, California horned lark, Tulare grasshopper mouse, short-eared owl, and blunt-nosed leopard lizard. These special-status species that have a low potential to occur in the project survey area are discussed further below and listed in Table 5.6-1.

Many sensitive plant and animal species in the southern San Joaquin valley occupy the same habitats: desert scrub, chenopod scrub, subshrub scrub, grassland, and alkali playa. These rare habitats represent a unique area of endemism in California. More endemic vertebrate species co-occur in the San Joaquin Valley than anywhere comparable in the continental United States (U.S. Fish and Wildlife Service [USFWS], 1998). Farming, urbanization, land reclamation, pest control, and other human disturbance have eliminated up to 95 percent of the habitat that once dominated the region, and many of the plants and animals that once ranged widely throughout the southern San Joaquin Valley have been decimated, and now only occur in a few scattered populations in the remaining natural areas.

***Blunt-nosed Leopard Lizard*.** The blunt-nosed leopard lizard lives in grassland and scrub habitats in the southern San Joaquin Valley. Blunt-nosed leopard lizards eat mostly insects, but opportunistically consume smaller lizards, including young leopard lizards. Leopard lizards are polygamous, with one male mating with several females, and eggs and young are produced during summer and early fall. Predators include snakes, birds, and carnivorous mammals, including the San Joaquin kit fox. Primary threats to the blunt-nosed leopard lizard include habitat fragmentation, disturbance, and destruction. The blunt-nosed leopard lizard is listed as endangered by both the federal government and the State of California (USFWS, 1998).

The nearest CNDDB record of blunt-nosed leopard lizard is 2.66 miles southwest of the project area in the Tumey Hills, last seen there in 1979. There are several other records in the project vicinity and the last observation documented in the area was in 1993 in a grassland area in the vicinity of Panoche Road at Silver Creek and San Benito/Fresno County Line.

***Swainson's Hawk*.** The Swainson's hawk forages in open country and nests in adjacent tall trees, usually near water. Swainson's hawks eat small rodents and grasshoppers. These hawks often nest in valley oaks and cottonwoods, and are considered among the species that are most threatened by destruction of riparian habitat in the Sacramento and San Joaquin Valleys. Swainson's hawks are divided into several groups based on nesting and wintering range. Most hawks occur in California in two populations, one in the Great Basin and one in the Sacramento and San Joaquin Valleys. Some Swainson's hawks migrate to Argentina, where they spend the Austral summer foraging on grasshoppers laden with DDT and other pesticides, but most Sacramento and San Joaquin Valley birds only fly as far south as Mexico, where they do not run such a high risk of pesticide poisoning. The major threat to Swainson's hawks in California is loss of habitat, including both open habitats used for foraging as well as loss of individual trees used for nesting. Swainson's hawks are listed as threatened by the State of California (Peeters, 2005).

The nearest CNDDB record of Swainson's hawk to the project area is 5.24 miles north of the project area along the California Aqueduct. The last official documentation was in 2005 in a nest tree located on the aqueduct's eastern embankment.

***Short-eared Owl*.** The short-eared owl is a California species of concern that lives in grasslands, shrublands, and marshes. This owl nests on the ground and requires dense vegetation for nest concealment. Short-eared owls are very rare nesting birds in the San Joaquin Valley, but are occasionally recorded as wintering birds. Short-eared owls are primarily threatened by destruction of nesting habitat (http://www.delta.dfg.ca.gov/gallery/shearowl.asp).

The nearest CNDDB record of short-eared owl to the project area is 5.75 miles southeast of the project area approximately 4 miles southeast of Manning Avenue exit off Interstate 5. It was last recorded in 1993 in non-native grassland and cultivated weedy fields.

***Horned Lark*.** The horned lark is a bird of shortgrass prairies, seashores, agricultural fields, sparse brushlands, deserts, and other open habitats throughout North America. In California, the horned lark may be common in grazed pastures, bare fields, and other agricultural settings, but nests are extremely vulnerable to destruction from agricultural equipment or trampling. In addition, loss of habitat is a considerable threat to this species. Horned larks eat mainly seeds, but will also eat insects during the breeding season. This is the only true lark native to the Americas. The horned lark is a California species of concern due to widespread, long-term population declines in the state (http://www.mbr-pwrc.usgs.gov/bbs/grass/a4740.htm).

The nearest CNDDB record of horned lark to the project area is 8.9 miles southeast of the project area east of Interstate 5 and Mountain View Avenue at Panoche Junction in non-native grassland agricultural fields. It was last observed in 1992.

***Tulare Grasshopper Mouse*.** The Tulare grasshopper mouse lives in arid grasslands, shrublands, and alkali sink habitats in the San Joaquin Valley. Grasshopper mice are carnivorous, eating scorpions, beetles, grasshoppers, pocket mice, western harvest mice, lizards, and frogs, with some seeds taken when there is no other food source available. Young are born in the late spring and summer, and both parents care for the young. Grasshopper mice are territorial, and the males will produce a loud scream to warn other mice that the territory is occupied. Predators of grasshopper mice include badgers, San Joaquin kit foxes, coyotes, and barn owls. Primary threats to Tulare grasshopper mice include habitat destruction and fragmentation as well as pesticide use. This species is currently considered a federal Species of Concern (USFWS, 1998).

The nearest CNDDB record of Tulare grasshopper mouse to the project area is 1.22 miles northwest of the project area along Panoche Creek. It was last recorded in 1918 at this location. There are other recorded observations in the project vicinity, the most recent being in 1955 in the Tumey Hills. Given the dates of detection, this species is likely extirpated from the project vicinity where native vegetation is lacking.

San Joaquin Kit Fox**.** The San Joaquin kit fox historically ranged throughout the San Joaquin Valley from Contra Costa County in the north to northern Santa Barbara county in the south. Currently the kit fox still has a wide distribution, however kit fox numbers are greatly reduced and populations are isolated from one another. Kit foxes primarily live in grassland and to a lesser extent, shrub and agricultural habitats. Kit foxes predominantly eat rodents, ground squirrels, rabbits and hares, and ground-nesting birds. Kit fox pups are born in late winter and early spring, and the male provides most of the food for the female while she is nursing. Kit foxes change dens frequently, and often enlarge existing ground squirrel burrows in order to make new dens. Predation or competitive exclusion of kit foxes may occur in the presence of coyotes, introduced red foxes, domestic dogs, bobcats, and large raptors. Human threats to kit fox include destruction of habitat, habitat degradation, predator and pest control programs, and accidents caused by proximity to humans such as electrocution, roadkills, and suffocation from accidental burial in dens. Finally, natural factors such as drought, flooding, and rabies cause a significant percent of kit fox deaths. The San Joaquin kit fox is currently listed as an endangered species by both the federal government and the State of California (USFWS, 1998).

The nearest CNDDB record of San Joaquin kit fox to the project area is 2.2 miles west of the project area along Panoche Creek in the Tumey Hills west-southwest of the intersection of Interstate 5 and Panoche Road. It was also seen 7.5 miles southeast of the project area along a drainage ditch in a recently cultivated field along the western embankment of the California Aqueduct in 1997. It was last recorded in the project vicinity in 1999.

5.6.1.6 Special Environmental Areas in the Project Vicinity

Special Environmental Areas within the project vicinity (the nearest of which is approximately 4.2 miles away) include Tumey Hills, Panoche Hills, Ciervo Hills, and

Monocline Ridge west of the project area. In addition, Mendocino Lake along the San Joaquin River is approximately 15 miles to the east of the project area. Most of the special-status species records are in these areas. These areas are shown on Figure 5.6-1.

5.6.2 Environmental Consequences

Potential and expected direct and indirect impacts to biological resources are discussed below. Significant impacts are those that would involve the loss of a sensitive plant or wildlife species, or degradation of their habitat. The project would have significant impacts to vegetation and wildlife if it would:

- Cause a fish or wildlife population to drop below self-sustaining levels (California Environmental Quality Act [CEQA] Guidelines, Section 15065 (a))
- Threaten to eliminate a plant or animal community (CEQA Guidelines, Section 15065 (a))
- Substantially affect, reduce the number, or restrict the range of unique, rare, or endangered species of animal or plant, or the habitat of the species (CEQA Guidelines, Section 15065 (a), Appendix G (c), Appendix I (II.4.b) and (II.5.b))
- Substantially diminish or reduce habitat for fish, wildlife, or plants (CEQA Guidelines, Section 15065 (a), Appendix G (t))
- Interfere substantially with the movement of resident or migratory fish or wildlife species (CEQA Guidelines, Appendix G (d))
- Change the diversity of species, or number of any species of plants (including trees, shrubs, grass crops, and aquatic plants) or animals (birds, land animals including reptiles, fish and shellfish, benthic organisms, or insects) (CEQA Guidelines, Appendix I (II.4.1) and (II.5.a))
- Introduce new species of plants or animals into an area, or act as a barrier to the normal replenishment of existing species (CEQA Guidelines, Appendix I (II.4.c) and (II.5.c))
- Deteriorate existing fish or wildlife habitat (CEQA Guidelines, Appendix I (II.5.d))
- Conflict with any regional Habitat Conservation Plans (HCPs)

The above criteria are used to evaluate the proposed project's impacts to plant communities and wildlife. The potential impacts associated with the construction and operation of the PEC are discussed below.

5.6.2.1 <u>PEC Site</u>

The proposed project would not result in significant impacts to biological resources because it would not:

- Cause a fish or wildlife population to drop below self-sustaining levels
- Threaten to eliminate a plant or animal community
- Substantially affect, reduce the number, or restrict the range of unique, rare, or endangered species of animal or plant, or the habitat of the species
- Substantially diminish or reduce habitat for fish, wildlife, or plants
- Interfere substantially with the movement of resident or migratory fish or wildlife species
- Change the diversity of species, or number of any species of plants (including trees, shrubs, grass crops, and aquatic plants) or animals (birds, land animals including reptiles, fish and shellfish, benthic organisms, or insects)
- Introduce new species of plants or animals into an area, or act as a barrier to the normal replenishment of existing species
- Deteriorate existing fish or wildlife habitat
- Conflict with any regional HCPs

Less-than-significant impacts associated with the proposed project construction and operations are discussed further below.

5.6.2.1.1 <u>Site Preparation and Construction Impacts</u>. The proposed project includes the installation of four (4) general electric LMS100 natural gas-fired combustion turbine generators (CTGs), emissions control equipment, one cooling tower, and process water treatment equipment and other associated equipment. Construction of these new facilities, including site grading, would not impact plant species because the site is void of native vegetation; however, the site is used by common native wildlife species, particularly birds, for breeding and foraging. The trees within the PEC that would be utilized by birds for breeding and foraging will be removed once the agricultural production of the trees is complete and before the breeding bird season. As long as tree removal is performed outside of the breeding bird season, no significant impacts to wildlife are anticipated. Some individuals of common terrestrial wildlife species, such as western toad, may be adversely affected by heavy equipment or vehicles in the construction area. This impact is considered adverse, but not significant due to the relatively small area affected.

<u>Air Emissions and Noise</u>**.** Increase in air emissions (Section 5.2) and noise (Section 5.12) as a result of the construction of the proposed power plant are not expected to cause significant impacts to wildlife. The project survey area provides limited habitat for wildlife due to high agricultural use. Most of the wildlife observed at the site are species that are often found in disturbed or developed areas and are expected to adapt to the new noise levels and air emissions.

5.6.2.1.2 Operations and Maintenance Impacts. Potential impacts to biological resources as a result of the operations and maintenance associated with the proposed project include air emissions, noise, and collision hazards. These potential impacts are discussed further below.

Air Emissions**.** The operational sources of emissions associated with the proposed PEC include four turbine stacks which will generate emissions from the combustion of natural gas, a stack for the firewater pump engine, and the cooling tower. Impacts to wildlife in the area as a result of these emissions are less than significant because the common wildlife that occurs in the vicinity of the project area is expected to adapt to these conditions. Modeled ground-level concentrations of criteria air pollutants, including particulate matter (PM), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), volatile organic compounds (VOCs), and carbon monoxide (CO) that would be emitted or form from emissions at the proposed PEC site are below levels that would cause violations of the ambient air quality standards or contribute significantly to existing violations (see Section 5.2, Air Quality). Significance levels for air emissions along with ambient air quality standards are set to protect human health and ecosystems. Since native vegetation is lacking within a one-mile radius of the proposed plant site, no impacts to native vegetation associated with air emissions and subsequent ground deposition are anticipated. Apricot and pomegranate orchards in the area are not expected to have a detectable reduction in growth or significant visible damage from salt deposition.

In the modeling analysis for the proposed PEC site, nitrogen or sulfur deposition was not modified, except in the nearest Class 1 area, which is required. However, a very crude estimate of the maximum deposition of nitrogen and sulfur near the project site was determined by multiplying the maximum model-predicted annual average concentrations of NO_2 and SO_2 by an approximate deposition velocity of 0.02 meter/sec and separating out the elemental nitrogen and sulfur components. The results show that the maximum deposition levels adjacent to the facility would be 0.35 kg nitrogen per hectare per year and sulfur deposition would be 0.47 kg sulfur per hectare per year. Maximum deposition rates due to the PEC operational emissions were conservatively calculated from the predicted peak air pollutant concentrations, and were found to be at nearly undetectable levels within 1,000 feet of the site (see Figure 5.6-3). Multiple photochemical reactions must take place for the gaseous nitric acid, nitrogen oxides, and ammonia from the project stacks to convert to aerosols that may be deposited on the ground. Worst-case-scenario models assume that these reactions will occur within the stack, when in fact they will take minutes or hours to occur within the atmosphere, by which time the plume would have dispersed and deposition would be further reduced.

Noise**.** The existing Panoche Substation and Interstate 5 generate some noise near the proposed PEC site; however, most of the vicinity within the project area is agricultural and noise levels are minimal. The PEC would generate a greater level of noise than currently exists in the project area; however, the increase in noise levels is less than 65 decibels, "A" scale (dBA) and there are no sensitive wildlife receptors. The potential impacts are considered less than significant because the area is already disturbed by intense agricultural use.

Collision Hazards**.** The proposed four 90-foot-tall turbine stacks associated with the PEC may present a collision hazard for birds. There is also a 17-foot-tall (4 feet above a 13-foot-tall building) stack for the firewater pump engine and the cooling tower height is 60 feet. The transmission line structures will be 75 feet tall, which includes a 15-foot-high grounding mast. Birds that would most likely be affected include migrating waterfowl and other species and some migratory song birds that tend to migrate at night. Bright lights on these tall structures may be an attractive nuisance for certain migrating birds. Fog or low cloud cover can further add to the problem. The exhaust stacks will not be lighted because under FAA guidelines lighting of 90 foot stacks is not necessary for aviation safety. Since the area has low quality habitat for birds, the collision hazards in the area of the PEC site are anticipated to be low and less than significant.

5.6.2.1.3 Impacts on Special-status Species. No federally-listed or state-listed threatened or endangered species are expected to occur in the project study area due to lack of suitable habitat, so no impacts as a result of the proposed project are anticipated. Most of the special-status species more recently reported are located near the Tumey Hills at least 4.2 miles from the project area.

5.6.2.1.4 Impacts to Wildlife Corridors. Substantial wildlife movement through the area is lacking and the project area is not a significant wildlife corridor, so no significant impacts to wildlife movement are expected.

5.6.2.2 Parking, Laydown, and Access Road

The proposed parking and laydown area and access road is within the same orchard, so impacts associated with construction and operations are expected to be the same as those discussed for the PEC. No impacts to special-status species are expected and less-than-significant impacts may occur to common wildlife species in the area.

5.6.2.3 Cumulative Impacts

The purpose of the cumulative impacts discussion for the proposed project is to:

- Identify past, present, and reasonably foreseeable actions within the project vicinity that could affect the same resource(s) as the PEC
- Determine if impacts of the PEC and the other actions would overlap in time or geographic extent

- Determine if the impacts of the proposed project would interact with, or intensify, the impacts of other actions
- Determine if this AFC overlaps another existing or planned AFC
- Identify any potentially significant cumulative impacts

Projects that could potentially contribute to cumulative impacts with the PEC are those within the same geographic area of influence. For this cumulative impact assessment, the area of influence is within a 5-mile radius of the PEC. In addition, projects or proposed projects with potential for regional significance are also included in the analysis. Information was gathered on projects that either: 1) have submitted an application for required approvals and permits; 2) have been previously approved and may be implemented in the near future; or 3) are contemplated and reasonably anticipated, but have not been formally proposed. Information for the cumulative impacts assessment was obtained primarily through personal communications. In addition, information from the internet was reviewed. The CEC and County of Fresno also provided information. Table 5.18-1 in Section 5.18 (Cumulative Impacts) shows a list of potential projects considered in the cumulative impact assessment and the timeframe for these projects. In summary, this list includes three potential projects.

No cumulative impacts of significance are anticipated.

5.6.3 Avoidance and Minimization Measures

In order to avoid and minimize impacts to common wildlife and any potential wildlife species, the following stipulations must be implemented:

- No tree removal during the breeding bird season (February 1 to August 31).
- Any existing raptor nests near the project area should be removed during the non-breeding season to minimize potential for nesting in the same location the following year.
- Pre-construction survey shall be conducted for any nesting raptor species.
- In order to minimize trapping of common wildlife, set up fences around construction zones and relocate any trapped wildlife. Fence areas and trenches should be checked regularly by a biological monitor to rescue and relocate any trapped animals.
- Provide biological orientation training for workers onsite to educate them on procedures for minimizing impacts to common wildlife species and any rare occurrences of special-status species that have a low potential to occur in the project area.
- An approved, designated biologist shall implement the above measures.

5.6.4 Mitigation Measures

There are no mitigation measures proposed for biological resources because native vegetation is lacking and special-status species are not expected to occur in the project area.

5.6.5 Applicable Laws, Ordinances, Regulations, and Standards (LORS)

LORS that are applicable or potentially applicable for biological resources associated with the proposed project are discussed below. Table 5.6-3 lists all applicable LORS. Construction and operation associated with the proposed project will adhere to the LORS pertinent to biological resources.

5.6.5.1 Federal Authorities and Administering Agencies

5.6.5.1.1 Endangered Species Act of 1973: 16 USC Section 1531 *et seq*.; 50 CFR Parts 17 and 222. The Endangered Species Act provides for the protection of threatened or endangered plants and animals and their determined critical habitats. The USFWS is the agency responsible for administering the act, designating critical habitat, and determining if a species should have a change in listing status. The PEC does not impact any federally-listed threatened or endangered plants or animals or their designated critical habitats and so the PEC will not violate the Endangered Species Act.

5.6.5.1.2 National Environmental Policy Act: 42 USC Section 4321 *et seq*. The National Environmental Policy Act (NEPA) requires an evaluation of the environmental impacts of projects taking place on federal lands or receiving federal funding. The USFWS is the administering agency for the above authority. Evaluation determined that there are no impacts to biological resources. The PEC is in compliance with NEPA.

5.6.5.1.3 Migratory Bird Treaty Act: 16 USC Sections 703 – 711; 50 CFR Subchapter B. The Migratory Bird Treaty Act protects most native birds, their eggs, and their nests, and prohibits any taking not in accordance with federal regulation. The USFWS is responsible for administering this Act. Because the project will not result in the deaths of birds or the destruction of any active nests, the PEC will not violate the Migratory Bird Treaty Act.

5.6.5.1.4 Fish and Wildlife Coordination Act: 48 Stat. 401, amended; 16 USC 661 *et seq*. The Fish and Wildlife Coordination Act requires all federal agencies to coordinate with the USFWS to preserve fish and wildlife when implementing federal actions. The USFWS is responsible for administering this Act. Because there are no impacts to biological resources, the PEC will comply with this Act.

5.6.5.1.5 Clean Water Act of 1977: 33 USC Section 1251 – 1376; 30 CFR Section 330.5(a)(26). The Clean Water Act protects wetlands, regulates discharges of pollutants, requires set water quality standards for individual pollutants, and provides a framework for

TABLE 5.6-3
LORS FOR BIOLOGICAL RESOURCES

AFC Section	Authority	Administering Agency	Requirements/Compliance
Federal			
Section 5.6.4.1	Endangered Species Act of 1973; 16 USC 1531 et seq.; 50 CFR Parts 17 and 222.	USFWS	Protection and management of federally listed threatened or endangered plants and animals and their designated critical habitats (terrestrial and avian species). Section 7 Endangered Species Act consultation with USFWS (or Section 10A)
Section 5.6.4.1	National Environmental Policy Act; 42 USC 4321 et seq.	USFWS	Analysis of impacts of Federal action
Section 5.6.4.1	Migratory Bird Treaty Act; 16 USC 703-711; 50 CFR Subchapter B.	USFWS	Protection of migratory birds
Section 5.6.4.1	Fish and Wildlife Coordination Act; 16 USC 661-666	USFWS	Conservation of fish and wildlife
Section 5.6.4.1	Clean Water Act of 1977; 33 USC 1251-1376; 30 CFR 330.5(a)(26)	USACOE and the RWQCB	Protection of wetlands and limiting of thermal discharges to the marine environment
State			
Section 5.6.4.2	California Endangered Species Act of 1984; California Fish and Game Code 2050-2098.	CDFG	Consultation Requirement
Section 5.6.4.2	California Species Preservation Act of 1970; California Fish and Game Code 900-903.	CDFG	Protection and enhancement of the birds, mammals, fish, amphibians, and reptiles of California
Section 5.6.4.2	California Fish and Game Code 4700 and 5515	CDFG	No taking of mammals listed as fully protected
Section 5.6.2.1 and 5.6.5.2	California Fish and Game Code 3503.	CDFG	No taking or possessing of the nests or eggs of birds
Sections 5.6.2.2, 5.6.2.3, and 5.6.5.2	CEQA; California Public Resources Code 21000 et seq.	CEC	Protection of environment
Section 5.6.4.2	California PRC 25523(a); 20 CCR 1752, 1752.5, 2300-2309; Chapter 2, Subchapter 5, Article I, Appendix B, Part (I)	CEC	Protection of environmental quality

TABLE 5.6-3 (CONTINUED)
LORS FOR BIOLOGICAL RESOURCES

AFC Section	Authority	Administering Agency	Requirements/Compliance
Local			
Section 5.6.4.3	Opens Space Element and Conservation Element of the County of Fresno General Plan	County of Fresno Economic and Development Department	Ensure that proposed development projects demonstrate a high degree of compatibility with any threatened or endangered species and sensitive biological resources

permitted pollutant discharge from a point source. The administering agencies for the Act are the USACOE and the Regional Water Quality Control Board (RWQCB). Because there are no impacts to biological resources, the PEC will not be in violation of this Act.

5.6.5.2 State Authorities and Administering Agencies

5.6.5.2.1 California Endangered Species Act of 1984: California Fish and Game Code Sections 2050 – 2098. The California Endangered Species Act provides for the protection and management of plant and animal species listed as threatened or endangered, or designated as candidates for such listing. This Act requires consultation between the CDFG and other state agencies to ensure that projects do not jeopardize the continued existence of threatened or endangered species or habitats essential for the continued survival of any threatened or endangered species. The administering agency for this act is the CDFG. Because there are no impacts to any species listed under this Act, the PEC will not be in violation of this Act.

5.6.5.2.2 California Species Protection Act of 1970: California Fish and Game Sections 900-903. The California Species Protection Act includes provisions for the protection and enhancement of the birds, mammals, fish, amphibians, and reptiles of California. The administering agency for this Act is the CDFG. Because there are no impacts to biological resources, the PEC will comply with this Act.

5.6.5.2.3 California Fish and Game Code Section 3503. This code section prohibits the taking and possessing of bird eggs and nests. The administering agency for this is the CDFG. Because there will be no disturbance to nesting birds, the PEC will be in compliance with this law.

5.6.5.2.4 California Fish and Game Code Section 3511, Section 4700, Section 5050 Section 5515. This code section prohibits the taking of birds, mammals, reptiles, and fish listed as fully protected. The administering agency for these is the CDFG. Because there are no listed birds, mammals, reptiles, or fish in the vicinity of the project site, the PEC will be in compliance with this law.

5.6.5.2.5 <u>CEQA, Public Resources Code Section 21000 *et seq*</u>. The CEQA provides for protection of the environment in the state of California. The administering agency for the above authority with regards to this project is the California Energy Commission (CEC). Because there are no natural resources at the project site, the PEC is in compliance with the California Environmental Quality Act.

5.6.5.2.6 <u>California Public Resources Code Section 25523(a): 20 CCR Sections 1752, 1752.5, 2300 – 2309, and Chapter 2, Subchapter 5, Article I, Appendix B, Part (i)</u>. These code sections require the CEC to protect environmental quality. The administering agency for the above sections is the CEC with comment by the CDFG. Because there are no rare or endangered species at the project site, the PEC will be in compliance with these code sections.

5.6.5.3 <u>Local Authorities and Administering Agencies</u>

The County of Fresno General Plan open space and conservation elements addresses goals and policies related to natural resources. The *Conservation Element* addresses the conservation, development, and use of natural resources including water, forests, soils, rivers, and mineral deposits. Overlapping the Conservation and Safety Elements, the *Open Space Element* details plans and measures for preserving open space for: protection of natural resources such as wildlife habitat; the managed production of resources such as agriculture and timberland; outdoor recreation such as parks, trails, and scenic vistas; and public health and safety such as areas subject to geologic hazards, flooding, and fires. (County of Fresno, 2000).

The Natural Resources component has three main goals (County of Fresno, 2000):

1. To help protect, restore, and enhance habitats in Fresno County that support fish and wildlife species so that populations are maintained at viable levels. Policies in this section seek to protect natural areas and to preserve the diversity of habitat in the county.
2. To conserve the function and values of wetland communities and related riparian areas throughout Fresno County while allowing compatible uses where appropriate. Policies in this section seek to protect riparian and wetland habitats in the county while allowing compatible uses where appropriate.
3. To preserve and protect the valuable vegetation resources of Fresno County. Policies in this section seek to protect native vegetation resources primarily on private land within the county.

The Mendota Wildlife Area just south of the San Joaquin River is designated as open space. The administering agency for the County of Fresno is the Planning and Resources Development Department. The PEC is in compliance with these goals and associated policies because it does not cause significant impacts to natural resources.

5.6.5.4 Agencies and Agency Contacts

There are no applicable permits related to biological resources.

5.6.5.5 Applicable Permits

There are no applicable permits related to biological resources.

5.6.6 References

California Department of Fish and Game. 2006a. Natural Diversity Database (CNDDB).

2006b. Central Valley Bay-Delta Branch website http://www.delta.dfg.ca.gov/gallery/shearowl.asp

California Energy Commission. 2000. Rules of Practice and Procedure and Plant Site Certification Regulations.

California Native Plant Society. 2006. Rare Plant Database.

County of Fresno. 2000. Fresno County General Plan. Conservation and Open Space Element.

Hans Peeters and Pam Peeters. 2005. *Raptors of California*. University of California Press, Berkeley and Los Angeles, California.

Hickman, J. C. 1993. The Jepson manual: higher plants of California. University of California Press, Berkeley and Los Angeles. 1400pp.

JRP Historical Consulting. 2006. *Historical Resources Inventory and Evaluation Report for the Panoche Energy Center*.

The North American Breeding Bird Survey. 2006. http://www.mbr-pwrc.usgs.gov/bbs/grass/a4740.htm

U.S. Fish and Wildlife Service. 1998. *Recovery plan for upland species of the San Joaquin Valley, California*. Region 1, Portland, OR. 319 pp.

Adequacy Issue: Adequate ____ Inadequate ____

DATA ADEQUACY WORKSHEET

Revision No. ____ Date ____

Technical Area: **Biological Resources** 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.	5.6.1, 5.6.1.2, 5.6.2 5.6.2.1, 5.6.2.1.1, 5.6.2.1.2, 5.6.2.1.3, 5.6.2.1.4, 5.6.2.2, 5.6.2.3, 5.6.3, 5.6.4		
Appendix B (g) (13) (A)	A regional overview and discussion of biological resources, with particular attention to sensitive biological resources near the project, and a map at a scale of 1:100,000 (or some other suitable scale) showing their location in relation to the project.	5.6, 5.6.1, 5.6.1.1, 5.6.1.2, 5.6.1.3, 5.6.1.4, Table 5.6-1, Table 5.6-2, 5.6.1.5, 5.6.1.5.1, 5.6.1.5.2, 5.6.1.6		
Appendix B (g) (13) (B)	A discussion and detailed maps at a scale of 1:6,000, of the biological resources at the site of the proposed project and related facilities, and in areas adjacent to them, out to a mile from the site and 1000 feet from the outer edge of linear facility corridors. Include a list of the species actually observed and those with a potential to occur. The discussion and maps shall address the distribution of community types, denning or nesting sites, population concentrations, migration corridors, breeding habitats, and the presence of sensitive biological resources.	5.6 5.6.1 5.6.1.1 5.6.1.2 5.6.1.3 5.6.1.4 Table 5.6-1 Table 5.6-2 5.6.1.5 5.6.1.5.1 5.6.1.5.2 5.6.1.6		

Adequacy Issue: Adequate ____ Inadequate ____ **DATA ADEQUACY WORKSHEET** Revision No. ____ Date ____

Technical Area: **Biological Resources** 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) (13) (C)	A description of all studies and surveys used to provide biological information about the project site, including seasonal surveys and copies of the California Department of Fish and Game's Natural Diversity Data Base Survey Forms, "California Native Species Field Survey Forms", and "California Natural Community Field Survey Forms", completed by the applicant. Include the dates and duration of the studies, methods used to complete the studies, and the names and qualifications of individuals conducting the studies.	5.6.1 5.6.1.1 Appendix B		
Appendix B (g) (13) (D)	A discussion of all permanent and temporary impacts to biological resources from site preparation, construction activities, and plant operation. Discussion of impacts must consider impacts from cooling tower drift, and from the use and discharge of water during construction and operation. For facilities which use once-through cooling or take or discharge water directly from or to natural sources, discuss impacts resulting from entrainment, impingement, thermal discharge, effluent chemicals, type of pump (if applicable), temperature, volume and rate of flow at intake and discharge location, and plume configuration in receiving water.	5.6.2 5.6.2.1 5.6.2.1.1 5.6.2.1.2 5.6.2.1.3 5.6.2.1.4 5.6.2.2 5.6.2.3 5.6.3 5.6.4		
Appendix B (g) (13) (E)	A discussion of the following:			
Appendix B (g) (13) (E) (i)	All measures proposed to avoid and/or reduce any adverse impacts;	5.6.2.1.1, 5.6.3		
Appendix B (g) (13) (E) (ii)	All measures proposed to mitigate any adverse impacts, including any proposals for off-site mitigation; and	5.6.4		
Appendix B (g) (13) (E) (iii)	Any educational programs proposed to enhance employee awareness in order to protect biological resources.	5.6.3		

Adequacy Issue: Adequate ____ Inadequate ____ **DATA ADEQUACY WORKSHEET** Revision No. ____ Date ________

Technical Area: **Biological Resources** 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) (13) (F)	A discussion of compliance and monitoring programs proposed to ensure the effectiveness of mitigation measures incorporated into the project.	5.6.3 5.6.4		
Appendix B (g) (13) (G)	A discussion of native fish and wildlife species of commercial and/or recreational value that could be impacted by the project.	5.6.2.1		
Appendix B (g) (13) (H)	For purposes of this section, sensitive biological resources are one of the following:			
Appendix B (g) (13) (H) (i)	Species listed under state or federal Endangered Species Acts;	Table 5.6-1, 5.6.1.5.1, 5.6.1.5.2		
Appendix B (g) (13) (H) (ii)	Resources defined in sections 1702 (q) and (v) of Title 20 of the California Code of Regulations; and			
Appendix B (g) (13) (H) (iii)	Species or habitats identified by legislative acts as requiring protection.	Table 5.6-1, 5.6.1.5, 5.6.1.5.1, 5.6.1.5.2, 5.6.2.1.3		
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;	Table 5.6-3		
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.	Table 5.6-3		

Adequacy Issue: Adequate ____ Inadequate ____ **DATA ADEQUACY WORKSHEET** Revision No. ____ Date ____

Technical Area: **Biological Resources** 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) (2)	A discussion of the conformity of the project with the requirements listed in subsection (h)(1)(A).	5.6.5.2, 5.6.5.2.1, 5.6.5.2.2, 5.6.5.2.3, 5.6.5.2.4, 5.6.5.2.5, 5.6.5.2.6, 5.6.5.3		
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.	5.6.5.4		
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.	5.6.5.5		

5.7 CULTURAL RESOURCES

Cultural resources include archaeological and historical objects, sites and districts, historic buildings and structures, cultural landscapes, and sites and resources of concern to local Native Americans and other ethnic groups.

The purpose of this cultural resources study is to inventory cultural resources in the vicinity of the PEC and identify any potential project-related effects to cultural resources. Records of correspondence with local Native Americans are included in the Technical Report (Appendix J). All other information contained in Appendix J can be found here in Section 5.7.

As part of the field inventory, archaeological field investigations and historic evaluations were undertaken to assess the presence/absence and/or the extent of specific sites and features. All cultural resources work for this project was carried out under the direct supervision of an archaeologist who meets the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (National Park Service [NPS], 1983 [36 CFR Part 61]), and is consistent with the procedures for compliance with Section 106 of the National Historic Preservation Act (NHPA), set forth at 36 CFR 800.

Detailed below are descriptions of project components; baseline conditions for prehistory, history, and ethnography; results of coordination with the Native American community; record searches; field surveys; and assessments of potential impacts (direct and indirect) on cultural resources on a component-by-component basis. The results of this study indicate that no adverse project-related effects to significant cultural resources are anticipated for the project. Appropriate mitigation measures are also set forth below to ensure site avoidance and/or proper treatment of cultural resources in the event of discovery.

Cultural resources work was conducted in compliance with CEQA. Work was also conducted in compliance with the CEC's "Instructions to the California Energy Commission Staff for the Review of and Information Requirements for an Application for Certification" (CEC, 1992) and "Rules of Practice and Procedure and Power Plant Site Regulations" (CEC, 1997).

5.7.1 Affected Environment

5.7.1.1 <u>Study Area</u>

The PEC is located in Western Fresno County adjacent to the Panoche Hills and east of the San Benito County line. The PEC site is located near Firebaugh, approximately 50 miles west of the City of Fresno and approximately 2 miles east of Interstate Highway 5. Electrical transmission lines extend north and south of the site. There is also an existing power substation immediately north of the proposed site. All proposed PEC project components are situated south of Panoche Road within a pomegranate orchard, and the surrounding land is entirely given over to agriculture.

5.7.1.2 Site Description

The project consists of the following components:

- **Proposed PEC Site.** The PEC will be located on approximately 12.8 acres of an agricultural parcel, roughly 2 miles east of Interstate Highway 5 along Panoche Road, in Fresno County, California. The PEC is located on property that contains a pomegranate orchard, and is adjacent to an almond orchard. Main access to the proposed PEC site is via an existing dirt access road off of Panoche Road.
- **Access Road.** Davidson Avenue, an unpaved road to the immediate west of the proposed project site, will be upgraded and will provide access to the site.
- **Gas Pipeline.** A 2,400-foot gas pipeline will connect the PEC to an existing pipeline to the northeast.
- **Substation Expansion.** The existing substation will be expanded to the south of the current substation location and east of the proposed PEC. The expansion will include an additional area approximately 320 feet x 150 feet, or 1.1 acres.
- **Construction Laydown Area.** The construction laydown area will be approximately 8 acres within the same pomegranate orchard adjacent to and immediately south of the PEC site.

5.7.1.3 Natural History

The project area is located in a region characterized today primarily by agricultural development situated near reclaimed land upon what was once marshland connected to the large Tulare Lake. Agricultural development characterizes the vicinity immediately surrounding the project area. Natural habitats for the most part have been displaced by developments associated with the various agricultural activities, primarily orchards. Prior to development, the lake and marsh setting of the general project area would have supported diverse wetland fauna and flora.

5.7.1.4 Soils and Geology

Please refer to Sections 5.3 and 5.4, respectively, for detailed descriptions of regional geology and soil conditions.

5.7.1.5 Disturbance within the Study Area

The primary sources of historic surface and subsurface disturbances in and adjacent to the PEC area are related to:

- Construction and operation of the current PG&E power substation

- Agricultural activity including plowing and planting
- Road construction

5.7.1.6 Prehistory

Northern California, specifically portions of the San Francisco Bay region, has supported a continuous cultural occupation for at least the last 4,000 years (Elsasser, 1978; Nelson, 1909; Gifford, 1916). The cultural occupation of the northern San Joaquin Valley can be divided into three time periods, or horizons, which help to define the practices and subsistence patterns of the people of that region. The designations Early, Middle, and Late Horizons were developed as a chronological sequence by Beardsley (1948, 1954) based upon his work in the Sacramento-San Joaquin Delta region to the San Francisco Bay area (Elsasser, 1978:37).

5.7.1.6.1 The Early Period. The Early Period in California generally refers to the time frame between 10,000 and 7,000 BP (years before present). Early Period components have been identified along the fossil lakeshores of Tulare Lake and Buena Vista Lake, in the east central and southwestern portions of the San Joaquin Valley, respectively. Lithic (stone) artifact assemblages associated with the Early Period are characterized by the presence of stemmed projectile points. The Witt site, on the fossil lakeshore of Tulare Lake also featured ‘fluted’ and concave based projectile points, associated with terminal Pleistocene ‘Clovis’ assemblages in other regions of North America (Riddell and Olsen, 1969; Moratto, 1984). The Buena Vista Lake site (CA-KER-116), in Kern County, is the other primary San Joaquin Valley site yielding Early Period stemmed points from lower layers in the stratigraphy (Fredrickson and Grossman, 1977; Hartzell, 1991, 1992). Stemmed points have also been recovered from several sites in the foothills at the margins of the valley, namely at the Skyrocket sites (CA-CAL-629 and -630) in the Calaveras County foothills, and at the Clark’s Flat site (CA-STA-S342) in the Stanislaus County foothills. Other Early Period lithic artifacts include cobble core tools (choppers and scrapers) and flake tools, as well as crescentic, leaf-shaped, ovate, and lanceolate bifaces. Groundstone artifacts of this period are typically expedient, showing light use wear, and often exhibit multiple forms of use wear.

5.7.1.6.2 The Middle Period. The Middle Period (7,000-2,500 BP) is characterized by an increase in groundstone implements and by ‘Pinto’ or ‘Stanislaus Stemmed’ projectile points (Peak and Crew, 1990). These points have been recovered at CA-KER-116, the Witt site, the Skyrocket sites, and the Clark’s Flat site. While much of the flaked-stone tool assemblage in the Middle Period is similar to that of the Early Period, the presence of more groundstone milling equipment with extensive use wear suggests a greater reliance on plant foods than in the Early Period.

5.7.1.6.3 The Late Period. The Late Period refers to the time period between approximately 2,500 BP and European contact, at which time Native American lifeways were recorded in the ethnographic/historic record. The material culture patterns observed at contact emerged during the Late Period, and the ethnohistoric record provides a valuable resource for understanding Late Period archaeology (see below). The archaeological record for the Late Period reveals a significantly different suite of material culture than that seen in Middle Period assemblages. Heavily utilized mortar and pestle technology (associated primarily with acorn processing), and bow and arrow technology both emerge during the Late Period. Large occupation sites, representing semi-permanent and permanent villages, emerge during this time as well. On the western margins of the San Joaquin Valley, these village sites typically feature dark-colored midden deposits, multiple excavated house pit depressions, and large, excavated communal structures. Other artifacts typical of Late Period deposits include freshwater and marine shell ornaments, ornaments and utilitarian implements of steatite and faunal bone, obsidian from eastern California sources, and notched cobbles thought to be associated with fishing.

5.7.1.7 Ethnography

The Project is located within the boundaries of the Northern Valley Yokuts territory, at the northeastern end of the San Joaquin Valley, near the Little Panoche Creek. Tribal groups throughout the Northern California territories interacted with each other along their tribal boundaries, and as such the tribal boundaries are not considered permanent. Presented below is a discussion of the ethnography of this region.

“Yokuts” is a term applied to a large and diverse number of people inhabiting the San Joaquin Valley and Sierra Nevada foothills of central California. The Northern Valley Yokuts inhabited a 40- to 60-mile-wide area straddling the San Joaquin River, south of the Mokelumne River, east of the Diablo Range, and north of the sharp bend that the San Joaquin River takes to the northeast. The Southern Valley Yokuts inhabited the San Joaquin Valley south of the bend in the river. Although they were divided geographically and ecologically, they had similar linguistic styles. For the Northern Valley Yokuts, the San Joaquin River and its main tributaries served as a lifeline to the valley (Wallace, 1978:462).

The Northern Valley tribes closely resembled the Yokuts groups to the south, although there were some cultural differences. The northerners had greater access to salmon and acorns, two important dietary resources, than the Southern Yokuts, and some of their religious practices reflected the influences of groups to their north, such as the Miwok. While inhumation was the usual practice in the southern valley, the Northern Valley Yokuts either cremated their dead or buried them in a flexed position (Wallace, 1978:464, 468).

The Northern Valley Yokuts built their riverside villages on mounds along the water’s edge to avoid the spring floods, which were a result of heavy Sierra snow melts. Living beside rivers and streams provided plentiful river perch, Sacramento pike, salmon, and sturgeon. Hunting provided waterfowl such as geese and ducks as well as land animals such as antelope, elk, and brown bear although by all indications fish constituted a majority of the diet. The surrounding woodland, grasslands, and marshes provided acorns, tule root, and seeds.

A chief headed the tribal villages, which averaged around 300 people. Family houses were round or oval, sunken, with a conically shaped pole frame, and covered with tule mats. Each village also had a lodge for dances and other community functions, as well as a sweathouse (Wallace, 1978:462-464).

The Northern Valley Yokuts used bone harpoon tips for fishing, stone sinkers for nets, chert projectile points for hunting, mortars and pestles, scrapers, knives, and bone awl tools to procure and manufacture food. Marine shells, procured from coastal tribes, were used for necklaces and other adornments, and marine shell beads sometimes accompanied the deceased. They used tule reed rafts to navigate the waterways for fishing and fowling. The Yokuts also manufactured a range of intricate baskets for a variety of purposes, including storing, cooking, eating, winnowing, hopper mortars, and the transport of food materials. Very little is known of the Northern Valley Yokuts' clothing, but drawings of their tattoos show that they served not only as a decoration but also as a form of identity (Wallace, 1978:464).

Historic accounts from an unnamed Spanish expedition in 1810 and 1811 recall that the Spaniards named one of the Yokuts' village Pescadero ("fisherman") after seeing the Indians catching fish. During the time of Mexican land grants, Rancho Pescadero north of Tracy was named for the Yokuts village (Hoover *et al*., 1990). According to early accounts, the Yokuts traded with neighboring tribes and were fairly peaceful. Initially, the Diablo Range served as a natural barrier against heavy recruitment by the coastal Spanish missions. However, by the early 19th century, Spanish, and later, Mexican missionaries began to explore the inner valleys in search of neophytes. The Yokuts became irritated with the intrusion, and soon began fighting back and stealing horses from rancheros and missions in retaliation for intrusion (ibid). Eventually, the Northern Valley Yokuts were decimated by missionization, usurpation of land by rancheros, "49ers," farmers, and epidemics (malaria being the most devastating, in 1833).

5.7.1.8 Historic Setting

The study area can be divided into four historic periods:

- Early European Contact and Missions: 1769 to 1849
- Gold Rush and Agriculture Boom: 1849 to 1900
- The 20th Century Through WWII: 1900 to 1945
- The Late 20th Century: 1945 to present

5.7.1.8.1 <u>Early European Contact and the Missions</u>. The study area is located northwest of the now dry bed of Tulare Lake. Up to the second half of the 19th century, this lake was the largest freshwater lake west of the Great Lakes. This lake was also home to several bands of Yokuts, to whom fugitives from the missions would often flee.

Though the Spanish missions were relegated to the coastal areas of California, Spanish soldiers and priests had made many forays into the San Joaquin Valley. The area surrounding Tulare Lake was a frequent target of Spanish parties searching for fugitives (Cook, 1976; Smith, 2004), and it is likely that fugitive-seeking expeditions also brought back unwilling converts from this area (Cook, 1976).

An 1804 expedition to find land on which to locate a mission met with disinterest and a lack of cooperation on the part of the Tulare Indians. Further unsuccessful attempts to find land for an interior mission were made in 1806 and 1813. Father Zalvidea's journals of an 1806 expedition to capture runaway neophytes in the San Joaquin Valley described the valley as a dry, miserable place, not suitable for settlement. This description helped to discourage attempts at settlement for over a decade (Smith, 2004).

From the 1820s through the 1840s parties from the missions, Anglo-American and French fur trappers, and Russian explorers began to explore the San Joaquin Valley. These explorations caused international tensions, but also increased the American interest in California that had initially been sparked by the belief in Manifest Destiny. In 1848, at the conclusion of the Mexican-American War (1846-1848), California was among the lands ceded to the United States as part of the peace settlement.

Although dangers such as raids by the Yokuts were common, land in the San Joaquin Valley began to be granted by the Mexican authorities in the 1840s, a practice that continued when the U.S. government took possession of California.

5.7.1.8.2 <u>The Gold Rush and Agricultural Boom</u>. John Sutter discovered gold near his mill in Sacramento in 1848. Though he and his men originally tried to keep it secret, word soon got out and the Gold Rush began. The Central Valley (inclusive of both the San Joaquin and Sacramento Valleys) and the Sierra Nevada were soon host to a teeming mass of placer miners and those who sought to make a living either by providing for the needs or making victims of these miners. The city of San Francisco sprang up almost overnight (earning it the nickname "the Instant City"), and several towns were established throughout California. Many of those already established grew quickly as the population boomed. In 1850, California's population was deemed large enough for it to be eligible for statehood.

Near the study area, the town of Fresno City (west of the current location of the City of Fresno) was established at the head of the Fresno Slough to serve the needs of California's fledgling riverboat industry. Fresno County was formed out of part of the larger Mariposa County in 1856.

This general area was plagued by many of California's worst bandits, reportedly including the notorious Joaquin Murieta (though both the existence and the location of Joaquin Murieta has been questioned), throughout the mid-19th century (California Office of Historic Preservation, 2004).

As many would-be miners found mining too difficult, the competition too fierce, or the payout too small (if not eventually non-existent for those who lacked the equipment to engage in large-scale mining operations), many turned to farming the soils of the Central Valley. This required the draining of many of the swamps and lakes in the San Joaquin Valley, including Lake Tulare near the study area.

Chinese workers, who had originally come to work in the mines, soon found themselves draining of California's wetlands and lakes to create farmland, or becoming farmhands. In addition to the well-known "Chinatowns" located in most large, and many small, cities in 19th century California, the Chinese workers left behind evidence of their activities in the work camps, the remains of which are still occasionally visible on the landscape.

These Chinese workers, and later migrant workers from other parts of Asia, would be the frequent targets of anti-migrant hostilities, both in the state and federal legislatures, in the streets of California's towns, and in the state's fields. In the 1890s, Fresno was the site of anti-migrant riots that resulted in the destruction of rural labor camps, possibly leaving archaeological traces of this activity (Takaki, 1998).

Though agriculture began in the 1840s despite the ever-present threat of Indian raids, with the draining of the lakes and swamps of California's Central Valley, agriculture became possible over a much greater expanse of land. Stock raising became a dominant business in the study area during the 1860s. In the 1870s, the coming of the railroad provided a larger market to farmers and also an easier mode by which settlers could come to California, ushering an era of general farming (County of Fresno, 2006).

Irrigation began in the late 1860s, but remained controversial given the relatively limited water supply of the region. However, as irrigation became more common throughout the late 19th and early 20th centuries, the harsh, dry environment demonized by Zalvidea became a fertile, if still often hot, agricultural powerhouse.

Throughout the remainder of the 19th century, Fresno County's population continued to grow, though it still remained relatively sparse, as befits a primarily agricultural area. Many of the modern cities, including Fresno, Reedley, and Sanger, were either founded or incorporated. Many of the markers of American culture, including newspapers, the railroad, and public streetcars either were established or expanded (Fresno Historical Society, 2001).

5.7.1.8.3 The 20th Century Through World War Two. Fresno County's population growth rapidly increased during the first half of the 20th century, starting with a population of over 37,000 in 1900 and continuing to grow to 276,515 people by 1950. Canals, dams, and artificial bodies of water including Hume Lake were created to supply water to both the people and agriculture of Fresno County. (Fresno Historical Society, 2001). In 1914, Firebaugh, near which the study area is located, was incorporated.

Tumultuous events of the early 20th century included the early growth of the labor movement; World War One (WWI); the Great Depression; conflicts between laborers native to California and migrant laborers from Asia, Central and South America; and, during the Depression, conflicts in the south and Midwest of the United States. Fresno County continued to grow, and even prosper. The founding of new towns, newspapers, educational institutions (including a normal school and the first junior college in California), and the coming of radio all served to tie Fresno County into the larger United States.

Increases in the price of Fresno's popular crops, such as raisins, raised land prices within the county and the growth of both staple and cash crops brought money to the area. South of the study area, the Kettleman Oil Fields were discovered in 1928, bringing yet another source of income to the area.

With the outbreak of World War Two (WWII), anti-Japanese sentiments led to the establishment of the Japanese internment camps in California and other parts of the western U.S. The establishment of temporary detention camps in eastern Fresno County and the Fresno Assembly Center expanded this region's role in WWII from that of producing food and supplies and providing soldiers.

5.7.1.8.4 The Late 20th Century. As with the rest of California, the post-WWII return of soldiers and growth of families led to even greater population growth. By 1950, Fresno County had a population of 276,515, and more cities continued to be incorporated throughout the 1940s and 1950s. By 1954, Fresno County had become the leading agricultural production county in the nation (Fresno Historical Society, 2001). The presence of major transportation corridors (including State Highway 99, State Highway 152, Interstate 5, a railroad, and an airport converted from military to civilian use) caused non-agriculturally-centered industries to grow in and around Fresno, as well.

Fresno County reached a population of 799,407 by 2000 (Umbach, 2002). An increasingly broad ethnic community has led to a rich cultural life in Fresno County, though it has also played a role in racial tension related to labor and to the laws concerning immigration.

Though Fresno County is now home to many different industries, it has maintained its agricultural character, especially outside the major cities. The study area itself is a pomegranate orchard surrounded by orchards on all sides, as far as the eye can see.

5.7.1.9 Native American Consultation

The PEC Native American correspondence discussed below, including the Native American Heritage Commission (NAHC) contact letter, NAHC response, Native American mailing list, and consultation letters, is confidential. Copies of this correspondence are provided in the confidential technical report (Appendix J).

The California NAHC was contacted on April 6, 2006, for a list of local Native American groups and/or individuals with direct or indirect knowledge of cultural resources within or near the project area. These consultations also sought to identify any sacred lands within the area (including a 1-mile radius study area) identified in the NAHC's Sacred Lands File. The NAHC responded on May 4, 2006 indicating that the search of the Sacred Lands File was negative, and providing a list of six local Native American contacts for Fresno County.

Letters describing the project and maps of the site and various components were sent on May 9, 2006 by certified mail, to the six contacts identified by the NAHC as appropriate for Fresno County. The letters inquired whether the groups/individuals had any concerns regarding the project, or wished to provide input regarding cultural resources in the project area.

A fax was received from Brian Austin, tribal attorney of the Chaushilha Tribe, on June 5, 2006. In this faxed letter, Mr. Austin states that the Chaushilha Tribal Council is not, at this time, aware of any specific cultural significance of the proposed site. However, in the event that any resources are found, Mr. Austin requests that the tribe be contacted.

Subsequent to the mailed letters, Matthew Armstrong, a URS archaeologist, called the Table Mountain Rancheria on June 30, 2006. At that time, a representative of the Cultural Resources office stated that the Rancheria had no concerns regarding the PEC.

Matthew Armstrong also made a follow-up call to the Santa Rosa Rancheria on June 30, 2006, and was notified by Mr. Lalo Franco of the Cultural Resources Office that there may be some concerns regarding a nearby village site for which the Southern San Joaquin Valley Information Center (SSJVIC) did not have a site record. On July 7, 2006, an email was received from Mr. Franco stating that there were no concerns regarding the project area.

5.7.1.10 Key Personnel Qualifications

The key cultural resources personnel who conducted and/or supervised the field survey and prepared the technical report (Appendix J) and Application for Certification (AFC) Section 7.3 are:

- Brian Hatoff, MA, RPA (URS Principal Investigator for the project)

- Reid Farmer, MA, RPA (URS Archaeologist)
- Christine Hacking, MA, RPA (URS Archaeologist)
- Matthew Armstrong (URS Archaeologist)

Mr. Hatoff meets the professional standards of the Secretary of the Interior for this work (Standards and Guidelines for Archaeology and Historic Preservation, National Park Service, 1983) and is certified by the Register of Professional Archaeologists.

5.7.1.11 Background Research

5.7.1.11.1 Archaeology. Prior to initiation of the cultural resources inventory, pre-field research was conducted to identify the extent of prior archaeological surveys and known cultural resources within or adjacent to the project area. Bibliographic references, previous survey reports, and archaeological site records were compiled through a records search conducted at the SSJVIC of the California Historical Resources Information System (CHRIS), at California State University, Bakersfield. A records search was conducted at the CHRIS (SSJVIC File No.: 06-160). The power plant proposed location, the 8-acre laydown area, and a 0.5-mile-wide study area around each area were researched.

The SSJVIC search included a review of all recorded sites, surveys, historical listings, and historical maps within the project area and specified study areas. Review of the existing archaeological survey information indicated that the project areas had not previously undergone archaeological survey, and that only four previous surveys had been performed within 0.5 mile of the study area.

5.7.1.11.2 Previously Conducted Cultural Resource Surveys within Approximately 0.5 Mile. The SSJVIC has four cultural resource studies on file that have been conducted within the 0.5-mile search radius around each project component. Reference and general information on the previous surveys are provided in Table 5.7-1.

5.7.1.11.3 Previously Recorded Cultural Resources Within Approximately 0.5 Mile. No cultural resources have been formally or informally documented within the approximately 0.5-mile radius study area around the project.

5.7.1.11.4 Built Environment Research. JRP Historical Consulting Services (JRP) conducted background research to arrive at a general understanding of the history of the region and the project area, focusing upon the construction history. JRP conducted background research for this project at the California State Library, Sacramento; UC Davis and UC Berkeley libraries; CSU East Bay; the Fresno Historical Society; and various websites. The research examined a variety of materials including maps, aerial photographs, local and county histories, directories, and newspapers. The full JRP report is included in the technical appendix.

TABLE 5.7-1
PREVIOUSLY CONDUCTED CULTURAL RESOURCE SURVEYS

Study Number	Author	Date	Title	Was all or part of the study or survey conducted in the project area?	Was the study or survey positive for cultural resources?
FR-00320	Canaday *et al*.	1992	Archaeological Survey of Right-of-Way Corridor and Extra Work Spaces Construction Spread 5B, California	No	Negative within 1/2 mile of the study area.
FR-00321	Moratto and Jackson	1990	Cultural Resources Assessment Report, PGT-PG&E Pipeline Expansion Project, Idaho, Washington, Oregon and California, Phase 1: Cultural Resources Inventory Atlas	No	Negative within 1/2 mile of the study area.
FR-01959	Moratto *et al*.	1994	Archaeological Investigations PGT-PG&E Pipeline Expansion Project, Idaho, Washington, Oregon, and California	No	Negative within 1/2 mile of the study area.
FR-02015	Aspen Environmental Group	2001	Los Banos-Gates 500 kV Transmission Project, Application No. 01-04-012, Draft Supplemental Environmental Impact Report	No	Negative within 1/2 mile of the study area.

5.7.1.12 Field Survey

As noted above, preparation for the cultural resources field survey consisted of an inventory and overview of all known cultural resources within the project area and adjacent study areas. This study provided the basis for assessing current survey requirements and cultural resources likely to be present in the project area. The bibliographic survey, coupled with the project field survey, facilitates an accurate assessment of the cultural resources possibly affected by project implementation. Review of the existing archaeological survey information indicated that only portions of the project area had previously undergone archaeological survey, indicating the need for field inventory.

5.7.1.12.1 Survey Methodology and Coverage.

***Archaeology*.** Two URS archaeologists conducted an archaeological survey on April 21, 2006 by walking in the space between each row of trees and examining the ground between and around the trees. The 12.8-acre plant site and the 8-acre laydown site were both surveyed in their entirety, as was the dirt access road.

A new project map including a substation expansion and an alternate gas pipeline was received by URS in June, 2006. A URS archaeologist returned to the project location to survey additional land on June 21, 2006. The survey was performed in the same manner as the previous survey. In addition, the area adjacent to Panoche Road north of the existing substation was also examined.

***Built Environment*.** An onsite inventory of existing structures and other built environment resources within and adjacent to the PEC and laydown area was conducted on June 5, 2006, by JRP representatives. No resources were found that JRP recommends as eligible for the National Register of Historic Places (NRHP) or the California Register of Historic Resources (CRHR). The results of this inventory are summarized below and detailed in Appendix J.

***Current Survey Results*.**

***Archaeology*.** No new archaeological sites were recorded during the survey.

***Built Environment*.** JRP located three resources near the proposed project location. One of these resources is Panoche Road itself, and the other two are complexes of buildings along Panoche Road.

Though Panoche Road plays a significant part in the history of northwest Fresno County, it has been heavily modified throughout the 20th century so that no trace of the initial road remains in or near the study area. As a result, it lacks integrity of design, workmanship, and location. Moreover, Panoche Road is a typical rural road, and examples of this type of road have been well-documented elsewhere. As a result, Panoche Road is recommended not eligible for federal or state registers.

The property at 43405 West Panoche Road consists of a residence, an ancillary building, and a large corrugated metal storage facility. Although the buildings are still in good condition, modifications to the buildings have diminished their integrity. None are the works of master craftsmen and none are connected with people of historic importance to the local area, state, or nation. Moreover, these buildings are of a common type that is well-documented elsewhere. While the large storage building is visually interesting, this is insufficient to make the property eligible for listing. This property is recommended not eligible for federal or state registers.

The property at 43946 West Panoche Road consists of a complex of residences that had been occupied by farm laborers. Today the buildings are abandoned and have been neglected, leaving them in poor condition. Their integrity of structure has been compromised, as has their integrity of materials. These buildings are of a well-documented common type, and are not associated with people of historic importance. This property is recommended not eligible for federal or state registers.

5.7.2 Environment Consequences

CEC regulations require that the PEC undergo various environmental resource assessments (i.e., cultural, paleontological, biological, etc.) as part of this AFC. With few exceptions, the potential effects of any project upon cultural resources are evaluated under CEQA or the National Environmental Policy Act (NEPA) (see Table 2.7-2). The PEC is not a federal undertaking, and therefore the AFC is written in compliance with CEQA and serves as CEQA environmental documentation. Under CEQA, the potential effects of the project upon cultural resources must be evaluated. Although not considered a federal undertaking, the project has been concurrently assessed with regard to the requirements of Section 106 of NHPA and its implementing regulations set forth as 36 CFR 800.

5.7.2.1 State-level Mandates

Cultural resources include archaeological and historical objects, sites and districts, historic buildings and structures, cultural landscapes, and sites and resources of concern to local Native American and other ethnic groups. The PEC Cultural Resources Technical Report (Appendix J) is consistent with compliance procedures set forth in CEQA, CCR Sections 15064.5 and 15126.4, and Section 106 of the NHPA, set forth at 36 CFR 800.

In considering impact significance under CEQA and NHPA, the significance of the resource itself must first be determined. At the state level, consideration of significance as an "...important archaeological resource" is measured by cultural resource provisions considered under CEQA Sections 15064.5 and 15126.4, and the draft criteria regarding resource eligibility to the CRHR.

Generally, under CEQA, a historical resource (including built environment historic and prehistoric archaeological resources) is considered significant if it meets the criteria for listing on the CRHR. These criteria are set forth in Section 15064.5, and are defined as resource items that:

- Are associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage
- Are associated with lives of persons important to our past
- Embody the distinctive characteristic of a type, period, region, or method of construction, or represent the work of an important creative individual, or possess high artistic values
- Have yielded, or may be likely to yield, information important to prehistory or history

Section 15064.5 of CEQA also assigns special importance to human remains and specifies procedures to be used when Native American remains are discovered. These procedures are detailed under PRC 5097.98.

Impacts to “unique archaeological resources” and “unique paleontological resources” are also considered under CEQA, as described under PRC 21083.2. A unique archaeological resource implies an archaeological artifact, object, or site about which it can be clearly demonstrated that (without merely adding to the current body of knowledge) there is a high probability that it meets one of the following criteria:

- The archaeological artifact, object, or site contains information needed to answer important scientific questions and there is a demonstrable public interest in that information
- The archaeological artifact, object, or site has a special and particular quality, such as being the oldest of its type or the best available example of its type
- The archaeological artifact, object, or site is directly associated with a scientifically recognized important prehistoric or historic event or person

A non-unique archaeological resource indicates an archaeological artifact, object, or site that does not meet the above criteria. Impacts to non-unique archaeological resources and resources which do not qualify for listing on the CRHR receive no further consideration under CEQA.

Under CEQA Section 15063.5, a project potentially would have significant impacts if it would cause substantial adverse change in the significance of:

- A historical resource (i.e., a cultural resource eligible to the CRHR)
- An archaeological resource (defined as a unique archaeological resource which does not meet CRHR criteria)
- A unique paleontological resource or unique geologic feature (i.e., would directly or indirectly destroy a site)
- Human remains (i.e., would disturb or destroy burials)

A non-unique archaeological or paleontological resource is given no further consideration, other than the simple recording of its existence by the lead agency.

Criteria for eligibility for the CRHR are very similar to those of the NRHP, which are the significance assessment tools used under the NHPA. The criteria of the NRHP apply when a project has federal involvement. Note that a property that is eligible for the NRHP is also eligible to the CRHR. On projects with federal involvement, impacts to significant resources are assessed and addressed under the procedures of Section 106 of the NHPA, set forth at 36 CFR 800.

All resources encountered during the mitigation and monitoring phases of the PEC, with the exception of isolate artifacts and isolate features that appear to lack integrity or data potential, will be evaluated for significance per CRHR and CEQA criteria described above. If a resource is found to be significant, then it will be avoided through alterations in project design when feasible. In the event that avoidance of cultural resources is not possible via project design modifications, appropriate mitigation measures will be developed, in accordance with appropriate regulations and consultation with the CEC.

The Warren-Alquist Act (WAA) requires that cultural resource studies be performed as an element of the application for certification for power facilities. Section 25520 requires that applications describe the projected impacts of a facility upon historic resources. Section 25527 prohibits the construction of facilities in locations where they may impact historic or aesthetic resources unless the construction of the facility is consistent with the use of said locations, there are no substantial adverse effects, and permission of the agency if any having ownership and/or control of the land is obtained. Section 25529 requires that any facilities constructed on lands containing historic or aesthetic resources set aside a portion of the property to allow the continued use of said resource. In addition, the WAA references the Public Utilities Code, section 1002, which states that historical and aesthetic values are to be one of the factors considered by the Public Utilities Commission in granting certifications.

5.7.2.2 Federal Level Mandates

The legal frameworks for addressing cultural resources at the federal and state levels are generally equivalent. The four criteria for evaluation established by the NRHP (listed below) are identified at 36 CFR 60.4 and are in accordance with the regulations outlined in 36 CFR 800 established by the Advisory Council on Historic Preservation (ACHP).

The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:

1. Resources that are associated with events that have made a significant contribution to the broad patterns of our history
2. Resources that are associated with the lives of persons significant in our past
3. Resources that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction
4. Resources that have yielded, or may be likely to yield, information important in prehistory or history (36 CFR 60.4)

Hence, these evaluating criteria are used to help determine what properties should be considered for protection from destruction or impairment (36 CFR 60.2).

The PEC is not considered a federal undertaking, however, the legal framework for addressing cultural resources at the federal and state levels are generally equivalent and are used somewhat interchangeably herein.

5.7.2.3 Local Mandates

On the local level, compliance with the Fresno County General Plan (FCGP, 2000) may be necessary. According to the plan, a goal of Fresno County is to identify, protect, and enhance important archaeological and historic resources within the county. In order to achieve this goal, a number of policies, measures, and programs targeting the management of cultural resources have been adopted by the county. In general, compliance with CEQA and Section 106 satisfies the county's concerns for cultural resources. Table 5.7-2, details legal and regulatory authorities associated with cultural resource concerns.

5.7.2.4 Panoche Energy Center Site

5.7.2.4.1 Archaeology. There are no previously recorded cultural resources located within or adjacent to the PEC site. No cultural resources were detected within the site during intensive pedestrian survey.

5.7.2.4.2 Built Environment. No built resources eligible for federal or state registers will be adversely impacted by the proposed project. The area has been surveyed by qualified personnel from JRP, and the structures located near the project location are recommended ineligible for state and federal registers.

5.7.2.5 Direct, Indirect, and Cumulative Impacts

5.7.2.5.1 Direct Impacts. Direct impacts are typically associated with construction activity and have the potential to immediately alter, diminish, or destroy all or part of the character and quality of historic and archaeological resources. The construction, operation, and maintenance of the PEC are not expected to result in significant new direct impacts to known cultural resources. Previously undiscovered cultural resources could be impacted by construction-related activities. Provisions for such an occurrence are discussed in Section 7.3.3.2.

5.7.2.5.2 Indirect Impacts. Indirect impacts as defined in the California Department of Transportation (Caltrans) Guidance for Consultants (Caltrans, 1991) "…are related to the primary consequences of the completed project and may be several steps removed from the project in the chain of cause and effect. Indirect impacts can normally be expected to cause

TABLE 5.7-2
LEGAL AND REGULATORY AUTHORITIES

AFC Section	Authority	Administering Agency	Requirements/Compliance
5.7.2.2	National Environmental Policy Act (NEPA); 42 USC 4321-4327; 40 CFR section 1502.25	Lead Federal Agency	Analysis of federal environmental impacts on federal lands or for projects requiring federal money, assistance, and/or permits
5.7.2.2	Archaeological and Historic Preservation Act of 1976 (16 USC 469)	Secretary of the Interior and Lead Federal Agency	Provides for coordination with the secretary when a Federally licensed undertaking may cause irreparable damage to significant cultural resources
5.7.2.2	American Indian Religious Freedom Act of 1979 (42 USC 1996)	Lead Federal Agency	Establishes U.S. Government policy to protect and preserve traditional religious beliefs and practices
5.7.2.2	Native American Graves Protection and Repatriation Act of 1990 (25 USC 3001)	Lead Federal Agency	Establishes mechanism for right of Indian tribes to claim ownership of human remains and certain cultural items
5.7.2.2	Secretary of the Interior's Standards and Guidelines, September 29, 1983	Secretary of the Interior and Lead Federal Agency	Establishes standards for the gathering and treatment of data related to cultural resources
5.7.2.1	The Warren-Alquist Act §§ 25520, 25527, 25529	CEC	Requires that cultural, historic, and aesthetic resources be taken into account in consideration of an application for certification Requires that a portion of any such resources on public land be set aside for public access
5.7.2.1	California Environmental Quality Act (CEQA) Section 15064.5; California Public Resources Code § 5024, 5024.5, and 21083.2; Title 14, CCR § 15126	CEC	Formal findings by the lead state agency regarding project-related effects to important cultural resources and unique paleontological resources
5.7.2.1	Cal. Pub. Res. Code §§ 25523(A), 25527;20 CCR §§ 1752, 1752.5, 2300-2309, and Chapter 2, Subchapter 5, Article 1, Appendix B, Part (i)	CEC	Special consideration of unique historical, archaeological, and cultural sites
5.7.2.1	Cal. Health & Safety Code § 7050.5	County Coroner (Medical Examiner)	Determination of origin of human remains and coordination with NAHC
5.7.2.1	Cal. Pub. Res. Code § 5024.1	State Historical Resources Commission	Establishes the California Register of Historic Resources and procedures for nominating sites to the register
5.7.2.1	Cal. Pub. Res. Code § 5097.5	Fresno County Planning Department	Prevent unauthorized removal of archaeological resources on public lands
5.7.2.1	Cal. Pub. Res. Code § 5097.94 and	Native American	

TABLE 5.7-2 (CONTINUED)
LEGAL AND REGULATORY AUTHORITIES

AFC Section	Authority	Administering Agency	Requirements/Compliance
	5097.98.21.	Heritage Commission	
5.7.2.3	Fresno County Master Plan	Fresno County Planning Department	Calls for adherence to CEQA cultural resources regulations within Fresno County

change in the character or use of built environment by the introduction of undesirable auditory or visual intrusions. Noise and vibration activity itself may be considered indirect

effects…" It is important to note that the Caltrans guidance define certain categories of projects that have virtually no potential for affecting historic resources, which they define as project with a "minimal Area of Potential Concern (APE)." These undertakings typically include "…repair, maintenance, or minor alteration of existing streets, sidewalks, gutters… and similar facilities" (Caltrans, 1991). The construction, operation and maintenance of the PEC project are not expected to result in significant new indirect impacts to archaeological or built environment cultural resources.

5.7.2.5.3 <u>Cumulative Impacts</u>. Section 5.18, Cumulative Impact Analysis, presents information on other projects that could affect the same resources as the PEC. The reader is referred to that section for details regarding each of these projects.

Each of these projects was assessed in conjunction with the PEC to ascertain the potential contribution of the PEC to cumulative impacts to the cultural resources base. Based on this analysis it has been concluded that cumulative impacts from the PEC on the regional cultural resources base are limited because implementation of the mitigation measures proposed below for cultural resources will reduce project-related impacts to a less-than-significant level. Although no archaeological sites have been identified that would be affected by the project, in the event that such a site were encountered, data recovery and/or site avoidance would ensure that the information content of site would be retained. These measures would limit the contribution to cumulative impacts of the PEC on the regional cultural resources base.

5.7.3 Mitigation

5.7.3.1 <u>Mitigation of Construction-related Impacts</u>

Mitigation under Section 106 of the NHPA, as declared by CEQA Sections 15064.5 and 15126.4 and NEPA, must address impacts to values for which a cultural resource is considered important. To mitigate adequately, it must therefore be determined what elements make a cultural resource eligible for the CRHR and/or NRHP.

The Applicant is committed to archaeological site avoidance where feasible. However, in the event that testing is required, the initial testing/evaluation program would be conducted expeditiously. If avoidance of a site found to be significant is not possible, PEC would comply with CEQA/CRHR and Section 106 of the NHPA in consultation with the CEC and the State Historic Preservation Office (SHPO) in order to complete formal determinations of eligibility and effect, and to formalize mitigation agreements.

5.7.3.1.1 Impacts and Mitigation Measures. Measures to ensure avoidance of cultural resources and measures to avoid indirect impacts to nearby cultural resources are described below. The mitigation measures and procedures described would apply to any cultural resources in the project areas of potential effect, or cultural resources determined not to be significant when the CEC and SHPO (if a federal undertaking) concur with the determination, regardless of facility component. With implementation of the Applicant-committed measures listed below, no significant unavoidable impacts to known cultural resources are expected to occur.

CUL-1: Avoidance. Should any unexpected resources be located prior to or during construction, avoidance measures will be taken to minimize impact to the resources. As needed, an archaeologist will accompany the project engineer to the field to demarcate cultural resource boundaries on the ground and to ensure that facility placement will not impinge upon a cultural resource. Routes of any access roads or other temporary use areas that must be built or graded that are outside of areas previously surveyed for cultural resources will be subjected to archaeological survey prior to construction. If a potentially significant cultural resource is discovered, the route/temporary use area will be modified to avoid that resource. If there are not feasible means to avoid the resource, the cultural resource will be tested; if found significant, the measures for mitigation described below will be implemented in consultation with the CEC.

CUL-2: Physical Demarcation and Protection. In instances where a project facility must be placed within 100 feet of a known cultural resource that may be eligible for inclusion on the CRHR, the cultural resource will be temporarily fenced or otherwise demarcated on the ground, and the area will be designated environmentally sensitive. Construction equipment will be directed away from the cultural resource and construction personnel will be told not to enter the area. Where cultural resource boundaries are unknown, the fenced or demarcated area will include a buffer zone with a 100-foot radius. In some cases, additional archaeological work may be required to demarcate the boundaries of the cultural resource and to ascertain whether the cultural resource can be avoided.

CUL-3: Crew Education. Prior to beginning of construction near any sensitive cultural resource, the construction crew will be informed of the resource values involved and of the regulatory protections afforded such resources. The crew will also be informed of procedures relating to culturally sensitive areas, and instructed not to drive into these areas or to park or operate construction equipment in these areas. The crew will be instructed not to collect artifacts, and asked to inform a construction supervisor in the event that artifacts are uncovered.

CUL-4: Archaeological Monitoring. All initial grading or excavation within 100 feet of any potentially significant resource that may have a subsurface component will be monitored by an archaeologist. If subsurface materials are uncovered, construction work in the immediate vicinity will be halted and emergency discovery procedures described below will be implemented.

CUL-5: Native American Monitoring. In order to ensure participation by interested members of the Native American community, it is recommended that a Native American monitor be present during archaeological cultural resource testing and/or data recovery operations at archaeological cultural resources that appear to have a prehistoric or ethnographic component. The monitor will be retained either directly by the project Applicant, or through the subconsultant conducting the actual fieldwork.

CUL-6: Formal Compliance with CEQA Section 15064.5 and 15126.4 and Section 106 of the NHPA. In the event that a resource cannot be avoided during the placement of any project facility, further archaeological work will be performed as appropriate to assess the importance/significance of the resource prior to the project implementation.

CUL-7: Mitigation For Resource. If an unanticipated resource is discovered during construction, it will be addressed under the procedures set forth at CEQA Section 15064.5. If possible, the resource will be avoided first through design modification, or second, through protective measures as described above. If the resource cannot be avoided, the project archaeologist will consult with the CEC and SHPO as appropriate to determine resource significance. If the resource is significant, then measures to mitigate impacts will be devised in consultation with the CEC and SHPO as appropriate and will be carried out by the Applicant.

5.7.3.2 Specific Mitigation Measures

Specific actions recommended at each project facility are described below. In devising specific mitigation measures to address impacts for any cultural resources that cannot be avoided during construction through project design modification, there is a potential for ongoing impacts to the resource. Any mitigating data recovery shall be adequately scoped, in conjunction with the regulatory agency(s), to address potential long-term ongoing impacts.

Project policy will dictate that crews and vehicles engaged in operation and maintenance will confine activities to the greatest possible extent to existing roads, or will perform inspections by air or on foot.

5.7.3.2.1 Panoche Energy Center Site. No adverse affects to cultural resources are anticipated for the construction, operation, and maintenance of the PEC as described to URS as of June 5, 2006. No specific mitigation measures are required for this component.

5.7.4 LORS Compliance

Cultural resource LORS are described below.

The archaeological survey described above served to identify cultural resources present within and immediately adjacent to the PEC site and associated project components. The PEC project is considered a state-level undertaking and as such, is subject to state LORS for paleontological and cultural resources. Any cultural resource potentially affected by the project will be subject to compliance with the provisions outlined in CEQA/CRHR and possibly Section 106 of the NHPA. If a cultural resource is discovered during construction, and cannot be avoided, a program of site evaluation will be undertaken to ascertain resource significance under CEQA/CRHR and Section 106 of the NHPA. If such a resource is determined to be significant, mitigation measures will be developed in concert with the CEC, SHPO, and other agencies as appropriate (Section 7.3.3). At this time no specific permit requirements have been identified at the federal, state, or local levels to perform any cultural resources work that may subsequently be required during the construction or operation phases of the project.

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Adequacy Issue:	Adequate ____	Inadequate ____	DATA ADEQUACY WORKSHEET	Revision No. ____	Date ____
Technical Area:	Cultural Resources	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.	Sections 5.7.1, 5.7.2.4, 5.7.2.5, 5.7.3		
Appendix B (g) (2) (A)	A brief summary of the ethnology, prehistory, and history of the region in which the project site and related facilities are located and maps at a scale of 1:24,000, indicating areas of ethnographic occupation. The region may vary depending on the extent of the territory occupied or used by prehistoric cultures indigenous to the area in which the project is located.	Sections 5.7.1.6 through 5.7.1.8		
Appendix B (g) (2) (B)	A description of all literature searches and field surveys used to provide information about known cultural resources in the project vicinity. If survey records of the area potentially physically affected by the project are not available, and the area has the potential for containing significant cultural resources, the applicant shall submit a new or revised survey for any portion of the area lacking comprehensive survey data. A discussion of the dates of the surveys, methods used in completing the surveys, and the identification and qualification of the individuals conducting the surveys shall be included.	Section 5.7.1.11		The information regarding the dates, methods, and personnel for the surveys was not made available through the information center (and may not have been in final reports). However, the companies that generated the reports follow a practice of allocating responsibility to qualified individuals and performing adequate fieldwork.

Adequacy Issue: Adequate ____ Inadequate ____

DATA ADEQUACY WORKSHEET

Revision No. ____ Date ____

Technical Area: **Cultural Resources** 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) (2) (C)	A discussion of the sensitivity of the project area described in subsection (g)(2)(A) and the presence and significance of any known archeological sites and other cultural resources that may be affected by the project. Information on the specific location of archeological resources shall be included in a separate appendix to the application and submitted to the Commission under a request for confidentiality pursuant to Title 20, California Code of Regulations, § 2501 et seq.	Sections: 5.7.1.3, 5.7.1.11		
Appendix B (g) (2) (D)	A summary of contacts and communications with, and responses from, Native American representatives who may have an interest in heritage lands and/or resources potentially affected by the proposed project.	Section 5.7.1.9		
Appendix B (g) (2) (E)	In the discussion on mitigation and monitoring prepared pursuant to subsection (g)(1), a discussion of any educational programs proposed to enhance awareness of potential impacts to archeological resources by employees and contractors, measures proposed for mitigation of impacts to known cultural resources, and a set of contingency measures for mitigation of potential impacts to previously unknown cultural resources.	Section 5.7.3.1.1		
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;	Table 5.7-2		

Adequacy Issue: Adequate ____ Inadequate ____ **DATA ADEQUACY WORKSHEET** Revision No. ____ Date ____

Technical Area: **Cultural Resources** 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) (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.	Table 5.7-2		Unless a federal hook is found, the only official to be contacted for cultural resources is the Fresno County Coroner in the event that human remains are found. If a federal hook is found for the project, then the State Historic Preservation Officer (SHPO) may have to consult to agree that there are no adverse impacts to cultural resources. Otherwise, the contacts for cultural resource issues should be the same as for other environmental issues or else should be indicated by the agency contacts for other environmental issues.
Appendix B (h) (2)	A discussion of the conformity of the project with the requirements listed in subsection (h)(1)(A).	Section 5.7		
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.	NA		See above
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.	NA		See above

5.8 PALEONTOLOGICAL RESOURCES

5.8.1 Introduction

Paleontological resources (fossils) are the remains or traces of prehistoric animals and plants. Fossils are important scientific and educational resources because of their use in: 1) documenting the presence and evolutionary history of particular groups of now extinct organisms; 2) reconstructing the environments in which these organisms lived; and 3) in determining the relative ages of the strata in which they occur. Fossils are also important in determining the geologic events that resulted in the deposition of the sediments that entombed them and their subsequent deformation.

This section of the Application for Certification (AFC) summarizes the potential environmental impacts on paleontological resources that may result from construction of the Panoche Energy Center (PEC or the project). Section 5.8.2 describes the existing environment that could be affected by the proposed project. Section 5.8.3 addresses potential impacts on paleontological resources resulting from construction and operation of the proposed project. Section 5.8.4 addresses the potential for cumulative impacts on paleontological resources from the project, while Section 5.8.5 discusses the issue of mitigation measures. The involved agencies and agency contacts are provided in Section 5.8.6, while Section 5.8.7 lists the federal and state LORS and the professional standards that protect paleontological resources. Section 5.8.8 discusses the status of permits required and permit schedule. Finally, Section 5.8.9 lists the references used in preparing this document.

This paleontological resources inventory and impact assessment was prepared by Dr. Lanny H. Fisk, PhD, PG, a California registered Professional Geologist and Senior Paleontologist of PaleoResource Consultants (PRC). It meets all requirements of the California Energy Commission (CEC) (CEC, 2000) and the standard measures for mitigating adverse construction-related environmental impacts on significant paleontological resources established by the Society of Vertebrate Paleontology (SVP, 1995, 1996).

A paleontological resource can be significant if:

- It provides important information on the evolutionary trends among organisms, relating living organisms to extinct organisms
- It provides important information regarding development of biological communities or interaction between botanical and zoological biota
- It demonstrates unusual circumstances in biotic history
- It is in short supply and in danger of being depleted or destroyed by the elements, vandalism, or commercial exploitation, and is not found in other geographic localities

Under the California Environmental Quality Act (CEQA) guidelines, (PRC 15064.5 (a) (2)), public agencies must treat all historical and cultural resources as significant unless the preponderance of evidence demonstrates that they are not historically or culturally significant. In keeping with significance criteria of the SVP (1995), all vertebrate fossils are categorized as having significant scientific value.

5.8.2 Affected Environment

5.8.2.1 Geographic Location

The site proposed for construction of the PEC is at a rural location in western Fresno County, California. The approximate location of the proposed PEC is latitude 36°39’06”N, longitude 120°35’05”W, in the SW ¼ of Section 5, T. 15 S., R. 13 E. in the U. S. Geological Survey (USGS) Chaney Ranch 7.5-minute (1:24,000 scale) Quadrangle. The site is located on the west-central portion of the San Joaquin Valley, near the geographic center of the State of California. The San Joaquin Valley comprises roughly the southern two thirds of the major north-northwest-oriented synclinorium called either the Valle Grande (Clark, 1929), Great Valley (Fenneman, 1931; Hackel, 1966), Great Interior Valley (Harradine, 1950), San Joaquin Valley (Jahns, 1954), Great San Joaquin Valley (Piper et al., 1939; Davis et al., 1957), or California Trough (Piper et al., 1939). The San Joaquin Valley Physiographic Province is located between the Sierra Nevada Physiographic Province on the east and the Coast Ranges Physiographic Province on the west. The general project area is bounded on the west by the upper portion of the gently inclined alluvial fan known as the Panoche Fan (Jennings and Strand, 1958; Miller et al., 1971) or Panoche Creek Fan (Bull, 1964a, 1964b; Lettis, 1982a, 1982b), which lies at the base of low-lying foothills of the Diablo Range, the easternmost ridge of the Coast Ranges. To the east of the proposed PEC site is the continuation of the gently inclined alluvial fan built by both Panoche Creek and adjacent smaller streams, such as Silver Creek, all of which head in the Diablo Range. The area in the immediate vicinity of the proposed plant site is irrigated farmland with the primary crop being pomegranates. To both the east and west of the basin floodplain drier soils are increasingly being planted to grape vineyards.

5.8.2.2 Regional Geologic Setting

The general geology of the San Joaquin Valley has been described in some detail by Hoots et al. (1954), Davis et al. (1957, 1959), Hoffman (1964), Croft and Wahrhaftig (1965), Hackel (1966), Marchand (1977), Lettis (1982a, 1982b), Bartow (1987, 1991), Beyer and Bartow (1988), and Calloway and Rennie (1991), among others. The information in these and other published reports form the basis of the following discussion. Individual publications are incorporated into this report and referenced where appropriate. For obtaining the older geological literature, the exhaustive compilation entitled “*Geological literature on the San Joaquin Valley of California*” by Maher et al. (1973) was particularly helpful.

The geology in the vicinity of the proposed PEC site has been described or mapped by numerous workers, including Anderson (1911), Anderson and Pack (1915), Mendenhall et al. (1916), Jennings and Strand (1958), Bull (1964b), Davis et al. (1957, 1959), Miller et al. (1971), Croft (1972), and Chin et al. (1993). Surficial geologic mapping of the Project site and vicinity has been provided at a scale of 1:750,000 by Jennings (1977); at a scale of 1:500,000 by Jenkins (1938) and Bartow (1991); at a scale of 1:250,000 by Jennings and Strand (1958), Bull (1964b), and Chin et al. (1993); and at a scale of 1:125,000 by Anderson and Pack (1915) and Miller et al. (1971). The area immediately to the west of the proposed PEC site was mapped at a scale of 1:50,000 by Bartow (1996). No 1:24,000-scale geologic maps are currently available for the immediate Project area. The aspects of geology pertinent to this report are the types, distribution, and age of sediments immediately underlying the Project area and their probability of producing fossils during Project construction. The site-specific geology in the vicinity of the Project is discussed separately below.

The San Joaquin Valley is a great structural depression between the westerly-tilted Sierra Nevada block on the east and the complexly folded and faulted Coast Ranges on the west. The valley is filled with thick Mesozoic and Tertiary marine sediments covered by a relatively thin veneer of Quaternary alluvial sediments (Bailey, 1966). The west margin of the San Joaquin Valley is a discontinuous series of individual and coalescing alluvial fans, with their apices located where streams drain the eastern foothills of the Coast Range. These low relief alluvial fans form a nearly continuous belt between the dissected uplands of the Coast Range and the nearly flat basin plain of the San Joaquin Valley. They are composed of undeformed to only slightly deformed alluvial deposits laid down primarily during Plio-Pleistocene time. Each alluvial fan consists of a mass of coarse to fine rock debris that splays outward from the mouth of its primary stream channel onto the valley floor as a fan-like deposit of well-sorted sand and gravel encased in a matrix of finer sediments, chiefly poorly sorted fine sand and silt deposited away from the stream channels on the alluvial plain. Our current interpretations and understanding of the alluvial deposits of major rivers flowing into the San Joaquin Valley lies in Arkley's (1962, 1964) studies of the Merced, Tuolumne, and Stanislaus River fans, Bull's (1964a) study of alluvial fans along the western margin of the Central Valley, Janda's (1966; Janda and Croft, 1965) study of alluvium of the upper San Joaquin River, Shlemon's (1967, 1972) study of the American River fan, Atwater's (1980) study of the Mokelumne River fan, Lettis' (1982a, 1982b) study of alluvial fans along the west central margin of the San Joaquin Valley, and, most recently, the work of Weissman et al. (2002) on the Kings River fan.

The alluvial deposits accumulated on alluvial fans along the western margin of the San Joaquin Valley consist of coarse- to fine-grained sediment eroded from Tertiary and older volcanic, plutonic, and metamorphic rocks in the Diablo Range to the west (Bull, 1964a; Lettis, 1982a, 1982b). The alluvial fan deposits grade east- or slightly northeast-ward through gradually decreasing grain sizes from coarse gravel at the Coast Range foothills to clay-rich silt on the San Joaquin Valley basin plain. The gravel, sand, silt, and clay that compose these alluvial fans have in the past produced significant fossils, primarily large land mammals such as mammoths, mastodons, camels, bison, and horses. These paleontological resources are discussed below.

5.8.2.3 Resource Inventory Methods

To develop a baseline paleontological resource inventory of the PEC site and surrounding area and to assess the potential paleontological productivity of each stratigraphic unit present, the published as well as available unpublished geological and paleontological literature was reviewed; and stratigraphic and paleontologic inventories were compiled, synthesized, and evaluated. These methods are consistent with CEC (2000) and SVP (1995) guidelines for assessing the importance of paleontological resources in areas of potential environmental effect. Stratigraphy was observed in numerous road cuts, walls of irrigation ditches and ponds, and natural stream banks during site surveys on June 8, 9, and 19 2006.

Geologic maps and reports covering the bedrock and surficial geology of the Project site and vicinity were reviewed to determine the exposed and subsurface rock units, to assess the potential paleontological productivity of each rock unit, and to delineate their respective areal distribution in the project area. Available soil surveys (Harradine, 1950; Arroues, 2006) and aerial photographs of the area were also examined to aid in determining the areal distribution of distinctive sediment and soil types. In addition, the logs from 20 geotechnical boreholes drilled at the proposed PEC site were examined and interpreted.

The number and locations of previously recorded fossil sites from rock units exposed in and near the project site and the types of fossil remains each rock unit has produced were evaluated. Literature review was supplemented by an archival search conducted at the University of California Museum of Paleontology (UCMP) in Berkeley, California, for additional information regarding the occurrence of fossil sites and remains in and near the project site.

Field surveys, which included a visual inspection of exposures of potentially fossiliferous strata in the project area, were conducted to document the presence of sediments suitable for containing fossil remains and the presence of any previously unrecorded fossil sites. The field surveys for this assessment were conducted on June 8, 9, and 19, 2006. During the field survey, stratigraphy was observed in road cuts, stream and ditch banks, and the walls of irrigation ponds. Less than 2 miles north of the proposed PEC site, the banks of Panoche Creek expose up to 25 feet of stratigraphy. Several irrigation ponds with up to 8 feet of exposed sediments were present within 3 miles of the project area.

5.8.2.4 Paleontological Resource Assessment Criteria

The SVP (1995), in common with other environmental disciplines such as archaeology and biology considers, any fossil specimen significant, unless demonstrated otherwise and, therefore, protected by environmental statutes. This position is held because vertebrate fossils are uncommon and only rarely will a fossil locality yield a statistically significant number of specimens representing the same species. In fact, vertebrate fossils are so uncommon that, in most cases, each fossil specimen found will provide additional important information about the characteristics or distribution of the species it represents.

A stratigraphic unit (such as a formation, member, or bed) known to contain significant fossils is considered to be "sensitive" to adverse impacts if there is a high probability that earth-moving or ground-disturbing activities in that rock unit will either disturb or destroy fossil remains. This definition of sensitivity differs fundamentally from that for archaeological resources:

> *It is extremely important to distinguish between archaeological and paleontological (fossil) resource sites when defining the sensitivity of rock units. The boundaries of archaeological sites define the areal extent of the resource. Paleontologic sites, however, indicate that the containing sedimentary rock unit or formation is fossiliferous. The limits of the entire rock formation, both areal and stratigraphic, therefore define the scope of the paleontologic potential in each case*. (SVP, 1995)

This distinction between archaeological and paleontological sites is important. Most archaeological sites have a surface expression that allow for their geographic location. Fossils, on the other hand, are an integral component of the rock unit below the ground surface and, therefore, are not observable unless exposed by erosion or human activity. Thus, a paleontologist cannot know either the quality or quantity of fossils present before the rock unit is exposed as a result of natural erosion processes or earth-moving activities. The paleontologist can only make conclusions on sensitivity to impact based upon what fossils have been found in that rock unit in the past, along with a judgment on whether or not the depositional environment of the sediments that compose the rock unit was likely to result in the burial and preservation of fossils.

Fossils are seldom uniformly distributed within a rock unit. Most of a rock unit may lack fossils, but at other locations within the same rock unit concentrations of fossils may exist. Even within a fossiliferous portion of the rock unit, fossils may occur in local concentrations. For example, Shipman (1977, 1981) excavated a fossiliferous site using a three-dimensional grid and removed blocks of matrix of a consistent size. The site chosen was known prior to excavation to be richly fossiliferous, yet only 17 percent of the blocks actually contained fossils. These studies demonstrate the physical basis for the difficulty in predicting the location and quantity of fossils in advance of project-related ground disturbance.

It is not possible to determine where fossils are located without actually disturbing a rock unit; therefore, monitoring of excavation by an experienced paleontologist during construction-related ground disturbances increases the probability that fossils will be discovered and preserved.

The non-uniform distribution of fossils within a rock unit is essentially universal (see for instance Lander, 1989, 1993; Reynolds, 1987, 1990; Spencer, 1990; Fisk et al., 1994; and references cited therein). In fact, most fossil sites recorded in reports of impact mitigation (where construction monitoring has been implemented) had no previous surface expression. Because the presence or location of fossils within a rock unit cannot be known without exposure resulting from erosion or excavation, under SVP (1995) standard guidelines, an entire rock unit is assigned the same level of sensitivity based on recorded fossil occurrences.

Using SVP (1995) criteria, the paleontological importance or sensitivity (high, low, or undetermined) of each rock unit exposed in a project site or surrounding area is the measure most amenable to assessing the significance of paleontological resources. The paleontological sensitivity of a stratigraphic unit reflects: 1) its potential paleontological productivity, and 2) the scientific significance of the fossils it has produced. This method of paleontological resources assessment is the most appropriate because the areal distribution of each rock unit, and corresponding discrete levels of paleontological importance, can be delineated on a topographic or geologic map.

The potential paleontological productivity of a stratigraphic unit exposed in a project area is based on the abundance/densities of fossil specimens and/or previously recorded fossil sites in exposures of the unit in and near a project site. The underlying assumption of this assessment method is that exposures of a stratigraphic unit in a project site are most likely to yield fossil remains both in quantity and density similar to those previously recorded from that stratigraphic unit in and near the project site.

An individual fossil specimen is considered scientifically important if it is:

- Identifiable
- Complete
- Well-preserved
- Age-diagnostic
- Useful in paleoenvironmental reconstruction
- A type or topotypic specimen
- A member of a rare species
- A species that is part of a diverse assemblage

- A skeletal element different from, or a specimen more complete than, those now available for that species

All identifiable land mammal fossils are considered scientifically important because of their potential use in providing accurate age determinations and paleoenvironmental reconstructions for the sediments in which they occur. Moreover, vertebrate remains are comparatively rare in the fossil record. Although fossil plants are usually considered of lesser importance because they are less helpful in age determination, they are actually more sensitive indicators of their environment (Miller, 1971) and, thus, as sedentary organisms, more valuable than mobile animals for paleoenvironmental reconstructions. For marine sediments, invertebrate and marine algal fossils, including microfossils, are scientifically important for the same reasons that land mammal and/or land plant fossils are valuable in terrestrial deposits. The value or importance of different fossil groups varies depending on the age and depositional environment of the stratigraphic unit that contains the fossils.

The following tasks were completed to establish the paleontological importance and sensitivity of each stratigraphic unit exposed in or near the project site:

- The potential paleontological productivity of each rock unit in and/or near the project site was assessed based on the density of fossil remains and/or previously recorded and newly documented fossil sites.
- The scientific importance of fossil remains recorded from a stratigraphic unit exposed in or near the project site was assessed.
- The paleontological importance of a rock unit was assessed, based on its documented and/or potential fossil content in the area surrounding the project site.

5.8.2.4.1 Categories of Sensitivity. In its standard guidelines for assessment and mitigation of adverse impacts to paleontological resources, the SVP (1995) established three categories of sensitivity for paleontological resources: high, low, and undetermined.

***High Sensitivity*.** Stratigraphic units in which fossils have been previously found have a high potential to produce additional fossils and are therefore considered to be highly sensitive. In the significance criteria of the SVP (1995), all vertebrate fossils are categorized as having significant scientific value and all stratigraphic units in which vertebrate fossils have previously been found have high sensitivity. In areas of high sensitivity, full-time monitoring is recommended during any project-related ground disturbance.

***Low Sensitivity*.** Stratigraphic units that are not sedimentary in origin or that have not been known to produce fossils in the past are considered to have low sensitivity. Monitoring is usually not recommended nor needed during excavation in a stratigraphic unit with low sensitivity.

***Undetermined Sensitivity*.** Stratigraphic units that have not had any previous paleontological resource surveys or any fossil finds are considered to have undetermined sensitivity. After reconnaissance surveys, observation of artificial exposures (such as road cuts) and natural exposures (such as stream banks), and possible subsurface testing (such as augering or trenching), an experienced, professional paleontologist can often determine whether the stratigraphic unit should be categorized as having high or low sensitivity.

5.8.2.5 Resource Inventory Results

5.8.2.5.1 Stratigraphic Inventory. Regional geologic mapping of the proposed PEC project site and vicinity has been provided by Jennings (1977; 1:750,000 scale), Jenkins (1938; 1:500,000 scale), Bartow (1991; 1:500,000 scale), Jennings and Strand (1958; 1:250,000 scale), Bull (1964; 1:250,000 scale), and Chin et al. (1993, 1:250,000 scale). Larger scale mapping of the project site has been provided by Anderson and Pack (1915; 1:125,000 scale) and Miller at al (1971; 1:125,000 scale). Unfortunately, no 1:62,500-scale or 1:24,000-scale geologic maps are currently available for the immediate project area. In these geologic maps of the Late Cenozoic deposits of the project area, geologists have not always used formally named stratigraphic units, nor have they consistently used the same map units.

Jennings and Strand (1958, 1:250,000 scale) simply mapped the area in the vicinity of the proposed project as “Recent alluvial fan deposits.” Bull (1964, 1:250,000 scale) mapped the entire Panoche Fan as Pleistocene and Holocene “fan deposits.” Chin et al. (1993, 1:250,000 scale) mapped nearly the entire Panoche Creek Fan as “younger alluvium (Holocene).” To the west of the PEC site, Chin et al. (1993) mapped the uppermost portion of the Panoche Creek Fan as “older alluvium (Pleistocene).” In the most detailed geologic map of the area available, Miller et al. (1971, 1:125,000 scale) mapped the entire Panoche Creek Fan simply as Pleistocene and Holocene alluvium. Bartow (1991, 1:50,000 scale) mapped the area immediately west of the proposed PEC site as “younger alluvium (Holocene),” the area northwest and southwest of the “younger alluvium” as “younger alluvial fan deposits (Holocene),” and the uppermost portion of the Panoche Fan as “older alluvial fan deposits (Holocene and Pleistocene).” All that these geologic maps tell us is that in the vicinity of the proposed PEC site the Panoche Creek Fan has exposed at the surface Holocene and Pleistocene alluvial fan deposits.

Since geological maps are a depiction of geological materials exposed only at the surface of the Earth, they must be interpreted to determine what geological materials will most likely be found in the subsurface. To aid in this interpretation, the stratigraphy exposed in natural stream banks and artificial exposures such in the banks of ponds and ditches, in addition to geological materials in wells and boreholes, is very helpful. Natural exposures near the proposed PEC site to depths of 25 feet are available in the stream banks of Panoche Creek approximately 1.85 miles north of the site. In addition, URS geologists supplied logs from 20 geotechnical boreholes for study and interpretation. The logs of several ground-water test holes in western Fresno County have also been published by Beard and Laudon (1988).

In the project vicinity, the geological materials composing the Panoche Creek alluvial fan have been subdivided into stratigraphic units and named differently by different geologists. This practice makes it more difficult to compare descriptions of fossil sites, which typically use either formally named stratigraphic units (formations and members) or North American Land Mammal Ages (NALMA), such as Blancan, Irvingtonian, or Rancholabrean.

The task of subdividing alluvial fan deposits into formal stratigraphic units is complicated by that fact that alluvial sediments are often lithologically similar. Bartow (1996) stated the problem as follows: “the unnamed Quaternary alluvial deposits are lithologically similar and are difficult to differentiate.” Davis and Hall (1959) addressed this problem by stating:

> *An important problem in attempting to differentiate geologic units in alluvial areas is that the sediments often are derived from a common source and are deposited in similar environments… Thus, the formations offer no textural or lithologic bases for subdivision. Nevertheless, the use of the topographic expression of the units in conjunction with the development of their soils makes it possible to define formations.*

In a doctoral dissertation at the University of California at Berkeley, which was also published as a USGS Open-File Report, Lettis (1982a, 1982b) described and mapped the Late Cenozoic stratigraphy of alluvial fans along the western margin of the central San Joaquin Valley from just north of the Panoche Creek Fan. He also discussed the geology of the Panoche Creek Fan and compared it to the area he studied in more detail. Lettis’ informally-named stratigraphic units are well defined, correlated with named stratigraphic units elsewhere, and are also applicable to the sedimentary sequence exposed on the Panoche Creek Fan. Lettis divided the alluvial fan deposits into three stratigraphic units. In order of decreasing age, these are the Middle to Late Pleistocene “Los Banos alluvium,” which he correlated with the Riverbank Formation of Marchand and Allwardt (1981); the Late Pleistocene to possibly Early Holocene “San Luis Ranch alluvium,” which he correlated with the Modesto Formation of Marchand and Allwardt (1981); and the Holocene “Patterson alluvium.” Since the proposed correlations with formally named formations on the east side of the San Joaquin Valley cannot be conclusively demonstrated, Lettis’ informally-named units are used herein to describe the site-specific stratigraphy in the vicinity of the proposed PEC power plant site.

Unconsolidated and semi-consolidated sediments composing the Panoche Creek alluvial fan can be divided into three informally named stratigraphic units, from oldest to youngest: the Middle to Late Pleistocene Los Banos alluvium, mapped by various geologists as being exposed on the upper alluvial fan; Late Pleistocene to possibly Early Holocene San Luis

Ranch alluvium; and a thin veneer of Holocene Patterson alluvium. These three stratigraphic units overlie each other with increasing thickness on the lower portion of the alluvial fan and in the floodplain of the San Joaquin River. Each of these stratigraphic units has yielded fossil remains at previously recorded localities within the Central Valley.

***Los Banos Alluvium*.** The Middle to Late Pleistocene Los Banos alluvium is not easily distinguished from either older or younger alluvial deposits. The principal differences between the Los Banos alluvium and the older alluvium of the Tulare Formation are stratigraphic position, degree of consolidation, topographic expression, attitude (tilted versus flat-lying), and fossil content. Alluvial sediments within and adjacent to the Coast Ranges, which often contain Late Pleistocene and Holocene fossil faunas, can often be distinguished from older Plio-Pleistocene sediments, such as the Tulare Formation, by their relatively flat-lying attitude while, in contrast, the older sediments containing Pliocene (Blancan NALMA) and Early to Middle Pleistocene (Irvingtonian NALMA) fossil faunas are often tilted (Savage, 1951; Lettis, 1982a, 1982b; Bartow, 1991). This criterion has also been helpful to others in distinguishing older alluvium from younger alluvium (see for instance, Taliaferro, 1951; Davis et al., 1957; Hall, 1958; Miller, 1971; and Helley et al., 1972).

Alluvial sediments referred to as the Tulare Formation are exposed only on the uppermost Panoche Creek alluvial fan and are overlain by an increasing thickness of younger deposits on the middle to lower fan. They are not likely to be impacted by PEC construction and will not be discussed further in this report.

Sediments of the Los Banos alluvium that appear to outcrop in the stream banks of Panoche Creek less than 2 miles northwest of the proposed PEC site suggest that it may be impacted by project-related excavation. Additionally, boreholes at the proposed site appear to have penetrated Los Banos alluvium.

The stream banks of Panoche Creek expose up to 25 feet of stratigraphic material. The abundance of diatomite clasts in the stratigraphic unit exposed in the lower walls of Panoche Creek suggests that this lithotype represents the Los Banos alluvium. Overlying the Los Banos alluvium is the San Luis Ranch alluvium, a 10-12 foot thick, poorly- to well-bedded silt and sand sequence, and the 1- to 3-foot-thick sandy silt unit, referred to herein as Patterson alluvium.

The 20 boreholes drilled at the proposed PEC site penetrated unconsolidated sediments of sand, silt, and clay with some gravel. Several caliche-cemented, discontinuous paleosols included in the sedimentary sequence are interpreted based on the presence of abundant caliche, iron oxide stained sediments, and the presence of root casts and/or root pores. The borehole logs revealed paleosol at approximately 48-50 feet, which was also reported by Beard and Laudon (1988) in a well drilled in the NW ¼ of the NW ¼ of Section 8 approximately 4.5 miles north of the proposed PEC site. Lettis recognized “at least 3 poorly to well preserved buried soils” within the sedimentary sequence he named San Luis Ranch alluvium and Los Banos alluvium.

San Luis Ranch Alluvium. The Late Pleistocene to possibly Early Holocene San Luis Ranch alluvium is composed of interbedded, unconsolidated, and poorly sorted yellowish brown sandstone and siltstone with lesser amounts of pebble to cobble conglomerate. Lettis correlated the San Luis Ranch alluvium with the Modesto Formation found on the east side of the San Joaquin Valley. Marchand and Allwardt (1981) gave the age of the Modesto Formation between about 12,000 and 42,400 years BP, Late Pleistocene.

The Quaternary alluvium of the Panoche Creek Fan assigned to the San Luis Ranch alluvium is lithologically indistinct from the underlying Los Banos alluvium and can be distinguished from it only by stratigraphic position and age. In addition, the Los Banos alluvium commonly bears a well-developed buried soil.

***Patterson Alluvium*.** The Holocene Patterson alluvium forms a thin veneer of primarily sandy silt, clayey silt, and silty clay overlying the San Luis Ranch alluvium over most of the Panoche Creek Fan. It varies from only a few inches in thickness on the upper alluvial fan to over four feet on the lower fan and floodplain of the San Joaquin River. The contact of the Patterson alluvium with the underlying San Luis Ranch alluvium is sometimes sharp but in other places is gradational.

Site Geology. The proposed PEC power plant site is underlain by alluvial fan deposits of Pleistocene to Holocene age informally named the Los Banos alluvium, San Luis Ranch alluvium, and Patterson alluvium, from oldest to youngest. This interpretation is supported by the presence of these units in the bluffs along Panoche Creek and their presence in boreholes drilled at the proposed PEC site. Each of these stratigraphic units is likely to be impacted by excavations for PEC construction.

5.8.2.5.2 Paleontological Resource Inventory. An inventory of the paleontologic resources of each stratigraphic unit likely to be impacted at the proposed PEC project site is presented below and the paleontological importance of these resources is assessed. The literature review and UCMP archival records search conducted for this inventory documented no previously recorded fossil sites within the very limited footprint of the actual project site. However, a number of fossil sites were documented as occurring in sediments of either the Los Banos alluvium or the San Luis Ranch alluvium in the project vicinity. In addition, fossil remains were found at several previously unrecorded fossil sites during the field survey of the proposed project site and vicinity conducted for this assessment. Some of these sites are documented in surveys of Quaternary land mammal fossils made by Stirton (1939, 1951), Hay (1927), Savage (1951), Lundelius et al. (1983), and Jefferson (1991b), or in surveys of Quaternary birds, reptiles, and amphibians made by Miller and DeMay (1953) and Jefferson (1991a).

***Los Banos Alluvium*.** Lettis (1982a, 1982b) reported bone and tooth fragments of a Pleistocene horse from the paleosol in the uppermost Los Banos alluvium and bone fragments of bison from the upper member. Beard and Laudon (1988) recorded “root pores” from a depth of 49 feet in a test hole drilled approximately 4.5 miles north of the proposed PEC site. At this depth these ichnofossils probably came from the Los Banos alluvium. Bull (1964b) reported “voids left by disintegration of entrapped vegetation” and “root cavities” in alluvial fan sediments of the Panoche Fan; however, the age of those sediments is in question. The UCMP lists only one fossil locality from western Fresno County recorded as being from the Riverbank Formation, (Los Banos alluvium). This locality, known as the Laguna Seca Ranch locality (UCMP V-81121), produced bones of a Rancholabrean-age horse.

Since vertebrate fossils have been previously reported from the Los Banos alluvium and since depositional conditions observed in exposures in the vicinity of the proposed project site appear to be favorable for the preservation of fossils, the Los Banos alluvium is judged to have high sensitivity. However, during a field survey of prospective fossiliferous sediments in the project vicinity, no fossils were found in the very limited exposures of sediments referred to the Los Banos alluvium along the bluffs of Panoche Creek. With this in mind, and since it is uncertain whether or not this formation will be impacted by project ground disturbance, there is a low probability of adverse impacts on paleontological resources in this strata.

***San Luis Ranch Alluvium*.** Lettis (1982a, 1982b) determined the age of San Luis Ranch alluvium to be between 60,000 and about 7,000 C^{14} years BP. Lettis reported bone fragments of a horse dated as 16,600 C^{14} years Before Present (BP) from the upper member of the San Luis Ranch alluvium. He also reported fossil wood with a radiocarbon date of 43,800 years and fossil roots with a radiocarbon date of 31,300 years. Beard and Laudon (1988) reported charcoalified wood from a depth of 5 feet in a test hole drilled approximately 4.5 miles north of the proposed PEC site. At this depth the fossil wood probably came from the upper member of the San Luis Ranch alluvium. Since it is possible that additional paleontological resources, including additional vertebrate fossils, could be found in sediments of this stratigraphic unit, this unit has high sensitivity for paleontological resources under the criteria established by SVP (1995).

During a field survey of prospective fossiliferous sediments in the project vicinity on June 8, 2006, fossil plant fragments were found, including charcoalified seeds, in interbedded silt and sandy silt in the bank of an irrigation pond approximately 3 miles north-northwest of the proposed PEC power plant site. The following day rodent bones and charcoalified wood were discovered in sediments at a locality in the bluffs of Panoche Creek approximately 1.85 miles northwest of the proposed PEC power plant site. The presence of these fossils indicates that scientifically important fossil specimens could be discovered from the San Luis Ranch alluvium during PEC project-related excavations.

***Patterson Alluvium*.** During the geological and paleontological literature review and museum archival records searches for this paleontological resource impact assessment, no previously recorded fossil sites in unnamed Holocene alluvium in western Fresno county were found. During a field survey of prospective fossiliferous sediments on June 8, 9, and 19, 2006, nothing suggested that the Patterson alluvium might be fossiliferous. Therefore, because the Patterson alluvium has not been known to produce fossils in the past, this stratigraphic unit is considered to have low sensitivity.

5.8.2.5.3 Summary. Although no fossils are known to directly underlie the proposed project site, the presence of previously reported fossils in both the Los Banos alluvium and San Luis Ranch alluvium elsewhere suggests that there is a possibility that additional similar fossil remains may be uncovered by excavations during project construction. Two previously unrecorded fossil localities in the vicinity of the proposed project site were found during the field survey conducted as part of this paleontological resource impact assessment. Additionally, depositional conditions in both the Los Banos alluvium and San Luis Ranch alluvium appear to be favorable for the preservation of fossils. Both these stratigraphic units are judged to have high sensitivity, and identifiable fossil remains recovered from these formations during PEC project construction could be scientifically important and significant. Because the Patterson alluvium has not been known to produce fossils in the past, this stratigraphic unit is judged to have low sensitivity.

Identifiable fossil remains recovered during PEC construction could represent new taxa or new fossil records for the area or for the State of California, represent either geographic or temporal range extensions, and make it possible to more accurately determine the age, paleoclimate, and depositional environment of the sediments from which they are recovered. Finally, fossil remains recovered during project construction could provide a more comprehensive documentation of the diversity of animal and plant life that once existed in western Fresno County, and could result in a more accurate reconstruction of the geologic and paleobiologic history of the San Joaquin Valley and adjacent foothills of the Coast Ranges.

5.8.3 Environmental Consequences

Potential impacts on paleontological resources resulting from construction of the proposed PEC can be divided into construction-related impacts and operation-related impacts. Construction-related impacts to paleontological resources primarily involve terrain modification (excavations and drainage diversion measures). Paleontologic resources, associated specimen data and corresponding geologic and geographic site data, and the fossil-bearing strata could be adversely affected by ground disturbance and earth moving associated with construction of the project. Direct impacts could result from vegetation clearing, grading of roads and the generating facility site, trenching for pipelines, augering for foundations for electrical towers or poles, and any other earth-moving activity that disturbs or buries previously-undisturbed fossiliferous sediments. The potential environmental effects from construction and operation of the project on paleontological resources are presented in the following subsections.

5.8.3.1 <u>Potential Impacts from Project Construction</u>

The proposed project site is located on fossiliferous Pleistocene and Holocene-age alluvial deposits informally named the Los Banos alluvium, San Luis Ranch alluvium, and Paterson alluvium. Excavations deeper than about four feet at the proposed PEC power plant site, such as those for foundations for turbines, trenching for the natural gas pipeline, the cooling-water supply pipeline, and electrical transmission line poles, have the potential to result in adverse impacts to significant paleontological resources. However, the construction of supporting facilities, such as temporary construction offices, laydown area, and parking areas, have very low potential to cause adverse impacts to significant paleontological resources, as they will involve ground disturbance only to the Patterson alluvium.

5.8.3.2 <u>Potential Impacts from Project Operation</u>

No impacts on paleontological resources are expected to occur from the continuing operation of the project or any of its related facilities.

5.8.4 Cumulative Impacts

If the project were to encounter paleontological finds during construction, the potential for cumulative impacts would exist. Mitigation measures would be implemented to recover such resources and reduce cumulative impacts to a level that is less than significant. The mitigation measures proposed in Section 5.8.5 would effectively recover the value to science of any significant fossils uncovered during project-related excavations.

5.8.5 Mitigation Measures

This section describes proposed mitigation measures that will be implemented to reduce potential adverse impacts to significant paleontological resources resulting from project construction. The proposed paleontological resource impact mitigation program would reduce, to an insignificant level, the direct, indirect, and cumulative adverse environmental impacts on paleontologic resources that could result from project construction. The mitigation measures proposed below for the project are consistent with CEC environmental guidelines (CEC, 2000) and with SVP standard guidelines for mitigating adverse construction-related impacts on paleontologic resources (SVP, 1995, 1996).

Prior to construction, a qualified paleontologist will be retained to both design a monitoring and mitigation program and implement the program during project-related earth-moving activities at the generating facility site, for deep boring for electrical transmission towers, and for construction of the water and natural gas pipelines, and for all other project-related ground disturbance. The paleontological resource monitoring and mitigation program will include construction monitoring; emergency discovery procedures; sampling and data recovery, if needed; museum storage of any specimen and data recovered; preconstruction coordination; and reporting. Prior to the start of construction, the paleontologist will conduct a field survey of exposures of sensitive stratigraphic units within the construction site that will be disturbed. Earth-moving construction activities will be monitored where this activity will disturb previously undisturbed sediment. Monitoring will not be conducted in areas where the ground has been previously disturbed or in areas where exposed sediment will be buried, but not otherwise disturbed.

Prior to the start of construction, construction personnel involved with earth-moving activities will be informed on the importance of the fossil record, on laws and regulations protecting fossils, on the appearance of fossils and the types of fossils likely to be seen during project construction, and on proper notification procedures should fossils be discovered. This worker training will be prepared and presented by a qualified paleontologist.

With a well designed and implemented paleontological resource monitoring and mitigation plan, project construction could actually result in beneficial effects on paleontological resources through the recovery of fossil remains that would not have been exposed without project construction and, therefore, would not have been available for study. The recovery of fossil remains as part of project construction could help answer important questions regarding the geographic distribution, stratigraphic position, and age of fossiliferous sediments in the project area.

5.8.6 Involved Agencies and Agency Contacts

There are no state or local agencies having specific jurisdiction over paleontological resources.

5.8.7 Laws, Ordinances, Regulations, and Standards

Paleontological resources are classified as non-renewable scientific resources and are protected by several federal and state statutes (California Office of State Historic Preservation Office, 1983; Marshall, 1976; Fisk and Spencer, 1994), most notably by the 1906 Federal Antiquities Act and other subsequent federal legislation and policies and by the State of California’s environmental regulations (CEQA, Section 15064.5). Professional standards for assessment and mitigation of adverse impacts on paleontological resources have been established by the SVP (1995, 1996). Design, construction, and operation of the proposed project, including ancillary facilities, will be conducted in accordance with laws, ordinances, regulations, and standards (LORS) applicable to paleontological resources.

Federal and state LORS applicable to paleontological resources are summarized in Table 5.8-1 and discussed briefly below, together with SVP professional standards.

TABLE 5.8-1
LORS APPLICABLE TO PALEONTOLOGICAL RESOURCES

Project LORS	Applicability	AFC Reference	Conformity
Antiquities Act of 1906	Protects paleontological resources on federal lands	Section 8.16.6	Yes
CEQA	Fossil remains may be encountered by earth-moving	Section 8.16.6	Yes
Public Resources Code Sections 5097.5/5097.9	Would apply only if some project land were acquired by the State of California	Section 8.16.6	Yes

5.8.7.1 Federal

Federal protection for significant paleontological resources would apply to the project if any construction or other related project impacts occurred on federally owned or managed lands. Federal legislative protection for paleontological resources stems from the Antiquities Act of 1906 (PL 59-209; 16 United States Code 431 *et seq.*; 34 Stat. 225), which calls for protection of historic landmarks, historic and prehistoric structures, and other objects of historic or scientific interest on federal land.

5.8.7.2 State

The CEC environmental review process under the Warren-Alquist Act is considered functionally equivalent to that of the California Environmental Quality Act (CEQA; Public Resources Code Sections 15000 et seq.) with respect to paleontological resources. Guidelines for the Implementation of CEQA, as amended March 29, 1999 (Title 14, Chapter 3, California Code of Regulations: 15000 *et seq*.) define procedures, types of activities, persons, and public agencies required to comply with CEQA, and include as one of the questions to be answered in the Environmental Checklist (Section 15023, Appendix G, Section XIV, Part a) the following: "*Will the proposed project disturb paleontological resources?*"

Other state requirements for paleontological resources management are in Public Resources Code Chapter 1.7, Section 5097.5, Archaeological, Paleontological, and Historical Sites. This statute specifies that state agencies may undertake surveys, excavations, or other operations as necessary on state lands to preserve or record paleontological resources and defines any unauthorized disturbance or removal of a fossil site or remains on public land as a misdemeanor. It would apply to the PEC project if the state or a state agency were to obtain ownership of project lands during the term of the project license or if construction of the project linear features (natural gas pipeline and/or water pipeline) were built on county- or state-owned lands, such as on highway rights-of-way (ROWs).

5.8.7.3 County LORS

Fresno County does not have mitigation requirements that specifically address potential adverse impacts to paleontological resources.

5.8.7.4 Professional Standards

The SVP, a national scientific organization of professional vertebrate paleontologists, has established standard guidelines (SVP, 1995, 1996) that outline acceptable professional practices in the conduct of paleontological resource assessments and surveys, monitoring and mitigation, data and fossil recovery, sampling procedures, and specimen preparation, identification, analysis, and curation. Most practicing professional paleontologists in the nation adhere closely to the SVP's assessment, mitigation, and monitoring requirements as specifically spelled out in its standard guidelines. Most California state regulatory agencies accept the SVP standard guidelines as a measure of professional practice.

5.8.8 Permits Required and Permit Schedule

No state or county agency requires a paleontological collecting permit to allow for the recovery of fossil remains discovered as a result of construction-related earth moving on state or private land in a project site.

5.8.9 References

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Adequacy Issue: Adequate _____ Inadequate _____

DATA ADEQUACY WORKSHEET

Revision No. 0 Date ____________

Technical Area: **Paleontological Resources** Project: PEC 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.	5.8.1, 5.8.2, 5.8.2.1, 5.8.2.2, 5.8.2.3, 5.8.2.4, 5.8.2.4.1, 5.8.2.5.1, 5.8.2.5.2, 5.8.3.1, 5.8.3.2, 5.8.4. 5.8.5 Appendix K		
Appendix B (g) (16) (A)	Identification of the physiographic province and a brief summary of the geologic setting, formations, and stratigraphy of the project area. The area may vary depending on the depositional history of the area.	5.8.2.4, 5.8.2.4.1 Appendix K		
Appendix B (g) (16) (B)	A discussion of the sensitivity of the project area described in subsection (g)(16)(A) and the presence and significance of any known paleontologic localities or other paleontologic resources within or adjacent to the project.	5.8.2.5.1, 5.8.2.5.2 Appendix K		
Appendix B (g) (16) (C)	A summary of all literature searches and field surveys used to provide information about paleontologic resources in the project area described in subsection (g)(16)(A). Identify the dates of the surveys, methods used in completing the surveys, and the names and qualifications of the individuals conducting the surveys.	5.8.2.5.1, 5.8.2.5.2, 5.8.2.5.3 Appendix K		
Appendix B (g) (16) (D)	Information on the specific location of known paleontologic resources, survey reports, locality records, and maps at a scale of 1:24,000, shall be included in a separate appendix to the Application and submitted to the Commission under a request for confidentiality, pursuant to Title 20, California Code of Regulations, § 2501 et seq.	Appendix L		

Adequacy Issue: Adequate ____ Inadequate ____ **DATA ADEQUACY WORKSHEET** Revision No. 0 Date ____

Technical Area: **Paleontological Resources** Project: PEC 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) (16) (E)	A discussion of any educational programs proposed to enhance awareness of potential impacts to paleontological resources by employees, measures proposed for mitigation of impacts to known paleontologic resources, and a set of contingency measures for mitigation of potential impacts to currently unknown paleontologic resources.	5.8.5		
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;	5.8.7 Table 5.8-1		
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.	5.8.6		
Appendix B (h) (2)	A discussion of the conformity of the project with the requirements listed in subsection (h)(1)(A).	5.8 7.2, 5.8.7.3, 5.8.7.4		
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.	5.8.6		
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.	5.8.8		

5.9 LAND USE

This section provides an assessment of land use issues and impacts for the Panoche Energy Center (PEC).

An evaluation of the PEC's conformance with local plans, land use regulations, and general land use compatibility is provided in this section. Land uses are described within 1 mile of the project site. There are no off site linear facilities proposed for this project so the analysis is limited to the 1-mile area around the plant site. Reasonably foreseeable future development within the affected area is discussed in Section 5.9.2.3, Cumulative Impacts.

Land uses in California are regulated using various methods of land use controls. Cities and counties in California are required by law to adopt a comprehensive, long-term General Plan for the physical development of their jurisdictional areas. These plans include a Land Use Element that establishes a pattern of appropriate land uses, as well as policies and guidelines for development of those uses. Local zoning ordinances, Specific Plans, and maps implement the Land Use Element of the General Plan. It is important to note that the Land Use Element reflects the ultimate pattern and that the zoning ordinances and zoning maps reflect current land use designations. Zoning designations may differ from land use designations. Building codes establish requirements for safe and sanitary structures. Subdivision controls and grading requirements regulate the design and improvement of subdivisions.

5.9.1 Affected Environment

The affected environment is defined by the California Energy Commission (CEC) based on the study area boundary. Fresno County has jurisdiction over all of the affected area within 1 mile of the plant site. The land use study area, along with major jurisdictional boundaries, is shown on Figure 5.9-1.

5.9.1.1 <u>Regional Setting</u>

The PEC is located in the unincorporated area west of Fresno County, within the northwestern section of the Westside Valley Area. The community of Mendota is located 16 miles to the east and northeast of the PEC and is the nearest city.

The existing land uses in the region include a majority of agricultural land, with land designated as rangeland approximately 3 miles to the west.

5.9.1.2 <u>Project Site and Vicinity</u>

The PEC is located southeast of the intersection of W. Panoche Road and Davidson Avenue, approximately 2 miles east of Interstate 5 and 14 miles west of Highway 33. The PEC site is located in the Southwest Quarter of Section 5 Township 15 South, Range 13 East, on the

USGS Quadrangle Map. The assessors parcel number (APN) is 027-060-78S. Primary access to the site is West Panoche Road via Interstate 5 or Hwy 33.

The plant will be constructed on a 12.8-acre site with an additional 8-acre laydown site. Ancillary improvements include a 300-foot transmission line from the existing substation to the plant site, a 2,400 linear foot gas pipeline and the paving of a 400-foot-long access road from West Panoche Road to the plant site. The plant site and laydown area is currently in agricultural production.

The PEC will be constructed adjacent to an existing Pacific Gas & Electric (PG&E) substation at 43711 W. Panoche Road, Firebaugh, California. The PEC is located within a 0.5 mile of a project by CalPeak Power, located within the PG&E parcel, and within 1 mile of a project by Wellhead Power, which is on the same parcel as the proposed PEC.

PG&E has determined the need to expand the Panoche Substation to interconnect to this project. The existing 230kV system is a double-bus, single breaker configuration and currently has 11 230kV line circuits without bus sectionalizing breakers. It is necessary to install a pair of bus sectionalizing breakers to split the busses into double-bus sections, add one bus parallel breaker, and one new gen-tie line breaker position. In so doing, other modifications are also required. Because there is limited land within the existing station, approximately 320 feet x 150 feet of land on the south side of the existing 230kV bus will be used. A lot line adjustment will be filed by PG&E to accommodate the footprint of the expansion. All substation expansion work will be performed by PG&E.

5.9.1.3 General Plan and Zoning Designation

The PEC as proposed is consistent with Fresno County’s General Plan and zoning designations for the site, with the approval of an unclassified Conditional Use Permit (CUP). The project site is designated Agriculture by the Land Use Element of the Fresno County General Plan. The existing zoning designation is AE-20, Exclusive Agriculture District. Energy production is an unclassified conditional use in the AE Zone district.

5.9.1.3.1 Conditional Use Permit Process. The Fresno County Zoning Ordinance requires a CUP for certain uses of land or types of businesses which are not allowed as matter of right. Four findings determine whether a CUP is permitted:

- That the site of the proposed use is adequate in size and shape to accommodate the use including all yards, spaces, walls, fences, parking, loading, landscaping, and other features required by the use
- That the site for the proposed use relates to streets and highways adequate in width and pavement type to carry the quantity and kind of traffic generated by the proposed use

- That the proposed use will have no adverse effect on abutting property and surrounding neighborhood or the permitted use thereof
- That the proposed use is consistent with the Fresno County General Plan

The site is not located within any additional Plan, Designation, or Overlay Districts and is not overseen by any other local governing or legislative body, except for Fresno County.

Existing land uses at the PEC site and the surrounding study area are shown in Table 5.9-1.

TABLE 5.9-1
PROJECT SITE AND SURROUNDING LAND USES
(WITHIN 1 MILE OF PROJECT SITE)

APN #	Zoning	Land Use	Owner	Owner Address
02706079S	AE-20	Agriculture	Barry S Baker Trustee	PO Box 867 Firebaugh CA 93622
02706077S	AE-20	Agriculture	Robert Hansen Trustee of Sharla Baker Trust	Panoche Farms PO Box 867 Firebaugh CA 93622
02706078S (Site)	AE-20	Agriculture/Power Generation-Wellhead	PAO Investments, LLC	45499 W Panoche Rd Firebaugh CA 93622
02706054S	AE-20	Agriculture	Gregory R. Pruett as operation Trustee	2800 W. March Lane #330 Stockton CA 95219
02706056S	AE-20	Residential/ Agriculture	Farmers International. Inc.	1260 Muir Ave Chico CA 95973
02706053S	AE-20	Residential	Vaquero Farms, Inc.	2800 W. March Lane #330 Stockton CA 95219
02706061SU	AE-20	Power Generation/Calpeak	Pacific Gas & Electric	San Francisco CA 94177

The site is adjacent to energy generation, residential, and agriculture uses. Land uses near the project include:

- North: Farming Structures, Residential Unit, W. American Avenue
- East: Agriculture uses, Farming Structures, Energy Production uses
- South: Agriculture uses, W. Lincoln Avenue
- West: Residential Units, Agriculture uses, and I-5

***Land Use Element*.** Agriculture is a primary land use designation categorized under the heading *Resource* in the Land Use Element of the Fresno County General Plan. The following is a list of the primary land use designations listed under *Resource.*

- **Agriculture.** This designation provides for the production of crops and livestock, and for location of necessary agriculture commercial centers, agricultural processing facilities, and certain nonagricultural activities.
- **Irrigated Agriculture.** This designation provides for the production of crops, necessary agricultural processing facilities, and certain nonagricultural activities. Irrigated agriculture requires a system that delivers at least one (1)-acre foot of water per acre per year.
- **Westside Rangeland.** This designation provides for grazing and other agricultural operations, mining, oil and gas development, wildlife habitat, various recreational activities, and other appropriate open space uses.
- **Eastside Rangeland.** This designation provides for grazing and other agricultural operations, wildlife habitat, various non-intensive recreational activities, and other appropriate open space uses.
- **Open Space.** This designation, which is applied to land or water areas that are essentially unimproved and planned to remain open in character, provides for the preservation of natural resources, the managed production of resources, parks and recreation, and the protection of the community from natural and manmade hazards.
- **Public Lands and Open Space.** This designation, which is applied to land or water areas that are essentially unimproved and planned to remain open in character, provides for the preservation of natural resources, the managed production of resources, parks and recreation, and the protection of the community from natural and manmade hazards.

The purpose of the Agriculture land use designation is to provide areas within Fresno County to facilitate the production of agriculture goods, services, and employment. In addition, the Agriculture land use designation allows the permitted use of certain oil and gas development activities pursuant to the policies in Section OS-C, Mineral Resources, of the Open Space and Conservation Element. It is the intent of the Land Use Element that agriculture sites be attractive, convenient, and safe, and that they be located so as to benefit both industry and the community.

***AE 20 Agricultural District*.** The PEC site is designated AE-20 pursuant to Chapter 2, Section 816 of the Zoning Ordinance Code of the County of Fresno. No additional zoning designations exist within 1 mile of the project site. The purpose of the Zoning Ordinance is to translate the broad land use categories established by the Fresno County General Plan into detailed land use classifications that are applied to property with much greater precision than the General Plan.

The AE-20, or Exclusive Agricultural District, is intended to be an exclusive district for agriculture and for those uses which are necessary and an integral part of agricultural operation. This district is intended to protect the general welfare of the agricultural community from encroachments of non-related agricultural uses, which by their nature would be injurious to the physical and economic well-being of the agricultural district. Typical uses prohibited in agricultural areas are residential subdivisions and industrial manufacturing uses which would conflict with agricultural operations.

The General Plan designation of Agriculture is low density (1 DU/20 acres). Land use policies of the General Plan relating to both Land Use, and Open Space and Conservation, are applicable to Agriculture Areas designation. In summary, the area surrounding the plant site in all four directions is predominantly in agricultural production. In the atypical instances where development does exist, the uses are either energy related, low density residential, or farming related structures.

Figure 5.9-2 presents the location of land uses with respect to the project area. The two residential use locations are within Map Reference 1 and Map Reference 2. Map Reference 3 highlights the location of West Panoche Road.

Section 5.4, Soils and Agricultural Resources, provides an assessment of the PEC effects on soil resources in the project area.

5.9.1.3.2 Site Control. The PEC site is owned by PAO Investments. The project is owned by Panoche Energy Center, LLC. The 12.8 acres of plant site will be leased to Panoche Energy Center, LLC. The tract of land that includes the PEC is 128 acres, with the 12.8 acre plant site and an adjacent 8 acres laydown area. A Williamson Act contract covers the 128-acre parcel.

The California Land Conservation Act (Williamson Act) was passed in 1965 to preserve agricultural and open space lands by discouraging premature and unnecessary conversion to urban uses. The Act creates an arrangement whereby private landowners contract with counties and cities to voluntarily restrict land to agricultural and open-space uses. The vehicle for these agreements is a rolling term 10-year contract (i.e., unless either party files a "notice of nonrenewal" the contract is automatically renewed annually for an additional year). In return, restricted parcels are assessed for property tax purposes at a rate consistent with their actual use, rather than potential market value.

While the Williamson Act requires cancellation for any development not agriculturally based, the Williamson Act allows electric power generation as a compatible use, as is stated in Williamson Act Section 51238 (below).

> 51238. (a) (1) Notwithstanding any determination of compatible uses by the county or city pursuant to this article, unless the board or council after notice and hearing makes a finding to the contrary, the erection, construction, alteration, or maintenance of gas,

electric, water, communication, or agricultural laborer housing facilities are hereby determined to be compatible uses within any agricultural preserve.

(2) No land occupied by gas, electric, water, communication, or agricultural laborer housing facilities shall be excluded from an agricultural preserve by reason of that use.

(b) The board of supervisors may impose conditions on lands or land uses to be placed within preserves to permit and encourage compatible uses in conformity with Section 51238.1, particularly public outdoor recreational uses.

5.9.1.4 Worker Parking and Equipment Laydown Locations

Material and equipment staging areas will be required during the construction period. Areas within the site boundary and the eight-acre laydown area immediately to the south of the site will serve as base stations for employees, field office locations, laydown areas, and storage of materials, equipment, and vehicles.

The laydown area is located directly south of the proposed 12.8 acre-power plant site. This laydown area will allow parking during construction and equipment and materials laydown, construction equipment parking, small fabrication areas, and office trailers. Figure 3.8-1 provides additional information on the equipment laydown area. The laydown area will revert back to agricultural use (pomegranate trees) upon completion of the construction phase, with the exception of a 0.8-acre storm water detention basin/pond.

5.9.1.5 Summary of Recent Actions of the Planning Department of Fresno County

According to Richard Perkins, Staff Analyst with Fresno County (June 19, 2006), zoning trends have remained constant since the adoption of the General Plan in 2000. Minor zoning adjustments have been approved that include individual properties, none of which are located in proximity of the project site.

A list of discretionary reviews performed within the past 5 years for Fresno County is included in Table 5.9-2.

5.9.2 Environmental Consequences

The following section discusses the potential effects of site preparation, construction, and operation on existing land uses and land use resources of the project area. Potential cumulative impacts are also discussed.

Other issues related to land use are addressed in Sections 5.2, 5.11, 5.12, 5.13, and 5.18 (Air Quality, Traffic, Noise, Visual Resources, Cumulative).

TABLE 5.9-2
DISCRETIONARY REVIEWS PERFORMED WITHIN THE PAST 5 YEARS
(5-MILE RADIUS: FRESNO COUNTY)

APN	Permit Type	Permit Name	Permit Number	Acceptance Date
02721039S	019	Variance	VA3803	11/8/2004
02706061SU	018	Conditional Use-Calpeak	CUP2976	3/22/2001
02706078S	018	Conditional Use-Wellhead	CU2971	2/16/2001
02719021S	018	Conditional Use	CU2778	6/7/2000
02719024S	018	Conditional Use	CU2778	6/7/2000
02719025S	018	Conditional Use	CU2778EXT	3/7/2002
02719027S	018	Conditional Use	CU3024	3/28/2002

Potential environmental consequences were analyzed for the study area within 1-mile of the proposed project site. Potential land use impacts relate to both the construction and operation of the PEC and any ancillary facilities.

5.9.2.1 Plant Facility

5.9.2.1.1 Site Preparation. Site preparation will involve the clearing of a portion of the existing pomegranate orchard. The land is relatively level, therefore, little earthwork and grading will be necessary. The 8-acre laydown area will be replanted with pomegranate trees once construction is complete. These impacts are temporary in nature and not considered significant.

5.9.2.1.2 Construction. Construction activities will include all work on the main site, installation and connection of offsite utilities, pipelines and transmission lines, improvements to the unpaved access road, improvements to the switchyard, and plant startup. Sequential activities for onsite and offsite work include: site preparation; foundation construction, erection of major equipment and structures; installation of piping, electrical systems, and control systems; and startup/testing.

PG&E will need to expand the Panoche Substation to interconnect to this project as described above in section 5.9.1.2. See Section 3.6.4 for additional detail on the needed expansion. Because there is limited land within the existing station, approximately 320 feet x 150 feet of land on the south side of the existing 230kV bus must be used for the expansion. This land is currently agricultural land. PG&E will apply to Fresno County to accomplish a lot line adjustment to incorporate the additional area as part of PG&E's Panoche Substation parcel. The area of land is approximately 1.1 acres and even with the lot line adjustment, the PEC parcel site will continue to be compliant with the 20 acre minimum parcel size.

Construction activities have the potential to create temporary impacts to local roadways along the access route. Construction activities may also create additional noise, dust, and emissions from grading equipment and other construction vehicles. Additional information on these issues is provided in Sections 5.2 and 5.12 (Air Quality and Noise).

Residences and businesses located near the project site may experience short-term impacts associated with facility construction, including visual disruption, dust, increased traffic, and project equipment and vehicle emissions (see Sections 5.2, Air Quality; 5.11, Traffic and Transportation; 5.12, Noise; and 5.13, Visual Resources). However, the temporary construction impacts have been determined not to be significant. The PEC will comply with applicable noise standards; however, it may be necessary to seek an administrative exception or an early work permit from the County because of the possibility of extended hours of construction for the PEC.

Overall, construction activities will result in short-term land use impacts. However, due to the compatibility with existing land uses (energy generation, transmission lines, a substation, and agriculture), the small traffic increase during project construction is considered less than significant.

5.9.2.1.3 Operations and Maintenance. There are no changes proposed to the land uses or zoning designations surrounding the area of the PEC. The existing character of the immediate area surrounding the project site will remain unchanged by the development of the project. The use of 12.8 acre plant site will change from agricultural production to power generation. Although 12.8 acres of Prime farmland will be converted to non-agricultural use, the remaining area of the parcel in agricultural use will continue in agricultural production.

Power generating facilities are a permitted use in the AE-20, Exclusive Agricultural District with an unclassified CUP. The project site has historically been used as an agricultural production site. The proposed use of the site as a power generating facility is consistent with the General Plan Land Use Element Designation of Agriculture. In addition, both the Wellhead Power Project and the Calpeak Power Project received approval from Fresno County for their CUP requests.

The plant layout is consistent with the Property Development Standards for the AE District. Section 816.5 of the Zoning Ordinance regulates building height to 35 feet with the exception of “non-dwelling structures and other accessory farm buildings.” The proposed stacks and cooling tower are non-dwelling structures and are exempt from the 35-foot height limitation.

Plant operation traffic impacts will be minimal. The facility will have up to 12 employees with 100 percent using West Panoche Road.

The site is an appropriate location for the PEC facility due to the designated land use and the close proximity of two other energy production sites.

There is no habitat conservation plan or natural community conservation plan within the PEC.

5.9.2.1.4 Abandonment/Closure. Planned permanent closure impacts will be incorporated into the facility closure plan and evaluated at the end of the generating station's operating life.

5.9.2.2 Worker Parking and Staging Areas

5.9.2.2.1 Site Preparation. Material and equipment staging areas required during the site preparation and construction period will utilize an adjacent 8-acre site. Land uses in the vicinity of the laydown area and parking areas will most likely experience temporary disturbances related to air quality, traffic, noise, and visual resources during the construction period. Impacts are not considered significant due to the temporary nature of the construction.

5.9.2.3 Cumulative Impacts

The assessment of cumulative impacts for this project includes a review of other projects where an application has been filed with Fresno County, as well as projects anticipated by the CEC. This project area and the surrounding area have not had any major development projects in the past 18 months, though three potential projects may be considered in the foreseeable future. Refer to Table 5.18-1 in Section 5.18, Cumulative Impacts, for information on these potential projects.

5.9.3 Mitigation Measures

The project will cause no significant adverse land use impacts and will not conflict with existing land use activities in the area. Therefore, no land use mitigation measures were identified.

5.9.4 Applicable Laws, Ordinances, Regulations and Standards

LORS related to land use and their applicability to the project are summarized in Table 5.9-3. The PEC will be constructed and operated in compliance with all applicable land use LORS, as discussed below.

5.9.4.1 Federal

There are no federal LORS related to the land use associated with the PEC.

TABLE 5.9-3
LORS AND COMPLANCE FOR LAND USE

Conformance (Section)	LORS	Jurisdiction	Applicability
Federal			
No federal LORS have been identified			
State			
5.9.5.2	California Public Resources Code *25523 (a); 20 CCR **1752, 1752.5, 2300-2309, and Chapter 2, Subchapter 5, Appendix B, Part (I) (3) and (4)	CEC	Evaluate compatibility of the proposed project with relevant land use plans
5.9.5.2	California State Planning Law, Government Code Section 65300 through 65302	Fresno County	Requires each city and county to adopt a comprehensive, general plan for the physical development of the county or city. Requirements identify contents of General Plan. Fresno County has adopted a General Plan. No project action is required
5.9.1.3.1, 5.9.5.2	California State Planning Law, Government Code Section 51200 through 51207 (Williamson Act)	Fresno County	Enables local governments to enter into contracts with private landowners to restrict specific parcels of land to agricultural or related open space use. Landowners receive property tax assessments much lower than normal because they are based upon farming and open space uses as opposed to full market value
Local			
5.9.1.3, 5.9.5.3	Fresno County General Plan	Fresno County Public Works & Planning Department	Comply with all applicable land use provisions
5.9.5.3	Fresno County Zoning Ordinance	Fresno County Public Works & Planning Department	Comply with applicable policies, development standards, and specific zoning requirements
5.9.5.3	Fresno County Municipal Code	Fresno County Public Works & Planning Department	Comply with all applicable County ordinances
5.9.5.3	Fresno County General Plan-2000 Land Use Element: Agriculture *Goals, Objectives, and Policies*, Policy LU-A.3	Fresno County Public Works & Planning Department	Allows, by use of a discretionary permit, certain non-agricultural uses including certain oil and gas development activities
5.9.5.3	Fresno County General Plan-2000 Land Use Element: Agriculture *Goals, Objectives, and Policies*, Policy LU-A.13	Fresno County Public Works & Planning Department	Ensure protection for agricultural operations from conflicts with nonagricultural uses by requiring buffers between proposed non-agricultural uses

TABLE 5.9-3 (CONTINUED)
LORS AND COMPLANCE FOR LAND USE

Conformance (Section)	LORS	Jurisdiction	Applicability
5.9.5.3	Fresno County General Plan-2000 Land Use Element: Open Space & Conservation: Minerals *Goals, Objectives, and Policies*, Policy OS-C.1	Fresno County Public Works & Planning Department	Incompatible land uses within the impact area of existing or potential surface mining areas not permitted
5.9.5.3	Fresno County General Plan-2000 Land Use Element: Open Space & Conservation: Minerals *Goals, Objectives, and Policies*, Policy OS-C.6	Fresno County Public Works & Planning Department	Ensures the Williamson Act is recognized and adhered to
5.9.5.3	Fresno County General Plan-2000 Land Use Element: Open Space & Conservation: Minerals *Goals, Objectives, and Policies*, Policy OS-C.10	Fresno County Public Works & Planning Department	Land uses that threaten the future availability of mineral resource or preclude future extraction of those resources not permitted
5.9.5.3	Fresno County General Plan-2000 Land Use Element: Open Space & Conservation: Oil & Gas *Goals, Objectives, and Policies*, Policy OS-C.12	Fresno County Public Works & Planning Department	Fresno County shall be divided into three areas for the regulation of oil and gas development
5.9.5.3	Fresno County General Plan-2000 Health Element: Noise *Goals, Objectives, and Policies*, Policy OS-C.1	Fresno County Public Works & Planning Department	Requires that all proposed development incorporate design elements necessary to minimize adverse noise impacts on surrounding land uses
5.9.5.3	Fresno County General Plan-2000 Health Element: Noise *Goals, Objectives, and Policies*, Policy OS-C.6	Fresno County Public Works & Planning Department	Regulates construction-related noise to reduce impacts on adjacent uses in accordance with the County's Noise Control Ordinance
5.9.5.3	Fresno County Zoning Ordinance Section 816	Fresno County Public Works & Planning Department	Defines "AE" Exclusive Agriculture District
5.9.5.3	Fresno County Zoning Ordinance Section 816.3	Fresno County Public Works & Planning Department	Defines uses subject to Conditional Use Permit in AE Zone
5.9.5.3	Fresno County Zoning Ordinance Section 816.5	Fresno County Public Works & Planning Department	Defines property development standards within AE Zone
5.9.5.3	Fresno County Zoning Ordinance Section 816.5A	Fresno County Public Works & Planning Department	Provides regulations for lot area

TABLE 5.9-3 (CONTINUED)
LORS AND COMPLANCE FOR LAND USE

Conformance (Section)	LORS	Jurisdiction	Applicability
5.9.5.3	Fresno County Zoning Ordinance Section 816.5B	Fresno County Public Works & Planning Department	Provides regulations for lot dimensions
5.9.5.3	Fresno County Zoning Ordinance Section 816.5C	Fresno County Public Works & Planning Department	Provides regulations for population density
5.9.5.3	Fresno County Zoning Ordinance Section 816.5D	Fresno County Public Works & Planning Department	Provides regulations for building height
5.9.5.3	Fresno County Zoning Ordinance Section 816.5E	Fresno County Public Works & Planning Department	Provides regulations for yards
5.9.5.3	Fresno County Zoning Ordinance Section 816.5F	Fresno County Public Works & Planning Department	Provides regulations for space between buildings
5.9.5.3	Fresno County Zoning Ordinance Section 816.5H	Fresno County Public Works & Planning Department	Provides regulations for fences, hedges, and walls
5.9.5.3	Fresno County Zoning Ordinance Section 816.6	Fresno County Public Works & Planning Department	Defines what permits are required in the AE Zone
5.9.5.3	Fresno County Zoning Ordinance Section 873	Fresno County Public Works & Planning Department	CUP process and authority
5.9.5.3	Fresno County Zoning Ordinance Section 873	Fresno County Public Works & Planning Department	Site plan review

5.9.4.2 State

5.9.4.2.1 California Public Resources Code *25523 (a); 20 CCR **1752, 1752.5, 2300-2309, and Chapter 2, Subchapter 5, Appendix B, Part (I) (3) and (4). These codes require that the applicant evaluate the compatibility of the proposed project with relevant land use plans. The administering agency for the above is the CEC. This requirement is met via Section 5.9.5.3, below.

5.9.4.2.2 California State Planning Law, Government Code Section 65300 through 65302. This code requires each planning agency to prepare and the legislative body of each county and city to adopt a comprehensive General Plan for the physical development of the county. The General Plan shall address seven mandatory elements including a land use element.

The administering agency for these state requirements is Fresno County. Conformance is discussed in Section 5.9.5.3.

5.9.4.2.3 California State Planning Law, Government Code Section 51200 through 51207 (Williamson Act). This act enables local governments to enter into contracts with private landowners to restrict specific parcels of land to agricultural or related open space use. Landowners receive property tax assessments much lower than normal because they are based upon farming and open space uses as opposed to full market value.

The administering agency for these state requirements is Fresno County.

5.9.4.3 Local

The Fresno County General Plan, adopted in 2000, reflects the values and contains the goals of the community with respect to development. The Plan is general in nature and provides a vision of the future. The General Plan contains an evaluation of existing conditions and provides long-term goals and policies to guide growth and development for the next 15 to 25 years. The General Plan is implemented by the County through its zoning, subdivision ordinances, specific plans, growth management policies, planned development districts, development agreements, development review, code enforcement, land use database, capital improvement programs, environmental review procedures, building and housing codes, and redevelopment plans. The site is designated an Agricultural use.

5.9.4.3.1 Land Use Policy Compatibility. The following General Plan land use policies apply to the plant site:

- Establishing within County government a framework for analyzing local and regional conditions and needs in order to respond effectively to the problems and opportunities facing Fresno County
- Identifying Fresno County's economic, environmental, and social goals
- Recording the County government's policies and standards for the maintenance and improvement of existing development and the location and characteristics of future development
- Providing Fresno County's citizens with information about their community and with opportunities to participate in the local planning and decision-making process
- Improving the coordination of community development and environmental protection activities among the County, cities, and regional, state, and federal agencies

- Establishing a basis for subsequent planning efforts, such as preparation and updating of community plans, specific plans, redevelopment plans, and special studies to deal with unique problems or areas in the community

5.9.4.3.2 <u>Agricultural Land Use Policies</u>. Applicable agricultural land use policies from Fresno County's General Plan Land Use Element include the following:

***<u>Policy LU-A.3</u>*.** The County may allow by discretionary permit in areas designated Agriculture, special agricultural uses and agriculturally related activities, including value-added processing facilities, and certain non-agricultural uses listed in Table LU-3. Approval of these and similar uses in areas designated Agriculture shall be subject to the following criteria:

- The use shall provide a needed service to the surrounding agricultural area which cannot be provided more efficiently within urban areas or which requires location in a non-urban area because of unusual site requirements or operational characteristics
- The use should not be sited on productive agricultural lands if less productive land is available in the vicinity
- The operational or physical characteristics of the use shall not have a detrimental impact on water resources or the use or management of surrounding properties within at least 0.25-mile radius

The PEC will provide necessary energy supplies to the area. The location of a power generation facility within an urban environment has the potential to impact sensitive receptors such as schools and hospitals in addition to greater land use conflicts with residences. Less productive agricultural lands were not available during the site selection investigation. The water resources in the PEC area will not be detrimentally impacted by the project since water use by the PEC will utilize low quality groundwater which is not a practical water source for the PEC area.

***<u>Policy LU-A.13</u>*.** The County shall protect agricultural operations from conflicts with nonagricultural uses by requiring buffers between proposed non-agricultural uses and adjacent agricultural operations.

The PEC will not preclude or negatively impact the continued agricultural use of the surrounding parcel as well as the surrounding area of agricultural operations. There are no expected conflicts between PEC's power generation and surrounding agricultural operations.

5.9.4.3.3 <u>Open Space and Conservation Policies</u>. Applicable open space and conservation land use policies from Fresno County's General Plan Open Space and Conservation Element include the following:

Minerals**.**

Policy OS-C.1**.** The County shall not permit incompatible land uses within the impact area of existing or potential surface mining areas.

Policy OS-C.6**.** The County shall accept Williamson Act contracts on land identified by the State of California as containing significant mineral deposits subject to the use and acreage limitations established by the County.

Policy OS-C.10**.** The County shall not permit land uses that threaten the future availability of mineral resources or preclude future extraction of those resources.

Oil and Gas**.**

Policy OS-C.12**.** Fresno County shall be divided into three areas for the regulation of oil and gas development.

- Urban areas including all land within 0.25 mile of the planned urban boundaries shown on adopted community plans.
- Established oil and gas fields as determined and updated by the California Division of Oil and Gas, excluding urban areas except where specifically included in these policies.
- Non-urban areas including all land not within either established oil and gas fields or urban areas. A non-urban area's designation shall be changed to an established oil and gas field designation upon:
    - Its identification by the Division of Oil and Gas as an oil and gas field
    - Subsequent approval by the County

The PEC is consistent with all of above described policies.

5.9.4.3.4 Noise Policies. Applicable noise land use policies from Fresno County's General Plan Health Element include the following:

Policy HS-G.1**.** The County shall require that all proposed development incorporate design elements necessary to minimize adverse noise impacts on surrounding land uses.

Policy HS-G.6**.** The County shall regulate construction-related noise to reduce impacts on adjacent uses in accordance with the County's Noise Control Ordinance.

The PEC has incorporated many design elements in order to minimize noise impacts to the surrounding area. Construction noise shall be minimized through the use of phasing of construction equipment. Construction noise impacts are expected to be insignificant.

<u>Policy PF-J.1</u> The County shall encourage the provision of adequate gas and electric, communications, and telecommunications service and facilities to serve existing and future needs of people in the unincorporated areas of the county.

<u>Policy PF-J.2</u> The County shall work with local gas and electric companies to design and locate appropriate expansion of gas and electric systems, while minimizing impacts to agriculture and minimizing noise, electromagnetic, visual and other impacts on existing and future residents.

The PEC is consistent with providing adequate electrical supplies. The PEC has a long term contract with PG&E to provide additional electric output from this facility to the public power grid. This project helps implement the above described policies. Impacts to the surrounding agricultural uses in the area of PEC are minimized by the location of the PEC near an existing substation and gas supplies. There are no off site linears required for the PEC thereby minimizing impacts to the area inclusive of visual, noise and electromagnetic.

5.9.4.3.5 <u>Fresno County Municipal Code</u>. This code includes the regulatory and penal ordinances as well as the administrative ordinances of Fresno County. A list of applicable Fresno County Municipal and Zoning Code Ordinances is included in Table 5.9-3.

5.9.4.3.6 <u>Conditional Use Permit (CUP) Process</u>. The Fresno County Zoning Ordinance requires a CUP for certain use of land or types of businesses that are not allowed as matter of right. Four findings determine the permitting of a CUP:

- That the site of the proposed use is adequate in size and shape to accommodate the use and all yards, spaces, walls, fences, parking, loading, landscaping, and other features required by use.

The site for the proposed use is adequate in size and shape to accommodate the use of the site as an electrical generation facility.

- That the site for the proposed use relates to streets and highways adequate in width and pavement type to carry the quantity and kind of traffic generated by proposed use.
- That the proposed use will have no adverse effect on abutting property and surrounding neighborhood or the permitted use thereof.
- That the proposed use is consistent with the Fresno County General Plan.

A URS Senior Transportation Engineer analyzed traffic impacts. Based on the very low ADT volume (762 to 1,057 daily trips) collected by Baymetrics on the first week of June 2006, it has been concluded that traffic will not be an issue even during project construction. Normal operations after construction will create even less traffic than that created during construction.

There are no long-term project buildout (Year 2020) scenarios; therefore, the approach has been modified accordingly to reflect the actual near-term conditions associated with the project.

***Traffic Analysis Scenarios*.**

- Existing Conditions (June 2006)
- Existing plus Peak Project Construction (June 2007)
- Existing Plus Plant Operations (January 2008)

It is not necessary to apply a growth factor to the other analysis years, as existing conditions would be largely identical to 2008 No Project conditions due to minimal growth in the area.

***Peak Construction Assumptions*.**

- Schedule (Tentative) => 16 months (January, 2008 to May, 2009)
- Peak Construction Traffic => 360 workers, 7 delivery trucks, 8 heavy vehicles
- Trip Distribution => 50 percent from South Interstate-5 and 50 percent from North Interstate-5 onto West Panoche Road

Plant Operations Assumptions

- Plant Operations Traffic => 6 Operators, 4 Maintenance Workers, 1 Plant Manger, 1 Secretary = 12 Total
- Trip Distribution => 100 percent from West Panoche Road

Given this analysis and with the planned improvements to the access road, the existing streets and highways will be more than adequate for this project. The traffic impacts are considered less than significant and the finding that the site for the proposed use relates to streets and highways adequate in width and pavement type to carry the quantity and kind of traffic generated by the proposed use.

- That the proposed use will have no adverse effect on abutting property and surrounding neighborhood or the permitted use thereof.
- That the proposed use is consistent with the Fresno County General Plan.

The proposed use, a natural gas plant/energy generator, will not have an adverse effect on the abutting property, as this property is also an energy generation facility operated by PG&E. The proposed use is self-contained and will not have any spillover affect or negative impacts on adjacent agriculture operations. The site is also located within 0.5 mile of a project by

CalPeak Power. Surrounding uses, listed in Table 5.9-1, will not be adversely affected by the construction and operation of the project, thus finding 3 can be made.

The proposed use is an approved use under the stipulations listed in Fresno County's General Plan, if both the Land Use and Open Space and Conservation Elements' policies are met and an Unclassified Conditional Land Use Permit is obtained. In addition, both PG&E, CalPeak Power, and Wellhead Power have set precedents for this type of use.

The proposed use is allowed under the stipulations listed in Fresno County's General Plan, if both the Land Use and Open Space and Conservation Elements' policies are met and an unclassified CUP is obtained. Thus, finding 4 can be made.

5.9.4.4 Involved Agencies and Agency Contacts

Agency contacts for agencies with jurisdiction to issue applicable permits and/or enforce LORS related Land Use regulations are provided in Table 5.9-4. A complete list of applicable Fresno County Municipal and Zoning Code Ordinances are included in Table 5.9-3.

TABLE 5.9-4
AGENCY CONTACTS

Agency	Contact	Title	Telephone
Fresno County, Department of Public Works and Planning	Richard Perkins	Planner & Resource Analyst	559.262.4100

5.9.4.5 Fresno County Permits and Approvals Required

The following permits and approvals are required from Fresno County:

- A building permit and certificate of occupancy would be required prior to commencement of construction proposed for the PEC. The 2001 California Building Standards Code has been adopted by the County of Fresno through Ord. 03-001 § 1 (part): Ord. 01-016 (part). The PEC would submit the building permit application and plan check fees prior to issuance of building permits. Building permits are non-discretionary and require approximately three weeks to obtain. The certificate of occupancy would be issued after construction is complete and is also a non-discretionary permit.
- The use of the site as a power generation facility would necessitate an unclassified CUP. The findings required for approval are described in Section 5.9.4.3.6 of this document. These findings were made for both the Calpeak and Wellhead generating facilities. Based on the assessment in this section the findings can be made for the PEC.

- The substation expansion will require approval of a lot line adjustment by Fresno County. This lot line adjustment will be obtained by PG&E. The Subdivision Map Act specifically excludes lot line adjustments as described in Section 66412.Map Act Exclusions (d) and Fresno County does not have requirements identified in the Fresno County Ordinance Code or the Zoning Code. An application does exist and can be processed, however.

Table 5.9-5 lists the permits required.

TABLE 5.9-5
PERMITS REQUIRED

Issuing Agency	Section	Type of Permit
Fresno County	15.08	Building Permit
Fresno County	15.28	Grading
Fresno County	853	Conditional Use Permit

5.9.5 References

California Energy Commission. 2000a. Improvements to the Energy Commission's Energy Facility Licensing Process. March.

2000b. Energy Facility Licensing Process: Developer's Guide of Practices and Procedures. Staff Report/Draft. December 7.

Casil, N. 2006. URS Corporation. Email correspondence with Eric VonBerg (URS Corporation).

Fresno County. 2000. General Plan.

The Ordinance Code of Fresno County Chapters 1, 2, 3, and 4.

Perkins, R. 2006. Fresno County Department of Public Works and Planning. Personal communication with J. Schneider (URS Corporation).

Adequacy Issue: Adequate ____ Inadequate ____ **DATA ADEQUACY WORKSHEET** Revision No. 1 Date ____

Technical Area: **Land Use** 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.	5.9.1.2 5.9.2.1 5.9.2.3	Yes	
Appendix B (g) (3) (A)	A discussion of existing land uses and current zoning at the site, land uses and land use patterns within one mile of the proposed site and within one-quarter mile of any project-related linear facilities. Include:	5.9.1.3 5.9.1.3.1	Yes	
Appendix B (g) (3) (A) (i)	An identification of residential, commercial, industrial, recreational, scenic, agricultural, natural resource protection, natural resource extraction, educational, religious, cultural, and historic areas, and any other area of unique land uses;	5.9.1.3.1	Yes	
Appendix B (g) (3) (A) (ii)	A discussion of any trends in recent zoning changes and potential future land use development;	5.9.1.5	Yes	
Appendix B (g) (3) (A) (iii)	Identification of all discretionary reviews by public agencies initiated or completed within 18 months prior to filing the application for those changes or developments identified in subsection (g)(3)(A)(ii); and	5.9.1.5	Yes	
Appendix B (g) (3) (A) iv)	Legible maps of the areas identified in subsection (g)(3)(A) potentially affected by the project, on which existing land uses, jurisdictional boundaries, general plan designations, specific plan designations, and zoning have been clearly delineated.	5.9-(1,2,3,4)	Yes	

Adequacy Issue: Adequate ____ Inadequate ____

DATA ADEQUACY WORKSHEET

Revision No. 1 Date ____

Technical Area: **Land Use** 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) (3) (B)	A discussion of the compatibility of the proposed facilities with present and expected land uses, and conformity with any long-range land use plans adopted by any federal, state, regional, or local planning agency. The discussion shall identify the need, if any, for variances or any measures that would be necessary to make the proposal conform with permitted land uses	5.9.1.3 5.9.2 5.9.5.3		
Appendix B (g) (15) (B)	A map at a scale of 1:24,000 and written description of agricultural land uses found within all areas affected by the proposed project. The description shall include:	5.9-1		
Appendix B (g) (15) (B) (i)	Crop types, irrigation systems, and any special cultivation practices; and	5.9.1.3.1		
Appendix B (g) (15) (B) (ii)	Whether farmland affected by the project is prime, of statewide importance, or unique as defined by the Natural Resource Conservation Service of the California Department of Conservation.	5.9.1.3.1		
Appendix B (g) (15) (C)	An assessment of the effects of the proposed project on soil resources and agricultural land uses. This decision shall include:			
Appendix B (g) (15) (C) (ii)	Direct and indirect effects on agricultural land uses; and	5.9.1.2 5.9.1.3 5.9.1.3.1 5.9.1.4 5.9.2 5.9.2.1 5.9.2.2		
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;	5.9.4		

Adequacy Issue: Adequate ____ Inadequate ____ **DATA ADEQUACY WORKSHEET** Revision No. 1 Date ____

Technical Area: **Land Use** 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) (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.	5.9.4.4 5.9.4.5		
Appendix B (h) (2)	A discussion of the conformity of the project with the requirements listed in subsection (h)(1)(A).	5.9.4.3		
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.	5.9.4.4		
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.			

5.10 SOCIOECONOMICS

The socioeconomic section describes the potential impact to the social and economic structure within the project vicinity and region resulting from the Panoche Energy Center (PEC) construction and operation. This discussion considers issues in project-related impacts to population, housing, public services (fire protection, emergency response services, law enforcement, schools, and medical services) and utilities, county tax revenue, and economic benefits from the project. Additionally, this section includes the cumulative impacts on the availability of labor within the area. Permits required for the project, proposed mitigation measures, laws, ordinances, regulations, and standards (LORS), and agency contacts relevant to socioeconomics are also discussed in this section.

The project consists of several components, including a generating facility, an electrical transmission line extending for approximately 300 feet to the Pacific Gas and Electric Company (PG&E) Panoche Substation, and offsite facilities (Panoche Substation expansion, fuel gas line, storm water infiltration basin, and access road).

5.10.1 Methodology

The criteria used in determining whether project-related socioeconomic impacts would be significant are presented in the California Environmental Quality Act (CEQA) Guidelines, Appendix G. Impacts attributable to the project are considered significant if they would:

- Induce substantial growth or reduction of population
- Induce substantial increase in demand for public services and utilities
- Displace a large number of people or existing housing
- Disrupt or divide the physical arrangement of an established community
- Result in substantial long-term disruptions to businesses

The specific methodology used to analyze the environmental justice aspects of the project is detailed in legislation and guidelines discussed in Section 5.10.4. If project-related impacts were significant, other indirect socioeconomic impacts could occur, such as changes in community interaction patterns, social organizations, social structures, or social institutions, and conflicts with community attitudes, values, or perceptions. This analysis will assess the potential occurrence and significance of socioeconomic impacts for the construction and operation of the PEC.

5.10.2 Study Area

The proposed project includes the construction and operation of a generating facility on West Panoche Road, approximately 2.2 miles east of Interstate 5, in the unincorporated northwest portion of Fresno County (refer to Figure 5.10-1). Fresno County is large, occupying about 6,000 square miles, and is roughly bordered on the west by San Benito and Monterey Counties, on the north by Merced and Madera Counties, on the east by Mono and Inyo Counties, and on the south by Tulare and Kings Counties. Fresno County is located in California's Central Valley, which is about 400 miles long, typically 40-60 miles wide, and covers a span of about 42,000 square miles. The Central Valley contains all or part of 18 counties, with a total of over five million people. These statistics amount to roughly 17 percent of California's population spread across over 40 percent of the land area.

The socioeconomic study area for this project includes the unincorporated area of Fresno County within the project vicinity, the nearby towns of Mendota and Firebaugh, and Fresno County as a whole. The environmental justice analysis evaluates the demographics and poverty for the population located within a 6-mile radius of the site.

5.10.2.1 Economic Base and Employment

The predominant industry in Fresno County and the surrounding regions of the Central Valley is agriculture. As a result of its seasonal orientation, economies in the Central Valley that rely heavily on agriculture are typically characterized by higher rates of poverty, lower median household incomes, and unusually high unemployment rates, compared with California's average.

While the general unemployment trend has improved in the last ten years, like much of the Central Valley, Fresno County historically and currently has higher unemployment rates compared to the state, as shown in Table 5.10-1. However, because of Fresno County's comparative market diversity, the county also serves as the financial, trade, commercial, and educational center for the Central Valley.

Fresno County's relative employment by industry is shown in Table 5.10-2. The top industries by percentage employment are government, trade, transportation and utilities, and agriculture. The non-farm industries are expected to grow nearly 2 percent annually between 2002 and 2012. This growth will add almost 58,000 new jobs and bring non-farm employment from 296,184 in 2006, to an estimated 369,400 people by 2012. Industries forecasted to grow faster than the region's annual rate include construction, which has shown the highest growth rate in the past 10 years, professional and business services, and education and health services (EDD, 2006).

According to the U.S. Census Bureau, the median household income in 2003 was $35,952, compared to a state average of $48,440. The percentage of the population earning below the poverty threshold was 20.6 percent, versus California's average of 13.8 percent (U.S. Census Bureau, 2006).

TABLE 5.10-1
UNEMPLOYMENT PERCENTAGE, FRESNO COUNTY AND CALIFORNIA

Region	1990	1995	2000	2006
California	5.8	7.9	5.0	4.6
Fresno County	11.7	14.1	10.4	7.9

Source: State of California Employment Development Department, Labor Market Information Division, 2006.

TABLE 5.10-2
FRESNO COUNTY EMPLOYMENT BY INDUSTRY
ANNUAL, BY PERCENTAGE

Industry	1990	1995	2000	2006
Agriculture	19.0	19.3	17.0	14.0
Construction	5.4	3.9	4.6	6.5
Education and Health Services	8.7	9.4	9.4	10.7
Financial Activities	4.6	4.3	4.1	4.2
Government	18.3	19.1	20.0	20.1
Information	1.6	1.5	1.5	1.3
Leisure and Hospitality	6.3	6.8	7.5	7.4
Manufacturing	8.8	8.2	8.5	7.5
Natural Resources and Mining	0.3	0.2	0.1	0.1
Professional and Business Services	6.1	7.2	7.8	8.3
Trade, Transportation, and Utilities	17.7	17.0	16.3	16.2
Other Services	3.3	3.3	3.2	3.2
Total Number of Positions	277,100	301,800	326,200	344,400

Source: State of California, Employment Development Department, Labor Market Information Division, Fresno MSA, May 2006.

The PEC site is located in an unincorporated region of Fresno County, in an area of low population. In 2000, 608 people inhabited the area within a six-mile radius of the project site, while between 50 to 100 people inhabited the specific census block in which the project site is located (Figure 5.10-1). The primary industry in the area surrounding the project site is agriculture, as shown on Figure 5.4-1 (Agriculture and Soils). Figure 5.10-3 shows the percentage of the population in poverty within a six-mile radius from the project site, while Figure 5.10-4 shows the pervasiveness of poverty within the county.

5.10.2.2 Employment During Construction

According to the Electric Power Research Institute (EPRI)'s report entitled, "*Socioeconomic Impacts of Power Plants*," construction workers will commute as much as two hours to construction sites from their homes, rather than relocate. Consultation with the Building and

Construction Trades Council of Fresno, Madera, Tulare, and Kings County confirms that Fresno County has a large available workforce. Additionally, the Council has reviewed the estimated labor demands (Table 5.10-3), and based on current and historical labor and employment trends, is confident that the supply of workforce within a commuting distance is available for the project needs (Hutson, 2006). Note that construction begins once site preparation (clearing and grubbing) is complete. Site preparation will require a maximum of 10 workers over a period of two months, and is not expected to cause a significant impact to the local employment. The Council will first draw upon a labor pool within Fresno County. In the event that additional workers are required, for instance during the period of the project's peak worker demand, the Council will refer workers within the daily commute distance from the nearby Madera and Merced counties (Hutson, 2006). Given the county's strong growth in the construction industry and the availability of workers, it is expected that the project will not encounter difficulties finding an available labor force within the daily commute distance to supply the work force associated with construction of the proposed project.

The PEC will provide about $27 million (in 2005 dollars) in construction payroll at an average salary of $65 per hour, including benefits.

5.10.2.3 Employment During Operation

Permanent employees will commute as much as one hour to their workplace (*Socioeconomic Impacts of Power Plants*, EPRI). To the extent possible, the employees will be hired locally from the community. Potentially, the PEC can provide 12 employment positions during operations (shown in Table 5.10-4). It is expected that the project will not encounter significant employee relocation effects during operation.

The average salary per employee is expected to be $85,000 per year, including benefits. Combined, the annual operation payroll will be approximately $ 1,000,000 for the facility.

5.10.3 Population and Housing

5.10.3.1 Fresno County Population

Fresno County has undergone overall population growth since the 1980s. According to studies, Fresno County had a total population of 865,620 in 2004, which reflects an approximate 1.1 percent increase from 799,407 in 2000. The majority of the growth takes place in the urbanized cities of Fresno and Clovis.

5.10.3.2 Project Vicinity

Fresno County's unincorporated regions typically encounter a slower and more intermittent growth compared with Fresno's metropolitan areas and small cities. As shown on Figure

TABLE 5.10-3
LABOR PERSONNEL REQUIREMENTS BY MONTH

	Months After Commencement of Site Work																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
Discipline	Construction Phase													Commissioning Phase			Total
Insulation Workers	--	--	--	--	--	--	--	12	12	12	25	6	4	--	--	--	71
Boilermakers	--	--	--	--	--	21	21	21	21	21	21	17	16	16	--	--	175
Carpenters/Cement Finishers	2	6	10	16	19	16	19	22	29	22	12	6	6	3	2	--	190
Electricians	2	4	6	8	10	12	22	42	51	55	57	64	25	15	7	7	387
Ironworkers	--	4	7	46	43	46	46	43	37	33	29	26	12	4	--	--	376
Laborers	4	5	6	17	23	47	47	47	47	23	11	6	6	5	3	3	300
Millwrights	--	--	--	10	12	20	42	62	62	62	45	13	13	2	1	1	345
Operating Engineers	2	4	10	10	10	19	19	16	13	6	2	2	2	1	1	--	117
Painters	--	--	--	--	--	6	13	13	13	6	6	3	3	3	--	--	66
Pipe fitters	--	--	--	4	9	13	13	24	58	17	9	6	3	2	--	--	158
Sheet metal workers	--	--	--	--	--	4	9	11	13	11	11	11	3	2	--	--	75
Surveyors	3	7	7	4	4	3	3	3	--	--	--	--	--	--	--	--	34
Teamsters	1	4	8	10	16	9	9	8	8	8	4	3	2	2	2	--	94
Commissioning Group	--	--	--	--	--	--	--	--	--	--	3	4	4	5	5	5	26
Total Workforce	14	34	54	125	146	216	263	324	364	276	235	167	99	60	21	16	2,414

TABLE 5.10-4
PEC ESTIMATED STAFF DURING OPERATIONS

Department	Position	Number of Employees	Shift	Workdays
Operations	Operating Technicians	6	Two 2-person shifts per day; OT as required	7 days per week
Maintenance	Maintenance Technician	4	Standard 8-hour day	5 days per week
Management	Secretary	1	Standard 8-hour day	5 days per week
	Plant Manager	1	Standard 8-hour day	5 days per week

5.10-1, the population within the project vicinity (6-mile radius) is relatively sparse, with 676 inhabitants in 1990, and 608 inhabitants in 2000. In general, populations in the unincorporated areas fluctuate according to the amount of employment available in the region. Table 5.10-5 summarizes historical and projected populations of the cities in the vicinity of the project, relative to Fresno County and the state.

TABLE 5.10-5
HISTORICAL AND PROJECTED POPULATIONS

Area	1980	1990	2000	2004	2010	2020
California[1]	23,667,764	29,760,021	33,871,648	35,893,799	38,067,134	42,206,743
Fresno County[1]	514,621	673,608	799,407	865,620	1,001,600	1,240,427
Mendota[2]	5,075	6,875	8,081	9,310 (2005)	10,676	13,506
Firebaugh[2]	3,740	4,200	5,917	6,046 (2005)	6,190	6,487
Project Vicinity[3]	Not Available	676	608	Not Available	Not Available	Not Available

Sources:

1 U.S. Census Bureau, Department of Finance, and Bureau of Economic Analysis

2 Council of Fresno County Governments

3 Population within a six-mile radius of the project site

5.10.3.3 Population During Construction Phase

Estimated labor personnel requirements during the construction and commissioning phases of the project are shown in Table 5.10-3. Note that construction begins once site preparation (clearing and grubbing) is complete. Site preparation will require a maximum of 10 workers over a period of two months, and is not expected to cause a significant impact to the population. As mentioned in Section 5.10.2.2, labor workers within a commuting distance to the project site will be available to supply the workforce needed for the construction. It has been assumed for this analysis that manual labor staff would be comprised of local workers and contractor staff would be non-local workers temporarily working in the area. This analysis assumes that during an average work week, non-local workers will lodge in local hotels and motels, and then return home for the weekend. Local workers for the project are expected to commute to the project, rather than relocate. In this way, the project is not expected to significantly impact the population in the study area during construction.

5.10.3.4 Project Impacts to Population During Operations

As shown in Table 5.10-4, the project will require approximately 12 full-time employees during operations. Operation workers will commute as much as one hour to the facility site from their homes. It is anticipated that these employees would be hired from within Fresno County and would commute, rather than relocate. The operational impact of the PEC on the population in the study area is not expected to be significant.

5.10.3.5 Housing

As of 2000, there were approximately 270,767 housing units in Fresno County, 1,618 units in the City of Firebaugh, and 1,919 units in the City of Mendota (U.S. Census Bureau, 2000 Census). These totals include single-family, multi-family, and mobile home residences. In 2000, the average vacancy rate in Fresno County was 6.6 percent (*California Statistical Abstract, 2000)*.

As of July 2006, there are four hotel and motel lodgings, with approximately 150 rooms, in Mendota and Firebaugh. Specific occupancy rates were not available; however, Fresno is within commuting distance to the project (approximately 50 miles from the project site), where there are about 400 hotel and motel lodgings, with a total of over 5,000 rooms.

In consideration of the available local workforce and the number of non-local contractor workers, the project does not anticipate significant impacts to the housing in the project vicinity during project construction. Additionally, since the project expects to hire as many local workers to operate the facility as possible, the project concludes that the impact to local housing will also be insignificant.

5.10.4 Environmental Justice

In response to Executive Orders 12250 and 12898, the CEC is required to consider environmental justice claims in the siting process. President Carter signed Executive Order 12250 in 1980, which directed federal agencies to adopt “disparate impact” regulations. “Disparate impacts” may be claimed if a minority community can demonstrate unique, different, and negative effects on their population, as a result of the actions of a state’s permitting agency (Scoll, 2003).

Executive Order 12898 directs each federal agency and state agencies such as the CEC, which receive federal assistance to "make environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high or adverse human health effects of its programs, policies, and activities on minority populations and low-income populations…" In this respect, the CEC considers a "high and adverse" environmental or health effect disproportionately falling upon a minority or low-income population in its analysis of environmental justice.

The U.S. Environmental Protection Agency (USEPA)'s published guideline for addressing environmental justice concerns, *Guidance for Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analyses* (1998), emphasizes the importance of selecting an analytical approach that is appropriate to the unique circumstances of the community potentially affected by a proposed project. The guidance also encourages the analyst to apply best judgment when drawing conclusions on whether the project may affect a low-income community disproportionately.

5.10.4.1 Environmental Consequences

5.10.4.1.1 Air Quality. As evaluated in detail in Section 5.2, Air Quality, of this AFC, the project will not emit significant emissions of criteria pollutants that could lead to health effects in the project vicinity. Also, the project will not result in significant emission of toxic air contaminants that could increase the ambient cancer risk or result in non-cancer health effects above established thresholds (Section 5.16, Public Health and Safety).

5.10.4.1.2 Water Quality. The project will not involve wastewater discharges that could affect drinking water supplies (Section 5.5, Water Resources).

5.10.4.1.3 Noise. The PEC will be designed to include noise mitigation measures such that there will be no significant noise or health impacts due to the project. These mitigation measures are discussed in Section 5.12, Noise.

5.10.4.1.4 Electromagnetic Field (EMF) Effects. The project includes construction of a 300 feet transmission line. The line is constructed to mitigate field effects, and will result in no significant impact to sensitive receptors (Section 3.0, Project Description and Location).

5.10.4.2 Environmental Justice Screening Analysis

The environmental justice screening analysis assesses whether "the potentially affected community includes minority and/or low income populations." A minority and/or low income population exists when the minority population exceeds 50 percent of the affected area's total population. Additionally, the screening analysis includes comparing the characteristics of the population residing near the proposed project versus the population located within the county area surrounding the proposed project.

The population within the project area is 608, as shown on Figure 5.10-2 and in Table 5.10-5. Of these inhabitants, 591 were found to be of Hispanic or Latino descent, as shown on Figure 5.10-3. Compared to Fresno County, which is 44 percent Hispanic or Latino (U.S. Census, 2000), the project area has 97 percent Hispanic or Latino population. It should be noted however, that the high percentage of Hispanic or Latino inhabitants in the project vicinity applies to a population of low density that is distributed over a large area. Of the 608 inhabitants within a six-mile radius of the project site, between twenty-five to forty-nine percent live below poverty levels (Figure 5.10-3). The Fresno County poverty projection (Figure 5.10-4) shows that the project area is part of a large region with twenty-five to forty-nine percent poverty levels.

The environmental justice screening process analyzes the project effects for a “high and adverse” environmental or health effect falling disproportionately upon a minority or low-income population. The PEC site occurs in a large unincorporated region of Fresno County uniform in its population density and poverty levels. The area within a six-mile radius of the project site exhibits very low population density, and has income levels consistent with the surrounding region, as shown in Figure 5.10-4. The analysis for environmental or health effects (Section 5.10.4.1) has determined that the PEC will result in no significant environmental consequences. In this way, because no significant environmental consequence results from the project, no disproportionate impact can be identified. Accordingly, no environmental justice issues arise with respect to the PEC.

5.10.5 Public Services and Utilities

5.10.5.1 Fire Protection and Emergency Response

The project site is served by the Fresno County Fire Protection District (FCFPD). The FCFPD protects 2,566 square miles, and consists of 13 permanently staffed stations and 8 stations staffed with Paid Call Firefighters (PCFs). Each permanently staffed station serves an area of approximately 170 square miles.

The PEC is within the service area of Station Number 96, in Mendota. Station 96 is located approximately 16 miles northeast of the project site. Station 96 typically has at least three full-time firefighter staff on duty, 24 hours a day. In addition to firefighting, all firefighters are trained EMTs, hazardous materials (hazmat) responders, and certified to perform confined space rescue. The fire response time to the project site is estimated to approximately 15-20 minutes. Station 96 routinely dispatches units from adjoining fire stations. In the event that additional resources are needed at the PEC site, the fire stations at Tranquility, Huron, Harris Ranch, and Caruthers will be available for support.

During facility operations, fire protection will be provided at the facility through a firewater supply and pumping system described in Section 3.4.11 (Fire Protection System).

5.10.5.2 Medical Facilities

Fresno County contracts paramedic services to a private emergency medical service (EMS) provider, American Ambulance. American Ambulance provides basic and advanced life support services, and has at least a paramedic and EMT unit available at all times. The project site is covered under the Mendota station, which is located approximately 16 miles from the site. Once a unit is dispatched, American Ambulance follows an automatic protocol to supply additional units from neighboring stations in Kerman and Los Banos, in order to provide for continuous coverage for all areas. Services are sufficient to respond to emergencies at the project site within an appropriate response time (Escobebo, 2006).

Additionally, American Ambulance is partnered with Skylife, which provides rapid air transportation for the critically injured trauma and medical patient. The helicopter is based at Fresno Yosemite International Airport in Fresno, and is staffed 24 hours/day with a flight nurse, flight paramedic, and EMS pilot.

During the facility construction and operation, American Ambulance and Skylife will transport injured personnel to the Fresno University Trauma Center (City of Fresno), Coalinga Regional Memorial Hospital, Memorial Hospital Los Banos, or Dos Palos Memorial Hospital, depending on the type of injury. Additionally, first aid kits and fire extinguishers will be located throughout the construction areas, and foremen and supervisors will be trained in first aid. First-aid trained safety personnel will comprise part of the construction staff. During project operation, the facility will implement proper worker safety programs to minimize potential unsafe work conditions (Section 5.17).

5.10.5.3 Law Enforcement

The Fresno County Sheriff’s Department provides patrol services for over 6,000 square miles. The department services four patrol areas, each commanded by a substation located in each of the areas. The PEC is located within Area 1, which covers over 2,400 square miles within western Fresno County, and is one of two patrol areas in the Southwest Field Services Bureau. The Area 1 station is located in the City of San Joaquin, and currently has 1 lieutenant, 7 sergeants, 1 office assistant, 4 community service officers, and 34 deputy sheriffs. At any time, at least three personnel are on staff at the station, and at least five or six cars are on patrol.

The sheriff’s department’s air support unit supports ground-based units engaged in all facets of law enforcement activities. The air support unit may provide air support to other law enforcement agencies in the scope of mutual aid during life threatening, emergency situations.

Consultation with the Area 1 station confirms that law enforcement will be able to respond accordingly to emergency situations without a negative impact to the sheriff’s services to the community (Barramond, 2006). Additionally, the project will take steps during construction to minimize the potential for law enforcement, including the installation of secured fencing around the entire project site (including laydown area) with controlled access, and 24-hour onsite security guards. During operation, the facility will have permanent fencing, and installation of electronic sensor and alarm system.

5.10.5.4 Schools

Data from the school districts within the vicinity of the project is compiled in Table 5.10-6. The project site is located within the Mendota Unified School District, and the Firebaugh Unified School District is nearby. Because a sufficient labor pool exists within the commuting distance of the project, it is anticipated that construction and operation workers will commute to the project site rather than relocate. No impacts to schools are expected from the project construction.

TABLE 5.10-6
SCHOOL DISTRICT ENROLLMENT INFORMATION, 2004-2005

School District	Schools Affected	Enrollment
Mendota School District	Washington Elementary	665
	McCabe Elementary	782
	McCabe Junior High	317
	Mendota High School	591
Firebaugh School District	Hazel M. Bailey Elementary	725
	Arthur E. Mills Intermediate	356
	Firebaugh Middle School	629
	Firebaugh High School	724

Source: Fresno County Department of Education, 2006.

Based on the report issued by the Fresno County School District, *The School District Organization in Fresno County* (January, 2006), the Mendota Unified School District is currently at capacity; however, the district has pre-existing plans to grow and add a middle school by 2009 (Alcaide, 2006). The Firebaugh-Las Deltas School District is currently experiencing low enrollment, based on enrollment trends in the past years.

Up to 12 permanent employees will staff the facility during operations. It is expected that either the Mendota or the Firebaugh School District could accommodate this number of families, if employees are hired from outside the county.

5.10.5.5 Utilities

The following subsections summarize the project’s approach to evaluate impacts to public utilities. The project will result in no significant impact to the project vicinity.

5.10.5.5.1 Electricity. When the facility is shut down, electricity for the project site will be provided by PG&E by backfeeding from the PG&E transmission system at Panoche Substation. When the facility generation is in operation, balance of plant will be supplied internally.

5.10.5.5.2 Natural Gas. Natural gas will be delivered to the PEC from a connection to a PG&E trunk line. The natural gas will be delivered to an underground pipeline up to 16 inches in diameter, capable of supporting an adequate supply for the facility operation.

5.10.5.5.3 Potable Water. The project facility will not require potable water supplies from the Fresno Water District. Instead, the project will provide bottled water for consumption. Other potable water requirements for facility showers, sinks, toilets, eye wash stations, and safety showers will be supplied by a production well.

5.10.5.5.4 Sewage System. During construction, the project will provide portable restrooms for personnel. During operation, the facility sanitary system will consist of a septic tank and leach field.

5.10.6 Fiscal Resources

The total property tax revenue for Fresno County for 2006 was approximately $560.4 million. All secured property (land and structures) in California is taxed at a base factor of 1.0 percent of the total assessed value, not including bonds and special assessments. The disbursement for this 1.0 percent is shown in Table 5.10-7.

TABLE 5.10-7
BASE FACTOR PROPERTY TAX DISBURSEMENT

Beneficiary Agency	Property Tax Allocation Percentage of Base Factor[1]
Fresno County Library	0.01903
Fresno County Fire District	0.08585
Westlands Water District	0.06386
Fresno West Side Mosquito District	0.03093
Mendota Unified School District	0.4031
West Hills Junior College	0.06631
School Equalization for Fresno County Schools	0.03248
Fresno County	0.29844

[1] County of Fresno Assessor's Office, 2006.

The project will be located on approximately 12.8 acres of a 128-acre parcel. The parcel is owned by PAO Investments, and committed by lease option to Panoche Energy Center, LLC. This site is located within the County's Tax Rate Area 140-006, and the site tax rate is

1.158972 (Thomas, 2006). During the 2005 fiscal year, the annual property tax for the entire 128-acre parcel was $6,114.70, where the portion of tax for the 12.8-acre project site is approximately $1,019.12.

5.10.6.1 Project Construction

The PEC's initial capital cost is estimated to be between $250 and $300 million. Of this, materials and supplies are estimated at approximately $190 million. To the extent possible, the project will purchase materials locally. Currently the estimated value of materials and supplies purchased within Fresno County during the construction phase is between $1 and $2 million.

5.10.6.2 Project Operation

Following the completion of construction, the PEC will be reassessed for its property value and tax rate. California property tax assessments on electric generation facilities larger than 50 MW are performed at the state level through the California Board of Equalization (BOE). The BOE staff confirmed that the BOE will determine the Unitary Market Value (UMV) of the facility, based upon the project's cost, revenue, expenses, and land value and then communicate the UMV to Fresno County. Fresno County is then responsible for assessing and collecting the property tax as a percentage of the UMV. According to the Fresno County Assessors' Office, the County will apply the 1.158972 property tax rate to the PEC UMV (Coronado, 2006).

While the UMV determination is an extensive assessment process, the BOE considers the initial capital cost of the project may be conservatively estimated to be $300 million (BOE Staff, 2006) in 2009. Based on this estimate, the PEC's property tax for 2009 is expected to be approximately $3.5 million.

5.10.7 Cumulative Impacts

The potential for cumulative socioeconomic impacts exists where other projects are proposed in the region, construction schedules overlap, and employment opportunities are created. This project area and the surrounding area have not had any major development projects in the past 18 months, though three potential projects may be considered in the foreseeable future. Refer to Table 5.18-1 in Section 5.18, Cumulative Impacts, for information on these potential projects.

5.10.8 Applicable Laws, Ordinances, Regulations, and Standards

Table 5.10-8 summarizes the LORS applicable to the socioeconomic impacts of the PEC.

TABLE 5.10-8
LORS APPLICABLE TO SOCIOECONOMICS

LORS	Applicability	Conformance (Section)
Federal		
Executive Order 12250	Federal agencies to adopt disparate impact regulations, where a minority community may claim a "disparate impact" when it can demonstrate unique, different, and negative effects resulting from the state's permitting agency	5.10.4
Executive Order 12898	Agencies are required to identify and address disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and low income populations	5.10.4
State		
Government Code Sections 65302 et seq.	Each city and county is required to develop a General Plan to guide planning and development within a jurisdiction	5.10.7.2
Government Code Sections 65995-65997 (Education Code Section 17620)	Includes provisions for levies against development projects in school districts	5.10.7.2
Local		
	None Identified	

5.10.8.1 Federal

5.10.8.1.1 Executive Order 12250. As discussed in Section 5.10.4, Executive Order 12250 requires federal agencies to adopt disparate impact regulations, where a minority community may claim a "disparate impact" when it can demonstrate unique, different, and negative effects resulting from the state's permitting agency. Refer to Section 5.10.4 for environmental justice concerns related to the PEC.

5.10.8.1.2 Executive Order 12898. Also discussed in Section 5.10.4, Executive Order 12898 *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations* (1994) requires federal government agencies to identify and address disproportionately high and adverse effects of federal action on the health and environment of minority and low-income populations. The USEPA has adopted the Order, and the California Environmental Protection Agency has established a working group for environmental justice concerns. The CEC receives federal funding and therefore must address environmental justice concerns associated with projects under its permitting jurisdiction. Refer to Section 5.10.4 for environmental justice concerns related to the PEC.

5.10.8.2 State

5.10.8.2.1 Government Code Sections 65995-65997 and Education Code Sections 17620-17626. In the event that new development impacts schools to the extent of requiring new construction or reconstruction, Government Code sections 65995-65997 and Education Code sections 17620-17626 give governing boards the authority to collect developer fees for residential, commercial, and industrial development within a school district. In order to assess a fee, the district must conduct a Fee Justification Study that reasonably demonstrates a relationship between the fee and the type of development to be assessed. The study includes consideration for the number of employees increased as a result of that development and the housing provided for those employees.

5.10.8.2.2 Government Code Sections 65300-65303.4. California State Planning Law (Government Code Sections 65300-65303.4) requires that each city and county adopt a General Plan, consisting of seven mandatory elements, to guide planning and development within the jurisdiction. As with most jurisdictions, the Fresno County General Plan does not have LORS specifically addressing the socioeconomic aspects of a project such as the PEC.

5.10.8.3 Local

There are no LORS that are considered to be directly applicable to socioeconomic issues for the PEC.

5.10.8.4 Involved Agencies and Agency Contacts

Various public service agencies were contacted in the course of the socioeconomics investigation to check on levels of activity and expected impacts of the project. Table 5.10-9, Involved Agencies and Contacts, lists those agencies.

5.10.8.5 Applicable Permits, Permit Schedule, and Fees

Table 5.10-10 summarizes the socioeconomic permits and fees applicable to the PEC. As shown, there are no applicable permits required related to socioeconomic resources.

However, the proposed project will be reviewed by the Mendota Unified School District and assessed a developer fee. This fee is independent of the government and education code stated above (5.10.7.2.1), and applies to all developments located within the Mendota Unified School District. The fee for commercial and industrial developments is calculated by applying $0.36 per square foot of a structural development. Based on current structural and equipment dimensions shown on Figure 3.5-1, the PEC expects to pay a developer fee of $10,682.84.

TABLE 5.10-9
INVOLVED AGENCIES AND CONTACTS

Subject	Agency	Contact/Title	Telephone
Fiscal Resources	Assessor's Office	Ruben Coronado, Chief Audit Appraiser	559-488-3514
Fiscal Resources	Fresno Auditor's Office	Kim Lamanuzzi	559-488-3496
Education	Mendota School District	Jose Alcaide, Director of Finance	559-655-4942
Fire Protection Services	Fresno County Fire Protection District, Mendota Station 96	Rusty Souza, Battalion Chief; Phil Gomez, Captain	559-655-4107
Law Enforcement	Fresno County Sheriff's Department	Lieutenant Ian Barramond	559-693-2437
Labor	Building and Construction Trades Council of Fresno, Madera, Tulare, and Kings County	John Hutson, Financial Secretary	559-457-0894
Planning	Department of Public Works and Planning, Fresno County	Bernard Jimenez	559-262-4078

TABLE 5.10-10
APPLICABLE SOCIOECONOMIC PERMITS AND FEES

Jurisdiction	Potential Permit and Fee Requirements
Federal	No permits or fees have been identified
State	No permits or fees have been identified
Local	
Mendota Unified School District	Developer fees assessed once project plans have been submitted

5.10.9 References

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Census 2000. *Table DB-2. Profile of Selected Social Characteristics: 2000; Geographic Area: Fresno County, California.*

Census 2000. *Table DB-3. Profile of Selected Economic Characteristics: 2000; Geographic Area: Fresno County, California.*

Census 2000. *Table DB-4. Profile of Selected Housing Characteristics: 2000; Geographic Area: Fresno County, California.*

Census 2000. *Table DB-1. Profile of General Demographic Characteristics: 2000; Geographic Area: Firebaugh City, California.*

Census 2000. *Table DB-2. Profile of Selected Social Characteristics: 2000; Geographic Area: Firebaugh City, California.*

Census 2000. *Table DB-3. Profile of Selected Economic Characteristics: 2000; Geographic Area: Firebaugh City, California.*

Census 2000. *Table DB-4. Profile of Selected Housing Characteristics: 2000; Geographic Area: Firebaugh City, California.*

Census 2000. *Table DB-1. Profile of General Demographic Characteristics: 2000; Geographic Area: Mendota City, California.*

Census 2000. *Table DB-2. Profile of Selected Social Characteristics: 2000; Geographic Area: Mendota City, California.*

Census 2000. *Table DB-3. Profile of Selected Economic Characteristics: 2000; Geographic Area: Mendota, California.*

Census 2000. *Table DB-4. Profile of Selected Housing Characteristics: 2000; Geographic Area: Mendota City, California.*

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Adequacy Issue: Adequate ____ Inadequate ____ **DATA ADEQUACY WORKSHEET** Revision No. ____ Date ____

Technical Area: **Socioeconomics** 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.	- Existing Site Conditions: 5.10.2 - Cumulative Impacts: 5.10.7, 5.18 - Environmental Consequences: 5.10.4.1		
Appendix B (g) (7) (A)	A description of the socioeconomic circumstances of the vicinity and region affected by construction and operation of the project. Include:	- Socioeconomic Circumstance: 5.10.2.1, 5.10.3.2, 5.10.3.5 - Construction Effects: 5.10.2.2, 5.10.3.3, 5.10.5 - Operation Effects: 5.10.2.3, 5.10.3.4, 5.10.5		
Appendix B (g) (7) (A) (i)	The economic characteristics, including the economic base, fiscal resources, and a list of the applicable local agencies with taxing powers and their most recent and projected revenues;	- Economic Base: 5.10.2.1 - Fiscal Resources & Revenues: 5.10.6 - Local Agencies: Table 5.10-10		
Appendix B (g) (7) (A) (ii)	The social characteristics, including population and demographic and community trends;	- Section 5.10.3.1 - Section 5.10.4.2		
Appendix B (g) (7) (A) (iii)	Existing and projected unemployment rates;	- Section 5.10.2.1		
Appendix B (g) (7) (A) (iv)	Availability of skilled workers by craft required for construction and operation of the project;	- Construction: 5.10.2.2 - Operation: 5.10.2.3		
Appendix B (g) (7) (A) (v)	Availability of temporary and permanent housing; and	- Section 5.10.3.5		

Adequacy Issue: Adequate ____ Inadequate ____

DATA ADEQUACY WORKSHEET

Revision No. ____ Date ____

Technical Area: **Socioeconomics** 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) (7) (A) (vi)	Capacities, existing and expected use levels, and planned expansion of utilities (gas, water and waste) and public services, including fire protection, law enforcement, emergency response, medical facilities, other assessment districts, and school districts. For projects outside metropolitan areas with a population of 500,000 or more, information for each school district shall include current enrollment and yearly expected enrollment by grade level groupings, excluding project-related changes, for the duration of the project construction schedule.	- Utilities: 5.10.5.5 - Public Services: 5.10.5.1 (Fire protection & Emergency Response) , 5.10.5.2 (Medical Facilities), 5.10.5.3 (Law Enforcement), 5.10.5.4 (Schools)		
Appendix B (g) (7) (B)	A discussion of the socioeconomic impacts caused by the construction and operation of the project, including:	- Construction: 5.10.2.2, 5.10.3.2, 5.10.3.5, 5.10.5, 5.10.6 - Operation: 5.10.2.3, 5.10.3.4, 5.10.3.5, 5.10.5, 5.10.6		
Appendix B (g) (7) (B) (i)	The number of workers to be employed each month by craft during construction and operation;	- Construction Employment: 5.10.2.2, Table 5.10-4 - Operation Employment: 5.10.2.3, Table 5.10-5		
Appendix B (g) (7) (B) (ii)	An estimate of the number and percentage of workers who will commute daily, commute weekly, or relocate in order to work on the project;	- Construction: 5.10.2.2, 5.10.3.3 - Operation: 5.10.2.3, 5.10.3.4		
Appendix B (g) (7) (B) (iii)	An estimate of the potential population increase caused directly and indirectly by the project;	- Construction: 5.10.3.3 - Operation: 5.10.3.4		
Appendix B (g) (7) (B) (iv)	The potential impact of population increase on housing during the construction and operations phases;	- Section 5.10.3.5		

Adequacy Issue: Adequate ____ Inadequate ____ **DATA ADEQUACY WORKSHEET** Revision No. ____ Date ____

Technical Area: **Socioeconomics** 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) (7) (B) (v)	The potential impacts, including additional costs, on utilities (gas, water and waste) and public services, including fire, law enforcement, emergency response, medical facilities, other assessment districts, and school districts. For projects outside metropolitan areas with a population of 500,000 or more, information on schools shall include project-related enrollment changes by grade level groupings and associated facility and staffing impacts by school district during the construction and operation phases;	- Utilities: 5.10.5.5 - Public Services: • Fire Protection & Emergency Response: 5.10.5.1 • Medical Facilities: 5.10.5.2 • Law Enforcement: 5.10.5.3 • Schools: 5.10.5.4, 5.10.8.5		
Appendix B (g) (7) (B) (vi)	An estimate of applicable school impact fees;	- Section 5.10.8.5		
Appendix B (g) (7) (B) (vii)	An estimate of the total construction payroll and an estimate of the total operation payroll;	- Construction: 5.10.2.2 - Operation: 5.10.2.3		
Appendix B (g) (7) (B) (viii)	An estimate of the expenditures for locally purchased materials for the construction and operation phases of the project; and	- Construction: 5.10.6.1 - Operation: 5.10.6.2		
Appendix B (g) (7) (B) (ix)	An estimate of the capital cost of the project of the potential impacts on tax revenues from construction and operation of the project.	- Construction: 5.10.6.1 - Operation: 5.10.6.2		
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 5.10.8, Table 5.10-8		

Adequacy Issue: Adequate ____ Inadequate ____ **DATA ADEQUACY WORKSHEET** Revision No. ____ Date ____

Technical Area: **Socioeconomics** 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) (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 5.10.8.5, Table 5.10-10		
Appendix B (h) (2)	A discussion of the conformity of the project with the requirements listed in subsection (h)(1)(A).	- Federal: 5.10.8.1 - State: 5.10.8.2 - Local: 5.10.8.3		
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 5.10.8.4, Table 5.10-9		
Appendix (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 5.10.8.5		

5.11 TRAFFIC AND TRANSPORTATION

The traffic and transportation section provides a summary of the transportation infrastructure and traffic conditions in the Panoche Energy Center (PEC) project vicinity, and addresses the direct construction and operating impacts of the proposed development on the surrounding transportation system. It addresses potential impacts associated with traffic and transportation systems in the project area that may result from construction and operation of the PEC. The analysis considers the regional and local roadways, current and project-related traffic conditions, access to the project site and transportation of hazardous materials related to construction and operation of the plant.

The project study area for the transportation analysis includes the immediate vicinity of the PEC and the surrounding local and regional circulation system. This circulation system could be potentially affected by traffic generated by the PEC during construction and operations when the project is completed. Figure 5.11-1 shows the PEC project site in context to the regional circulation system.

5.11.1 Affected Environment

This subsection describes the existing conditions of the roadway circulation system within the study area. This section also presents the traffic volume and existing operating conditions of the study roadway segments and intersections. Figure 5.11-2 shows the PEC project study area.

The rural isolation of the project site from major population centers effectively eliminates potential conflicts with infrastructures associated with urban environment including airports, transportation centers, rail lines, bus and bike routes, and other ancillary facilities supporting commerce and industries. Therefore, the focus of the traffic impact analysis is the evaluation of transportation and circulation impacts to the adjacent facilities (Panoche Road and Interstate 5 [I-5]) during the construction and operation phase of the project.

5.11.1.1 Existing Roadway Network

Panoche Road serves the PEC project study area with direct ramp connections to I-5 approximately 2 miles west of the project site. East of the project site, Panoche Road continues east and connects to the local circulation network of the adjoining cities of Mendota to the north, Firebaugh to the northwest, Kerman to the east and Fresno further east. Panoche Road transitions eastbound to North Avenue, then to a short north-south stretch of North Avenue, then continues eastbound on California Avenue and Whitesbridge Avenue (SR 180) towards State Route 99 in Fresno.

California Department of Transportation (Caltrans) District 6 staff confirms that there are no major construction activities planned for I-5 within the project study area. Spot repairs of pavement, guardrails and other freeway fixtures will be conducted as part of preventive maintenance and repair.

5.11.1.1.1 <u>Caltrans Vehicle Requirements</u>. From Caltrans' Division of Traffic Operations, the following is a list of requirements for legal, unpermitted vehicles to operate in California.

***<u>Vehicle Width</u>*.** The maximum allowable vehicle width is 102 inches (some exceptions apply).

***<u>Vehicle Height</u>*.** The maximum allowable vehicle height is 14 feet.

***<u>Vehicle Length (California Legal)</u>*.** The maximum allowable lengths for vehicles that can travel throughout California are as follows (some exceptions apply).

- Single vehicle length is 40 feet
- Combination length is 65 feet
- Trailer length is not specified
- Kingpin-to-rear-axle (KPRA) length is 40 feet maximum
- Doubles - 75 feet for combination of vehicles consisting of a truck tractor and two trailers, provided neither trailer length exceeds 28 feet 6 inches
- Doubles - 65 feet for combination of vehicles consisting of a truck tractor and two trailers, if one trailer length exceeds 28 feet 6 inches

***<u>Vehicle Length Surface Transportation Assistance Act (STAA)</u>*.** The maximum allowable lengths for vehicles that are limited to the National Network and Terminal Access routes are as follows:

- Combination length is unlimited
- Maximum trailer length is 53 feet
- KPRA is unlimited if trailer is no more than 48 feet
- KPRA is 40 feet maximum if trailer is more than 48 feet
- Doubles - unlimited length for combination of vehicles consisting of a truck tractor and two trailers, but *neither* trailer length can exceed 28 feet 6 inches

***<u>Vehicle Weight</u>*.** The maximum allowable lengths are as follows:

- Gross combination weight is 80,000 pounds
- Single-axle weight is 20,000 pounds

- Maximum weight on a tandem axle with a four-foot spread is 34,000 pounds

***Exceptions*.** For specific exceptions and variances, refer to the California Highway Patrol (CHP) 889, "Vehicle Code Size and Weight Law Summary" or call the Commercial Vehicle Section of the California Highway Patrol (CHP).

5.11.1.1.2 Highways.

***Interstate 5*.** I-5 is a major north-south route through the Central Calley and the length of California, extending from San Diego County towards the states of Oregon and Washington. Within the project study area, I-5 provides for two mainline lanes in each direction with wide shoulders and a center median. Current Average Daily Traffic (ADT) volume on the segment of I-5 between Manning Avenue and Russell Avenue is 51,500 vehicles per day with truck traffic ranging from 25 to 30 percent. Within the project study area, the study segment of I-5 generally follows a straight northerly-trending alignment with relatively flat vertical profile. There is adequate median width separating the opposing traveled way and wide shoulders for roadway stops and emergencies. There are no identified geometric features that would affect public safety.

5.11.1.1.3 Local Roads.

***Panoche Road*.** Panoche Road is a two-lane east-west roadway classified as a Collector in the Fresno County General Plan. Panoche Road serves as the primary access to the project site. Current ADT volume on the segment of Panoche Road between I-5 between and the PEC project site is 1,057 vehicles per day with 15 percent truck traffic. Within the project study area Panoche Road has a generally straight horizontal east-west alignment and level vertical profile. There are no identified geometric features that would affect public safety.

***PEC Service Road*.** The proposed PEC service road will provide the primary access of the PEC site from Panoche Road. It will be approximately 400 feet long and 28 feet wide, providing adequate width for two-way vehicular traffic.

5.11.1.1.4 Bicycle Facilities. According to the routes defined in the Fresno County Rural Bikeway system, there are no designated bicycle routes within the immediate vicinity of project site and the study area.

5.11.1.2 Existing Roadway and Intersection Geometrics

Table 5.11-1 shows the key study area intersections that have been identified for analysis under existing, project construction and operations conditions. Figure 5.11-3 shows the existing intersection geometrics.

TABLE 5.11-1
STUDY INTERSECTIONS

Intersection	Traffic Control
I-5 Southbound Ramp/Panoche Road	Unsignalized
I-5 Northbound Ramp/Panoche Road	Unsignalized

5.11.1.3 Existing Roadway and Intersection Volumes

Figure 5.11-4 shows existing traffic volume for the key study area intersections. Roadway segment and study area intersection traffic counts were collected in June 2006. The traffic counts are provided in Appendix T.

5.11.1.4 Existing Level of Service Analysis

The results of the existing conditions roadway segment and intersection Level of Service (LOS) analysis are discussed separately below. LOS is an indicator of operating conditions on a roadway or at an intersection and is defined in categories ranging from A to F. These categories can be viewed much like school grades, with A representing the best traffic flow conditions and F representing poor conditions. LOS A indicates free-flowing traffic and LOS F indicates substantial congestion with stop-and-go traffic and long delays at intersections.

5.11.1.4.1 Existing Roadway Segment Analysis. Table 5.11-2 displays the LOS analysis results for key study area roadway segments under existing conditions. The two roadway segments of Panoche Road were selected for evaluation, as they are the locations that would most likely be affected by project traffic during both project construction and operations.

As shown in Table 5.11-2, all study roadway segments are currently operating at acceptable LOS B or better under existing conditions.

5.11.1.4.2 Existing Intersection Analysis. Table 5.11-3 displays the intersection LOS and average vehicle delay results for the key study area intersections using Highway Capacity Manual (HCM) Operations Methodology under existing conditions. Both intersections are currently unsignalized. The LOS calculation worksheets for existing conditions are provided in Appendix T.

As shown in Table 5.11-3, both study intersections are currently operating at acceptable LOS A under existing conditions.

5.11.2 Environmental Consequences

This subsection provides the criteria used to determine if the project would have the potential to result in significant traffic-related impacts within the PEC study area.

TABLE 5.11-2
ROADWAY SEGMENT LOS – EXISTING CONDITIONS

Roadway	Segment	Cross-Section Classification	Time Period	Traffic Volume	Level of Service (LOS)
I-5	Manning to Russell	Freeway	Daily	51,500 [1]	B [3]
Panoche Road	Between I-5 and PEC Site	2-Lane Collector		41/73 [2]	A/A [4]
Panoche Road	East of PEC Site	2-Lane Collector		52/69 [2]	A/A [4]

1 ADT
2 Peak Hour Volume
3 ADT LOS
4 Peak Hour LOS

TABLE 5.11-3
PEAK HOUR INTERSECTION LOS – EXISTING CONDITIONS

	AM Peak Hour		PM Peak Hour	
Intersection	LOS	Average Delay (sec)	LOS	Average Delay (sec)
I-5 SB Ramps/Panoche Road [1]	A	2.4	A	2.3
I-5 NB Ramps/Panoche Road [1]	A	6.6	A	7.5

1 Unsignalized two-way stop controlled.

5.11.2.1 Level of Service Concept

Table 5.11-4 provides the level of service definitions as specified in the HCM.

5.11.2.2 Significance Thresholds

The following policy as cited from the Transportation and Circulation Element Policy Document October 2000, Fresno County General Plan, was used in the assessment of potential construction and operational traffic impacts for the PEC project:

5.11.2.2.1 Policy TR-A.2. "The County shall plan and design its roadway system in a manner that strives to meet Level of Service (LOS) D on urban roadways within the spheres of influence of the cities of Fresno and Clovis and LOS C on all other roadways in the county. Roadway improvements to increase capacity and maintain LOS standards should be planned and programmed based on consideration of the total overall needs of the roadway system, recognizing the priority of maintenance, rehabilitation, and operation of the existing road

TABLE 5.11-4
LEVEL OF SERVICE DESCRIPTIONS

Average Vehicle Delay per Vehicle	Level of Service (LOS) Characteristics
≤ 10	LOS A describes operations with very low delay, up to 10 seconds per vehicle. This level of service occurs when progression is extremely favorable and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.
>10 and ≤20	LOS B describes operations with delay greater than 10 and up to 20 seconds per vehicle. This level generally occurs with good progression, short cycle lengths, or both. More vehicles stop than with LOS A, causing higher levels of average delay.
>20 and ≤35	LOS C describes operations with delay greater than 20 and up to 35 seconds per vehicle. These higher delays may result from fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant at this level, though many still pass through the intersection without stopping.
>35 and ≤55	LOS D describes operations with delay greater than 35 and up to 55 seconds per vehicle. At level D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high volume to capacity (v/c) ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.
>55 and ≤80	LOS E describes operations with delay greater than 55 and up to 80 seconds per vehicle. This level is considered by many agencies to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are frequent occurrences.
>80	LOS F describes operations with delay in excess of 80 seconds per vehicle. This level, considered to be unacceptable to most drivers, often occurs with over saturation, that is, when arrival flow rates exceed the capacity of the intersection. It may also occur at high v/c ratios below 1.0 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing cause to such delay levels.

Source: 2000 Highway Capacity Manual, TRB Special Report 209

system. The County may, in programming capacity-increasing projects, allow exceptions to the level of service standards in this policy where it finds that the improvements or other measures required to achieve the LOS policy are unacceptable based on established criteria. In addition to consideration of the total overall needs of the roadway system, the County shall consider the following factors:

a. The right-of-way needs and the physical impacts on surrounding properties;

b. Construction and right-of-way acquisition costs;

c. The number of hours that the roadway would operate at conditions below the standard;

d. The ability of the required improvement to significantly reduce delay and improve traffic operations; and

e. Environmental impacts upon which the County may base findings to allow an exceedance of the standards.

In no case should the County plan for worse than LOS D on rural County roadways, worse than LOS E on urban roadways within the spheres of influence of the cities of Fresno and Clovis, or in cooperation with Caltrans and the Council of Fresno County Governments, plan for worse than LOS E on State highways in the County."

5.11.2.3 Construction-related Impacts (Year 2008 Peak Project Construction)

The PEC project construction is envisioned to be completed within a 16-month construction schedule. The average construction workforce will be about 150 workers over this time period. During an approximately 3-month peak period, the construction workforce may reach up to 364 workers during the peak month.

Independent of the power plant construction activities, expansion of the adjacent substation would require up to 19 workers onsite during a 5-month construction period. For analysis purposes, it was conservatively assumed that these work activities would overlap. The expected PEC manpower-loading curve is presented in Figure 5.11-5.

In consultation with Fresno County Public Works Department, Year 2008 baseline conditions were developed using the recommended 3 percent annual growth factor to account for cumulative projects within the project study area including the proposed Starwood Energy Center to the east of the project site.

During the project construction period, small quantities of hazardous materials will be delivered and construction waste products will be hauled to and from the project site. More detailed discussion on project waste management and handling of hazardous materials are presented in Section 5.14, Waste Management and Section 5.15, Hazardous Materials, respectively. All applicable laws, ordinances, regulations, and standards (LORS) will be observed during the course of project construction.

5.11.2.4 Operations-related Impacts (Year 2009 Project Operations)

Similar to Year 2008 baseline conditions, Year 2009 baseline conditions were developed consistent with the Fresno County recommended traffic growth assumptions. Upon completion of the proposed PEC construction and commissioning of the facility, the PEC will generate operations-related trips that are substantially less than the peak construction activities.

During the normal operational phase of the project, a planned 12-employee workforce will oversee the operation and maintenance of the project. Occasional deliveries and maintenance-related trips are anticipated as part of the normal operations of the plant.

Based on the operational needs of the PEC the following sources of vehicular traffic are anticipated:

- Operations personnel vehicles
- Bottled water deliveries
- Office materials and supplies deliveries
- Trash pickup
- Uniform laundry deliveries and pickup
- Tools and spare parts deliveries
- Janitorial staff visits
- Chemical (e.g., aqueous ammonia, sulfuric acid, water treatment) deliveries
- Lubricating oil and filters deliveries
- Laboratory analysis waste deliveries
- Hazardous and non-hazardous waste pickups
- Visitor vehicles

During the project operations, small quantities of hazardous materials will be delivered and operational waste products will be hauled to and from the project site. More detailed discussion on project waste management and handling of hazardous materials are presented in Section 5.14, Waste Management and Section 5.15, Hazardous Materials, respectively. All LORS will be observed during the project operations.

5.11.2.5 Future 20-Year Horizon Impacts

In consultation with Fresno County Public Works Department, it was determined that a Future 20-Year Horizon analysis is not warranted as daily project operational trips generated are substantially fewer than the 100 daily project trip generation threshold required for a Future 20-Year Horizon analysis.

5.11.2.6 Project Distribution

It is assumed that the majority of the construction workforce needs will be met with local labor from within Fresno County. The short-term need for specialty trades that cannot be filled from local labor sources during project construction are assumed to be filled by workers residing elsewhere. It is assumed that construction traffic trips would primarily use I-5. Long-term operations workers are anticipated to be locally sourced and would primarily use Panoche Road east of the project site.

5.11.2.7 Project Trip Generation

5.11.2.7.1 Peak Project Construction Trip Generation. For analysis purposes, the peak 3-month construction activity during the 16-month PEC construction schedule was used in the construction traffic impact analysis for the proposed project. Independent of the plant construction activities, expansion of the adjacent substation would require up to 19 workers onsite during a 5-month construction period. For analysis purposes, it was conservatively assumed that these work activities would overlap. This assumption presents the worst-case scenario and the most conservative estimation of project construction traffic.

Typically, construction activity early work starts before the 7:00 AM to 9:00 AM and 4:00 PM to 6:00 PM adjacent street peak hour traffic, but for traffic impact analysis purposes, it was conservatively assumed that construction workers traffic would commute alone and within the 7:00 AM to 9:00 AM and 4:00 PM to 6:00 PM adjacent street peak hour traffic window.

In addition to the construction workforce trips, construction equipment deliveries and construction-related truck traffic would contribute additional trips during the construction period. Truck and heavy equipment traffic were estimated using a passenger car equivalent (PCE) factor of 3 cars per truck.

Table 5.11-5 presents the peak project construction trip generation estimates for the proposed project.

As shown in Table 5.11-5, during the peak 3-month project construction period, it is conservatively estimated that there will be approximately 853 daily trips and 413 AM peak hour and 407 PM peak hour trips. These figures were used as the basis for the peak project construction traffic analysis.

5.11.2.7.2 Project Operations Trip Generation. Upon completion of the proposed project construction, it is anticipated that there will be approximately 12 workers staffing the PEC plant operations. These workers will not all commute during the 7-9 AM and 4-6 PM adjacent street peak hour traffic but were included for purposes of evaluating the worse-case scenario during plant operations. During normal plant operating hours, occasional visitor trips, maintenance visits and as-needed material and equipment deliveries are anticipated on a non-recurring basis and will more likely be occurring outside of the 7-9 AM and 4-6 PM analysis peak hours.

TABLE 5.11-5
PEAK PROJECT CONSTRUCTION TRIP GENERATION

	Daily Trips	AM Peak Hour Trips		PM Peak Hour Trips	
		In	Out	In	Out
Peak PEC Construction Workers [1]	725	364	0	0	364
Equipment Deliveries[2]	42	9	9	0	12
Construction Trucks[3, 4]	48	12	0	0	12
Substation Workers	38	19	0	0	19
Total Trips	853	404	9	0	407

1 Worker traffic during 3-month peak project construction period in Year 2008

2 Equipment movement during 3-month peak project construction period in Year 2008

3 Construction truck movement during 3-month peak project construction period in Year 2008

4 3 Passenger Car Equivalent (PCE) per truck

Table 5.11-6 presents the project operations trip generation estimates for the proposed project.

TABLE 5.11-6
PROJECT OPERATIONS TRIP GENERATION

	Daily Trips	AM Peak Hour Trips		PM Peak Hour Trips	
		In	Out	In	Out
Operational Workforce[1]	24	12	0	0	12
Total Trips	24	12	0	0	12

1 All operational workers (12 employees) were conservatively assumed to commute during the 7-9 AM and 4-6 PM adjacent street peak hour traffic.

5.11.2.8 Year 2008 Conditions Impact Analysis

This section describes Year 2008 traffic conditions for both “with” and “without” the proposed peak project construction. The following scenarios were analyzed under Year 2008 conditions:

- Year 2008 No Project Conditions
- Year 2008 Peak Project Construction Conditions

5.11.2.8.1 Year 2008 No Project Conditions. The Year 2008 No Project baseline conditions builds upon existing traffic volume and includes Fresno County Public Works Department recommended ambient traffic growth of 3 percent per year to account for potential related cumulative projects within the project study area including the proposed

Starwood Energy Center to the east of the project site. Figure 5.11-6 shows Year 2008 No Project peak hour traffic volumes at the project study intersections.

5.11.2.8.2 <u>Year 2008 No Project Roadway Segment Analysis</u>. Table 5.11-7 summarizes the results of the Year 2008 No Project roadway segment analysis. The roadway segment LOS calculation worksheets are provided in Appendix T.

TABLE 5.11-7
ROADWAY SEGMENT LOS –
YEAR 2008 NO PROJECT CONDITIONS

Roadway	Segment	Cross-Section Classification	Time Period	Traffic Volume	Level of Service (LOS)
I-5	Manning to Russell	Freeway		54,590[1]	B [3]
Panoche Road	Between I-5 and PEC Site	2-Lane Collector		43/ 77 [2]	A/A [4]
Panoche Road	East of PEC Site	2-Lane Collector		55/ 73 [2]	A/A [4]

1 ADT

2 Peak Hour Volume

3 ADT LOS

4 Peak Hour LOS

As shown in Table 5.11-7, all of the study roadway segments are forecast to operate at acceptable LOS B or better under Year 2008 No Project conditions.

5.11.2.8.3 <u>Year 2008 No Project Intersection Analysis</u>. Table 5.11-8 displays the intersection LOS and average vehicle delay results under Year 2008 Peak No Project conditions. The intersection LOS calculation worksheets are provided in Appendix T.

TABLE 5.11-8
PEAK HOUR INTERSECTION LOS –
YEAR 2008 NO PROJECT CONDITIONS

	AM Peak Hour		PM Peak Hour	
Intersection	LOS	Average Delay (sec)	LOS	Average Delay (sec)
I-5 SB Ramps/Panoche Road [1]	A	2.4	A	2.3
I-5 NB Ramps/Panoche Road [1]	A	6.6	A	7.7

1 Unsignalized two-way stop controlled.

As shown in Table 5.11-8, both study intersections are forecast to operate at acceptable LOS A under Year 2008 No Project conditions.

5.11.2.8.4 Year 2008 Peak Project Construction Conditions. This scenario includes Year 2008 No Project traffic volumes plus PEC peak project construction activity trip generation. Figure 5.11-7 shows Year 2008 Peak Project Construction peak hour traffic volumes at the project study intersections.

5.11.2.8.5 Year 2008 Peak Project Construction Roadway Segment Analysis. Table 5.11-9 displays the LOS analysis results for the study area roadway segments under Year 2008 with Peak Project Construction conditions.

TABLE 5.11-9
ROADWAY SEGMENT LOS –
YEAR 2008 PEAK PROJECT CONSTRUCTION CONDITIONS

Roadway	Segment	Cross-Section Classification	Time Period	Traffic Volume	Level of Service (LOS)
I-5	Manning to Russell	Freeway		56,144[1]	B [3]
Panoche Road	Between I-5 and PEC Site	2-Lane Collector		259/ 290 [2]	A/A [4]
Panoche Road	East of PEC Site	2-Lane Collector		273/ 287 [2]	A/A [4]

1 ADT
2 Peak Hour Volume
3 ADT LOS
4 Peak Hour LOS

As shown in Table 5.11-9, all of the study roadway segments are forecast to operate at acceptable LOS B or better under Year 2008 Peak Project Construction conditions. The roadway segment LOS calculation worksheets are provided in Appendix T.

5.11.2.8.6 Year 2008 Peak Project Construction Intersection Analysis. Table 5.11-10 displays the intersection LOS and average vehicle delay results under Year 2008 with Peak Project Construction conditions. The intersection LOS calculation worksheets are provided in Appendix T.

As shown in Table 5.11-10, both study intersections are forecast to operate at acceptable LOS A under Year 2008 with Peak Project Construction conditions. The results of the Year 2008 with Peak Project Construction analysis accounts for the very conservative traffic analysis assumption focusing on the highest incremental increase in construction related trip-making during the peak 3 months of the 16-month proposed project construction schedule including the construction of the adjacent substation expansion.

As discussed earlier in this section, the Year 2008 Peak Construction activities represent the worst possible case traffic analysis scenario during the lifetime of the PEC.

TABLE 5.11-10
PEAK HOUR INTERSECTION LOS –
YEAR 2008 PEAK PROJECT CONSTRUCTION CONDITIONS

Intersection	AM Peak Hour		PM Peak Hour	
	LOS	Average Delay (sec)	LOS	Average Delay (sec)
I-5 SB Ramps/Panoche Road [1]	A	5.1	A	3.6
I-5 NB Ramps/Panoche Road [1]	A	6.3	A	6.2

[1] Unsignalized two-way stop controlled.

5.11.2.8.7 <u>Year 2008 Conditions Traffic Impact Summary</u>. Based on the Fresno County Department of Public Works traffic impact threshold criteria, none of the project study intersections would be significantly impacted during the peak project construction activity in Year 2008. The existing circulation system including study roadways, freeway segments and intersections have sufficient capacity to accommodate peak PEC project construction traffic.

5.11.2.9 Year 2009 Conditions Impact Analysis

This section focuses on Year 2009 traffic conditions for both "with" and "without" proposed project operations.

The operation of the PEC would not require a significant number of workers onsite. However, non-recurring site visits are anticipated as a result of the PEC operations. The following analysis scenarios were conducted under the Year 2009 Conditions analysis:

- Year 2009 No Project Conditions
- Year 2009 Project Operations Conditions

5.11.2.9.1 <u>Year 2009 No Project Conditions</u>. The Year 2009 No Project baseline conditions builds upon the Year 2008 No Project conditions with minor increase in ambient traffic growth to account for background traffic. Figure 5.11-8 shows Year 2009 No Project peak hour traffic volume at the project study intersections.

5.11.2.9.2 <u>Year 2009 No Project Roadway Segment Analysis</u>. Table 5.11-11 displays the intersection LOS and average vehicle delay results under Year 2009 No Project conditions. The roadway segment LOS calculation worksheets are provided in Appendix T.

As shown in Table 5.11-11, all of the study roadway segments are forecast to operate at acceptable LOS B or better under Year 2009 No Project conditions.

TABLE 5.11-11
ROADWAY SEGMENT LOS –
YEAR 2009 NO PROJECT CONDITIONS

Roadway	Segment	Cross-Section Classification	Time Period	Traffic Volume	Level of Service (LOS)
I-5	Manning to Russell	Freeway		56,135[1]	B [3]
Panoche Road	Between I-5 and PEC Site	2-Lane Collector		45/ 80 [2]	A/A [4]
Panoche Road	East of PEC Site	2-Lane Collector		57/75 [2]	A/A [4]

1 ADT

2 Peak Hour Volume

3 ADT LOS

4 Peak Hour LOS

5.11.2.9.3 **<u>Year 2009 No Project Operations Intersection Analysis</u>.** Table 5.11-12 displays intersection LOS and average vehicle delay results under Year 2009 Project Operations conditions. The intersection LOS calculation worksheets are provided in Appendix T.

TABLE 5.11-12
PEAK HOUR INTERSECTION LOS –
YEAR 2009 NO PROJECT OPERATIONS CONDITIONS

	AM Peak Hour		PM Peak Hour	
Intersection	LOS	Average Delay (sec)	LOS	Average Delay (sec)
I-5 SB Ramps/Panoche Road [1]	A	2.4	A	2.3
I-5 NB Ramps/Panoche Road [1]	A	6.6	A	7.7

1 Unsignalized two-way stop controlled

As shown in Table 5.11-12, the result of the Year 2009 No Project conditions analysis shows that both study intersections are forecast to operate at acceptable LOS A conditions.

5.11.2.9.4 **<u>Year 2009 Project Operations Conditions</u>.** This scenario includes Year 2009 No Project traffic volume and incorporates the proposed project operation added trips. Figure 5.11-9 shows Year 2009 project operations AM and PM peak hour traffic volumes at the project study intersections.

5.11.2.9.5 Year 2009 Project Operations Roadway Segment Analysis. Table 5.11-13 displays the LOS analysis results for the key study area roadway segments under Year 2009 Project Operations conditions. The roadway segment LOS calculation worksheets are provided in Appendix T.

TABLE 5.11-13
ROADWAY SEGMENT LOS –
YEAR 2009 PROJECT OPERATIONS CONDITIONS

Roadway	Segment	Cross-Section Classification	Time Period	Traffic Volume	Level of Service (LOS)
I-5	Manning to Russell	Freeway		56,135[1]	B [3]
Panoche Road	Between I-5 and PEC Site	2-Lane Collector		46/ 82 [2]	A/A [4]
Panoche Road	East of PEC Site	2-Lane Collector		72/ 91 [2]	A/A [4]

1 ADT

2 Peak Hour Volume

3 ADT LOS

4 Peak Hour LOS

As shown in Table 5.11-13, all of the study roadway segments are forecast to operate at acceptable LOS B or better under Year 2009 Project Operations conditions.

5.11.2.9.6 Year 2009 Project Operations Intersection Analysis. Table 5.11-14 displays intersection LOS and average vehicle delay results under Year 2009 Project Operations conditions. The intersection LOS calculation worksheets are provided in Appendix T.

TABLE 5.11-14
PEAK HOUR INTERSECTION LOS –
YEAR 2009 PROJECT OPERATIONS CONDITIONS

Intersection	AM Peak Hour		PM Peak Hour	
	LOS	Average Delay (sec)	LOS	Average Delay (sec)
I-5 SB Ramps/Panoche Road [1]	A	2.4	A	2.3
I-5 NB Ramps/Panoche Road [1]	A	6.6	A	7.7

1 Unsignalized two-way stop controlled

As shown in Table 5.11-14, the result of the Year 2009 Project Operation conditions shows that both study intersections are forecast to operate at acceptable LOS A during both AM and PM peak hour operations conditions.

5.11.2.9.7 Year 2009 Conditions Traffic Impact Summary. As discussed previously, the Year 2008 Peak Construction activities represented the worst possible case traffic analysis scenario for the proposed PEC. Upon completion of the proposed PEC project construction and commissioning of the facility, the PEC will generate operations-related trips that are substantially less than peak construction activities. Post-construction background traffic within the project study area is anticipated to be slightly higher than pre-construction levels with minor incremental traffic increase attributed to ambient growth and added trips from plant operations.

Based on the Fresno County Department of Public Works traffic impact threshold criteria, none of the project study intersections would be significantly impacted with the start of project operations by Year 2009. The projected incremental net increase of trips attributed to project operations would not create significant traffic impacts to the surrounding roadway circulation system.

5.11.3 Mitigation Measures (Construction)

The result of the project construction traffic analysis showed that no study roadway segment or intersection would be significantly impacted by the proposed project during Year 2008 Peak Construction activities. Based on these findings, the Year 2008 Peak Construction conditions would not require traffic mitigation.

The following mitigations are voluntarily offered by PEC either as part of the construction activity requirements, or as pro-active measures initiated by PEC to minimize construction related tripmaking and resultant increases of traffic to the surrounding roadway circulation system.

5.11.3.1 Traffic-1: Construction Traffic Route

During project construction, PEC will designate a construction worker, equipment and material delivery/haul route via I-5, the short segment of Panoche Road, the PEC Service Road and vice versa. Construction traffic on Panoche Road east of the project site is anticipated to be primarily be worker trips and will be minimized to the extent feasible.

5.11.3.2 Traffic-2: Traffic Control Plan

If required, a traffic and transportation control plan will be prepared in coordination with Fresno County and Caltrans to address short-term construction traffic and material deliveries during project construction.

5.11.4 Mitigation Measures (Operations)

None proposed. There were no identified project operational traffic impacts, in this study.

5.11.5 Applicable LORS

Based on the information provided in this documentation, the project would comply with the applicable traffic and transportation LORS discussed below. Table 5.11-15 summarizes the applicable LORS and Table 5.11-16 lists the agency contacts.

5.11.5.1 Federal Authorities and Administering Agencies

5.11.5.1.1 Title 49, Code of Federal Regulations, Parts 171-177. Governs the transportation of hazardous materials, the types of materials defined as hazardous, and the marking of the transportation vehicles.

The administering agencies for the above regulation are the CHP and the Department of Transportation (DOT), Pipeline and Hazardous Materials Safety Administration (PHMSA).

The PEC would conform to this law by requiring that shippers of hazardous materials use the required markings on their transportation vehicles.

5.11.5.1.2 Title 14, Code of Federal Regulations, Section 77.13(2)(i). Requires an applicant to notify the Federal Aviation Administration (FAA) of construction of structures with a height greater than 200 feet from grade or greater than an imaginary surface extending outward and upward at a slope of 10 to 1 from the nearest point of the nearest runway of an airport with at least one runway more than 3,200 feet in length.

The administering agency for the above regulation is the DOT FAA.

The proposed facility heights would not exceed 200 feet. Therefore, notification to the FAA would not be required.

5.11.5.2 State Authorities and Administering Agencies

5.11.5.2.1 California Vehicle Code, Section 353. Defines hazardous materials as any substance, material, or device posing an unreasonable risk to health, safety, or property during transportation, as defined by regulations adopted pursuant to Section 2402.7.

The administering agency for the above statute is the CHP.

The PEC would comply with these codes by continuing to classify all hazardous materials in accordance with their clarification.

5.11.5.2.2 California Vehicle Code, Sections 2500-2505. Authorizes the Commissioner of Highway Patrol to issue licenses for the transportation of hazardous materials including explosives.

TABLE 5.11-15
SUMMARIES OF LORS

Jurisdiction	LORS	Requirements	Conformance Section	Administering Agency	Agency Contact
Federal					
	Title 49, Code of Federal Regulations, Section 171-177	Governs the transportation of hazardous materials, including the marking of transportation vehicles.	Section 5.11.5.1, Federal Authorities and Administering Agencies	California Highway Patrol	2
	Title 14, Code of Federal Regulations, Section 77.13(2)(i)	Requires applicant to notify FAA of any construction greater than height limits defined by the FAA.	Section 5.11.5.1, Federal Authorities and Administering Agencies	Federal Aviation Administration	1
State					
	California Vehicle Code, Section 353	Defines the hazardous materials.	Section 5.11.5.12, State Authorities and Administering Agencies	California Highway Patrol	2
	California Vehicle Code, Sections 13369, 15275, 15278	Addresses the licensing of drivers and the classification of license required for the operation of particular types of vehicles. In addition, these sections require the possession of certificates of permitting the operation of vehicles transporting hazardous materials.	Section 5.11.5.12, State Authorities and Administering Agencies	California Department of Motor Vehicles	4
	California Vehicle Code, Section 31303-31309	Requires transporters of hazardous materials to use the shortest route possible.	Section 5.11.5.12, State Authorities and Administering Agencies	California Highway Patrol	2
	California Vehicle Code, Section 32000-32053	Regulates the licensing of carriers of hazardous materials and noticing requirements.	Section 5.11.5.12, State Authorities and Administering Agencies	California Highway Patrol	2

TABLE 5.11-15 (CONTINUED)
SUMMARIES OF LORS

Jurisdiction	LORS	Requirements	Conformance Section	Administering Agency	Agency Contact
	California Vehicle Code, Section 32100-32109	Transporters of inhalation hazardous materials or explosive materials must obtain a hazardous materials transportation license.	Section 5.11.5.12, State Authorities and Administering Agencies	California Highway Patrol	2
	California Vehicle Code, Section 34000-34100	Establishes special requirements for the transport of flammable and combustible liquids over public roads and highways.	Section 5.11.5.12, State Authorities and Administering Agencies	California Highway Patrol	2
	California Vehicle Code, Section 34500	Regulates the safe operation of vehicles, including those that are used for the transportation of hazardous materials.	Section 5.11.5.12, State Authorities and Administering Agencies	California Highway Patrol	2
	California Vehicle Code, Section 35550	Imposes weight guidelines and restrictions upon vehicles traveling upon freeways and highways.	Section 5.11.5.12, State Authorities and Administering Agencies	California Department of Transportation	3
	California Vehicle Code, Section 35780	Requires approval for a permit to transport oversized or excessive load over state highways.	Section 5.11.5.12, State Authorities and Administering Agencies	California Department of Transportation	3
	California Streets and Highways Code, Sections 117	Permits for the location in the ROW of any structures or fixtures necessary to telegraph, telephone, or electric power lines or of any ditches, pipes, drains, sewers, or underground structures.	Section 5.11.5.12, State Authorities and Administering Agencies	California Department of Transportation	3

TABLE 5.11-15 (CONTINUED)
SUMMARIES OF LORS

Jurisdiction	LORS	Requirements	Conformance Section	Administering Agency	Agency Contact
	California Streets and Highways Code, Sections 660, 670, 672, 1450,1460,1470, 1480 et seq.	Defines highways and encroachment. Regulates ROW encroachment and the granting of permits with conditions for encroachment in state and county roads.	Section 5.11.5.12, State Authorities and Administering Agencies	California Department of Transportation and Fresno County	3,5
	California Health and Safety Code, Section 25160 et seq.	Addresses the safe transport of the hazardous materials.	Section 5.11.5.12, State Authorities and Administering Agencies	California Highway Patrol	2
	California Department of Transportation Traffic Manual, Section 5-1.1	Requires traffic control plans to ensure continuity of traffic during roadway construction.	Section 5.11.5.12, State Authorities and Administering Agencies	Fresno County	5
Local					
	Fresno County General Plan, Circulation Element, Policy TR-A.2.	Requires LOS D or better operating conditions for rural County roadways.	Section 5.11.5.1.3, Local Authorities and Administering Agencies	Fresno County	5
	Fresno County General Plan, Circulation Element, Policy TR-A.3.	New roadways require conformity with access specifications in the Circulation Diagram and Standards.	Section 5.11.5.1.3, Local Authorities and Administering Agencies	Fresno County	5

Notes:
FAA = Federal Aviation Administration
LORS = laws, ordinances, regulations, and standards
ROW = right-of-way

TABLE 5.11-16
AGENCY CONTACT LIST FOR LORS

Federal					
1	Karen McDonald 310.725.6557 Federal Aviation Administration Western Pacific Region AWP5202 15000 Aviation Boulevard, Lawndale, CA 90261-1002				
State					
2	Officer Mike Panelli 209.826.3811 California Highway Patrol 706 West Pacheco Blvd. Los Banos, CA 93635-3992	3	Kien Le 916.322.6001 Caltrans North Region Permits Office MS# 41 1823 14th Street Sacramento, CA 942874-001	4	Public Inquiry 916.657.8698 Department of Motor Vehicles, Licensing Operations Division 2415 1st Avenue Mail Station F101 Sacramento, CA 95818
Local					
5	Stan Nakagawa 559.262.4438 Principal Engineer/Manager Transportation Planning Division, Fresno County Public Works Department 2220 Tulare Street, 6th Floor Fresno, CA 93721				

LORS = laws, ordinances, regulations, and standards

The administering agency for the above statutes is the CHP.

The PEC would comply with these codes by requiring that contractors and employees be properly licensed and endorsed when operating vehicles used to transport hazardous materials.

5.11.5.2.3 <u>California Vehicle Code, Sections 13369, 15275, 15278</u>. These statutes address the licensing of drivers and the classification of license required for the operation of particular types of vehicles. A commercial driver's license is required to operate commercial vehicles. An endorsement issued by the Department of Motor Vehicles (DMV) is required to drive any commercial vehicle identified in Section 15278.

The administering agency for the above statutes is the DMV.

The PEC would comply with these codes by requiring that contractors and employees be properly licensed and endorsed when operating such vehicles.

5.11.5.2.4 <u>California Vehicle Code, Sections 31303-31309</u>. Requires that the transportation of hazardous materials be on the state or interstate highway that offers the shortest overall transit time possible.

The administering agency for the above statutes is the CHP.

The PEC would comply with this law by requiring that shippers of hazardous materials use the shortest route possible to and from the project site.

5.11.5.2.5 <u>California Vehicle Code, Sections 31600-31620</u>. Regulates the transportation of explosive materials.

The administering agency for the above statutes is the CHP.

It must be noted that the proposed PEC would not use explosive materials specifically defined in Section 12000 of the Health and Safety Code. However, the PEC would comply with this law by requiring that shippers of other potentially explosive materials have the required licenses from the CHP.

5.11.5.2.6 <u>California Vehicle Code, Sections 32000-32053</u>. Authorizes the CHP to inspect and license motor carriers transporting hazardous materials of the type requiring placards.

The administering agency for the above regulation is the CHP.

The PEC would comply with this law by requiring that motor carriers of hazardous materials be properly licensed by the CHP.

5.11.5.2.7 <u>California Vehicle Code, Sections 32100-32109</u>. Requires that shippers of inhalation hazards in bulk packaging to comply with rigorous equipment standards, inspection requirements, and route restrictions.

The administering agency for the above regulation is the CHP.

If applicable, the PEC would comply with this law by requiring shippers of these types of material to comply with all route restrictions, equipment standards, and inspection requirements.

5.11.5.2.8 <u>California Vehicle Code, Sections 34000-34100</u>. Establishes special requirements for vehicles having a cargo tank and for hazardous waste transport vehicles and containers, as defined in Section 25167.4 of the Health and Safety Code. The commissioner shall provide for the establishment, operation, and enforcement of random on- and off-highway inspections of cargo tanks and hazardous waste transport vehicles and containers and ensure that they are designed, constructed, and maintained in accordance with the regulations adopted by the commissioner pursuant to this code and Chapter 6.5 (commencing with Section 25100) of Division 20 of the Health and Safety Code.

The administering agency for the above regulation is the CHP.

The PEC would comply with this law by requiring that shippers of hazardous materials maintain their hazardous material transport vehicles in a manner that ensures the vehicles will pass CHP inspections.

5.11.5.2.9 California Vehicle Code, Section 3500. Regulates the safe operation of vehicles, including those vehicles that are used for the transportation of hazardous materials.

The administering agency for the above regulation is the CHP.

The PEC would comply with this law by requiring shippers of hazardous materials to have the necessary permits, inspections, and licenses issued by the CHP for the safe operation of the hazardous materials transport vehicles.

5.11.5.2.10 California Vehicle Code, Section 35550. Imposes weight guidelines and restrictions upon vehicles traveling upon freeways and highways. The section holds that "a single axle load shall not exceed 20,000 pounds. The load on any one wheel or wheels supporting one end of an axle is limited to 10,500 pounds. The front steering axle load is limited to 12,500 pounds." Furthermore, CVC Section 35551 defines the maximum overall gross weight as 80,000 pounds and adds that "the gross weight of each set of tandem axles shall not exceed 34,000 pounds."

The administering agency for the above statute is the Caltrans.

The PEC would comply with this code by requiring compliance with weight restrictions and by requiring heavy haulers to obtain permits, if required, prior to delivery of any heavy haul load.

5.11.5.2.11 California Vehicle Code, Section 35780. Requires a Single-Trip Transportation Permit to transport oversized or excessive loads over state highways. The permit can be acquired through the Caltrans.

The administering agency for the above statute is Caltrans.

The PEC would comply with this code by requiring that heavy haulers obtain a Single-Trip Transportation Permit for oversized loads for each vehicle, prior to delivery of any oversized load.

5.11.5.2.12 <u>California Streets and Highways Code, Section 117</u>. Unless otherwise specifically provided in the instrument conveying title, the acquisition by the department of any right-of-way (ROW) over any real property for state highway purposes, includes the right of the department to issue, under Chapter 3 (commencing with Section 660), permits for the location in the ROW of any structures or fixtures necessary to telegraph, telephone, or electric power lines or of any ditches, pipes, drains, sewers, or underground structures.

The administering agency for the above statute is Caltrans.

If applicable, the PEC would comply with this code by acquiring the necessary permits and approval from Caltrans with regard to use of public ROWs.

5.11.5.2.13 <u>The California Streets and Highways Code, Sections 660, 670, 672, 1450, 1460, 1470, 1480 et seq</u>. Defines highways and encroachment, requires encroachment permits for projects involving excavation in State Highways, County/City streets. This law is generally enforced at the local level.

The administering agencies for the above regulation are Caltrans and Fresno County Public Works Department.

PEC would apply for encroachment permits for any excavation in state and county roadways prior to construction.

5.11.5.2.14 <u>California Health and Safety Code, Section 25160 et seq</u>. Addresses the safe transport of hazardous wastes, requires a manifest for hazardous waste shipments, requires a person who transports hazardous waste in a vehicle to have a valid registration issued by the Department of Toxic Substances Control (DTSC) in his or her possession while transporting the hazardous waste.

The administering agency for the above regulation is the DTSC.

The PEC would comply with this law by requiring that shippers of hazardous wastes are properly licensed by the DTSC and hazardous waste transport vehicles are in compliance with DTSC requirements.

5.11.5.2.15 <u>California Department of Transportation Traffic Manual, Section 5-1.1</u>. Requires a temporary traffic control plan be provided for "continuity of function (movement of traffic, pedestrians, bicyclists, transit operations), and access to property/utilities" during any time the normal function of a roadway is suspended.

The administering agencies for the above regulation are Caltrans and Fresno County Public Works Department. The Applicant would file a Traffic Control Plan prior to the start of construction.

5.11.5.3 Local Authorities and Administering Agencies

According to the General Plan Circulation Elements of Fresno County, the following Programs and Policies of the General Plan address traffic and circulation that could be affected by construction of the proposed PEC:

5.11.5.3.1 Fresno County General Plan Circulation Element. Key roadways in Fresno County serve as vital transportation corridors within San Joaquin Valley. Passenger vehicles, motor homes, and trucks cross Fresno County en route to out-of-county and interstate destinations. In addition, rail traffic and pipelines have major routes through Fresno County.

The Fresno Council of Governments (COG) is the regional transportation agency that prepares the Regional Transportation Plan (RTP) to examine long-range transportation issues, opportunities and needs for Fresno County.

5.11.5.3.2 Fresno County General Plan, Circulation Element, Policy TR-A.2. The County shall plan and design its roadway system in a manner that strives to meet LOS D on urban roadways within the spheres of influence of the cities of Fresno and Clovis and LOS C on all other roadways in the county. Roadway improvements to increase capacity and maintain LOS standards should be planned and programmed based on consideration of the total overall needs of the roadway system, recognizing the priority of maintenance, rehabilitation, and operation of the existing road system. The County may, in programming capacity-increasing projects, allow exceptions to the level of service standards in this policy where it finds that the improvements or other measures required to achieve the LOS policy are unacceptable based on established criteria. In addition to consideration of the total overall needs of the roadway system, the County shall consider the following factors:

a. The right-of-way needs and the physical impacts on surrounding properties;

b. Construction and right-of-way acquisition costs;

c. The number of hours that the roadway would operate at conditions below the standard;

d. The ability of the required improvement to significantly reduce delay and improve traffic operations; and

e. Environmental impacts upon which the County may base findings to allow an exceedance of the standards.

In no case should the County plan for worse than LOS D on rural County roadways, worse than LOS E on urban roadways within the spheres of influence of the cities of Fresno and Clovis, or in cooperation with Caltrans and the Council of Fresno County Governments, plan for worse than LOS E on State highways in the county.

5.11.5.3.3 Fresno County General Plan, Circulation Element, Policy TR-A.3. The County shall require that new or modified access to property abutting a roadway and to intersecting roads conform to access specifications in the Circulation Diagram and Standards section. Exceptions to the access standards may be permitted in the manner and form prescribed in the Fresno County Zoning and Subdivision Ordinances, provided that the designed safety and operational characteristics of the existing and planned roadway facility will not be substantially diminished.

5.11.6 References

Baymetrics. 2006a. *24-hour ADT and Peak Hour Intersection Traffic Counts.*

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2006c. *Status of Projects, Central Region, Caltrans District 6*

2006d. *Transit Map, Fresno County Rural Transit Authority*

2006e. *Fresno County Rural Bikeway System, Fresno COG*

2005. *Interstate 5 Transportation Concept Report, Office of Systems Planning, Caltrans District 6*

2003. *San Joaquin Valley Growth Response Study, Phase III*

2000. *Fresno County General Plan Circulation Element.*

2000. *Fresno County General Plan Land Use Element.*

California Code. 2005a. *Vehicle Code.*

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California Department of Transportation, District 6. 2006a. Telephone conversation with Kurt Hatton on June 22, 2006, (559) 243-3451.

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City of Mendota Planning Department. 2006. Telephone conversation and facsimile correspondence with Nora Valdez on June 08, 2006, (559) 655-4298.

Code of Federal Regulations. 2002a. *Title 14 Aeronautics and Space, Federal Aviation Administration.*

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County of Fresno, 2000. *General Plan.* October.

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Transportation Research Board. 2000. *Highway Capacity Manual*.

Adequacy Issue: Adequate ____ Inadequate ____ **DATA ADEQUACY WORKSHEET** Revision No. 0 Date ____

Technical Area: **Traffic and Transportation** 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.	5.11.1, 5.11.2, 5.11.3, 5.11.4		
Appendix B (g) (5) (A)	A regional transportation setting, on topographic maps (scale of 1:250,000), identifying the project location and major transportation facilities. Include a reference to the transportation element of any applicable local or regional plan.	Figure 5.11-1, 5.11-2		
Appendix B (g) (5) (B)	An identification, on topographic maps at a scale of 1:24,000 and a description of existing and planned roads, rail lines, including light rail, bike trails, airports, bus routes serving the project vicinity, pipelines, and canals in the project area affected by or serving the proposed facility. For each road identified, include the following information, where applicable:	Figure 5.11-1, 5.11-2		
Appendix B (g) (5) (B) (i)	Road classification and design capacity;	5.11.1.1.2, 5.11.1.1.3		
Appendix B (g) (5) (B) (ii)	Current daily average and peak traffic counts;	Figure 5.11-4, 5.11.1.1.2, 5.11.1.1.3, Appendix T		
Appendix B (g) (5) (B) (iii)	Current and projected levels of service before project development, during construction, and during project operation;	5.11.2, 5.11.3		
Appendix B (g) (5) (B) (iv)	Weight and load limitations;	5.11.1.1.1		
Appendix B (g) (5) (B) (v)	Estimated percentage of current traffic flows for passenger vehicles and trucks; and	5.11.1.1.2, 5.11.1.1.3		
Appendix B (g) (5) (B) (vi)	An identification of any road features affecting public safety.	5.11.1		

Adequacy Issue: Adequate ____ Inadequate ____ **DATA ADEQUACY WORKSHEET** Revision No. 0 Date ____

Technical Area: **Traffic and Transportation** 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) (5) (C)	A description of any new, planned, or programmed transportation facilities in the project vicinity, including those necessary for construction and operation of the proposed project. Specify the location of such facilities on topographic maps at a scale of 1:24,000.	NA		
Appendix B (g) (5) (D)	An assessment of the construction and operation impacts of the proposed project on the transportation facilities identified. Include anticipated project-specific traffic, estimated changes to daily average and peak traffic counts, levels of service, and traffic/truck mix, and the impact of construction of any facilities identified in subsection (g)(5)(C).	5.11.2, 5.11.3		
Appendix B (g) (5) (E)	A discussion of project-related hazardous materials to be transported to or from the project during construction and operation of the project, including the types, estimated quantities, estimated number of trips, anticipated routes, means of transportation, and any transportation hazards associated with such transport.	5.11.2.3, 5.11.2.4, 5.14.1, 5.14.2		
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;	Table 5.11-15 5.11.5		
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.	5.11.5		
Appendix B (h) (2)	A discussion of the conformity of the project with the requirements listed in subsection (h)(1)(A).	5.11.5		
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.	Table 5.11-16		

Adequacy Issue: Adequate ____ Inadequate ____ **DATA ADEQUACY WORKSHEET** Revision No. 0 Date ____

Technical Area: **Traffic and Transportation** 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.	5.11.5		

5.12 NOISE

In accordance with CEC regulations, this section describes the existing noise environment on site and in the vicinity of the plant, and assesses potential noise impacts associated with the proposed project. Noise-sensitive receptors that may be affected by noise are identified, as well as the laws, ordinances, regulations, and standards that regulate noise levels at those receptors. The following discussion describes the results of a detailed site reconnaissance, sound level measurements, acoustical calculations, and assessment of potential noise impacts. Where appropriate, mitigation measures are proposed to reduce potential project-related noise impacts to acceptable levels.

5.12.1 Affected Environment

5.12.1.1 Fundamentals of Acoustics

Noise is generally defined as loud, unpleasant, unexpected, or undesired sound typically associated with human activity and that interferes with or disrupts normal activities. The human environment is characterized by a certain consistent noise level which varies with each area. This is called ambient noise. Although exposure to high noise levels has been demonstrated to cause hearing loss, the principal human response to environmental noise is annoyance. The response of individuals to similar noise events is diverse and influenced by the type of noise, perceived importance of the noise and its appropriateness in the setting, time of day and type of activity during which the noise occurs, and sensitivity of the individual.

Sound is a physical phenomenon consisting of minute vibrations that travel through a medium, such as air, and are sensed by the human ear. Sound is generally characterized by several variables, including frequency and intensity. Frequency describes the sound’s pitch and is measured in cycles per second, or hertz (Hz), whereas intensity describes the sound’s loudness and is measured in decibels (dB). Decibels are measured using a logarithmic scale. A sound level of 0 dB is approximately the threshold of human hearing and is barely audible under extremely quiet listening conditions. Normal speech has a sound level of approximately 60 dB. Sound levels above about 120 dB begin to be felt inside the human ear as discomfort and eventually as pain at still higher levels. The minimum change in the sound level of individual events that an average human ear can detect is about 3 dB. The average person perceives a change in sound level of about 10 dB as a doubling (or halving) of the sound’s loudness; this relation holds true for sounds of any loudness. Sound levels of typical noise sources and environments are provided in Table 5.12-1.

Because of the logarithmic nature of the decibel unit, sound levels cannot be added or subtracted directly and are somewhat cumbersome to handle mathematically. A simple rule is useful, however, in dealing with sound levels. If a sound’s intensity is doubled, the sound

TABLE 5.12-1
SOUND LEVELS OF TYPICAL NOISE SOURCES AND NOISE ENVIRONMENTS

Noise Source (at Given Distance)	Noise Environment	A-Weighted Sound Level	Human Judgment of Noise Loudness (Relative to Reference Loudness of 70 Decibels)
Military Jet Takeoff with Afterburner (50 ft)	Carrier Flight Deck	140 Decibels	128 times as loud
Civil Defense Siren (100 ft)		130	64 times as loud
Commercial Jet Take-off (200 ft)		120	32 times as loud Threshold of Pain
Pile Driver (50 ft)	Rock Music Concert Inside Subway Station (New York)	110	16 times as loud
Ambulance Siren (100 ft) Newspaper Press (5 ft) Gas Lawn Mower (3 ft)		100	8 times as loud Very Loud
Food Blender (3 ft) Propeller Plane Flyover (1,000 ft) Diesel Truck (150 ft)	Boiler Room Printing Press Plant	90	4 times as loud
Garbage Disposal (3 ft)	Higher Limit of Urban Ambient Sound	80	2 times as loud
Passenger Car, 65 mph (25 ft) Living Room Stereo (15 ft) Vacuum Cleaner (10 ft)		70	Reference Loudness Moderately Loud
Normal Conversation (5 ft) Air Conditioning Unit (100 ft)	Data Processing Center Department Store	60	1/2 as loud
Light Traffic (100 ft)	Large Business Office Quiet Urban Daytime	50	1/4 as loud
Bird Calls (distant)	Quiet Urban Nighttime	40	1/8 as loud Quiet
Soft Whisper (5 ft)	Library and Bedroom at Night Quiet Rural Nighttime	30	1/16 as loud
	Broadcast and Recording Studio	20	1/32 as loud Just Audible
		10	1/64 as loud
		0	1/128 as loud Threshold of Hearing

Source: Compiled by Kimley-Horn and Associates, Inc.

level increases by 3 dB, regardless of the initial sound level. Thus, for example, 60 dB + 60 dB = 63 dB, and 80 dB + 80 dB = 83 dB.

The normal human ear can detect sounds that range in frequency from about 20 Hz to 20,000 Hz. However, all sounds in this wide range of frequencies are not heard equally well by the human ear, which is most sensitive to frequencies in the range of 1,000 Hz to 4,000 Hz. This frequency dependence can be taken into account by applying a correction to each frequency range to approximate the human ear's sensitivity within each range. This is called A-weighting and is commonly used in measurements of community environmental noise. The A-weighted sound pressure level (abbreviated as dBA) is the sound level with the "A-weighting" frequency correction. In practice, the level of a noise source is conveniently measured using a sound level meter that includes a filter corresponding to the dBA curve.

The C-weighting network uses much smaller reductions in the low frequency range, which causes the C-weighted sound pressure level to be essentially controlled by the low-frequency content of the noise.

Because community noise fluctuates over time, a single measure called the Equivalent Sound Level (L_{eq}) is often used to describe the time-varying character of community noise. The L_{eq} is the energy-averaged A-weighted sound level during a measured time interval, and is equal to the level of a continuous steady sound containing the same total acoustical energy over the averaging time period as the actual time-varying sound. Additionally, it is often desirable to know the acoustic range of the noise source being measured. This is accomplished through the L_{max} and L_{min} indicators, which represent the root-mean-square maximum and minimum noise levels obtained during the measurement interval. The L_{min} value obtained for a particular monitoring location is often called the "acoustic floor" for that location.

To describe the time-varying character of environmental noise, the statistical noise descriptors L_{10}, L_{50}, and L_{90} are commonly used. They are the noise levels equaled or exceeded during 10, 50, and 90 percent of a stated time, respectively. Sound levels associated with L_{10} typically describe transient or short-term events, whereas levels associated with L_{90} describe the steady-state (or most prevalent) noise conditions.

Another sound measure known as the Community Noise Equivalent Level (CNEL) is an adjusted average A-weighted sound level for a 24-hour day. It is calculated by adding a 5-dB adjustment to sound levels during evening hours (7:00 p.m. to 10:00 p.m.) and a 10-dB adjustment to sound levels during nighttime hours (10:00 p.m. to 7:00 a.m.). These adjustments compensate for the increased sensitivity to noise during the typically quieter evening and nighttime hours.

Some land uses are considered sensitive to noise. Noise sensitive areas (NSAs) are land uses associated with indoor and/or outdoor activities that may be subject to stress and/or significant interference from noise. NSAs often include residential dwellings, mobile homes, hotels, motels, hospitals, nursing homes, educational facilities, and libraries. Industrial, commercial, and agricultural land uses are generally considered not sensitive to noise.

5.12.1.2 Ambient Noise Survey

A series of sound level measurements were conducted on June 19-20, 2006. The purpose of the measurements was to quantify the existing noise environment in the vicinity of the proposed project and to characterize NSAs that may be exposed to sound level increases as a result of the project. Measurement locations were near the closest residential locations as detailed below:

ML1: This location is northeast of the site. The residential building is a multiplex with five units. The building is on the south side of West Panoche Road, approximately ¾ mile southwest of the intersection with South Fairfax Avenue; however, no street address was visible. The measurement was conducted in the front yard of the westernmost unit. The meter was placed in the branches of a tree approximately 10 feet above ground level to minimize interference from residents. The location was monitored continuously from 1:00 p.m. on June 19, 2006, to 2:00 p.m. on June 20, 2006. Noise sources consisted of vehicular traffic on West Panoche Road that included agricultural vehicles, barking dogs, children playing, wind in the trees, and mechanical noise and industrial noise from equipment and processes at the existing Wellhead Power Panoche, LLC power plant and Pacific Gas & Electric (PG&E) substation.

The hourly L_{eq} ranged from 48 to 69 dBA (average = 60 dBA) and the hourly L_{90} ranged from 42 to 57 dBA (average = 50 dBA). The lowest four contiguous hour average L_{90} during the nighttime period was 42 dBA (1 a.m. to 5 a.m.). Refer to Table 5.12-2 for further details.

ML2: This location is north of the site. There are three single-family residential structures, in a row from east to west. The center building is inhabited; the other two are appear to be uninhabitable. The property is located on the north side of West Panoche Road, approximately 1.1 miles southwest of the intersection with South Fairfax Avenue; however, no street address was visible. There is a commercial building on the property, north of the residential area. The property is owned by the occupant of the residence. The measurement was conducted in the side yard of the residence. The location was monitored for one hour in each of the daytime, evening, and nighttime periods during the time frame of 2:00 p.m. on June 19, 2006 to 3:00 a.m. on June 20, 2006. Refer to Table 5.12-3 for further details. Noise sources consisted of vehicular traffic on West Panoche Road (including agricultural vehicles, wind in the trees, and industrial noise from mechanical equipment and processes at the existing Wellhead Power Panoche, LLC power plant and Pacific Gas & Electric (PG&E) substation.

TABLE 5.12-2
25-HOUR SOUND LEVEL MEASUREMENT AT ML1

Time	L_{eq}	L_{min}	L_{max}	L_{10}	L_{50}	L_{90}
13:00 – 14:00	64.9	44.0	85.8	67.2	60.8	52.7
14:00 – 15:00	64.2	44.2	79.6	67.5	60.9	51.7
15:00 – 16:00	63.9	44.1	78.1	66.9	61.7	54.0
16:00 – 17:00	62.4	42.6	79.8	66.0	57.5	50.1
17:00 – 18:00	59.8	40.0	76.0	62.4	54.6	48.9
18:00 – 19:00	60.3	42.3	78.0	64.1	56.3	49.6
19:00 – 20:00	62.1	41.0	75.1	66.0	59.1	50.8
20:00 – 21:00	64.9	41.4	76.1	69.5	60.1	47.0
21:00 – 22:00	57.7	41.8	77.5	61.0	48.6	45.0
22:00 – 23:00	56.5	43.9	77.8	53.3	47.5	45.4
23:00 – 00:00	50.6	43.7	73.6	48.6	46.4	45.0
00:00 – 01:00	48.2	42.6	72.4	47.5	45.1	43.7
01:00 – 02:00	50.8	42.4	73.2	48.4	45.3	44.0
02:00 – 03:00	51.5	40.8	79.6	46.5	43.4	41.8
03:00 – 04:00	50.0	40.0	73.8	45.2	43.1	41.6
04:00 – 05:00	54.7	40.2	79.3	49.5	43.9	42.0
05:00 – 06:00	69.3	47.3	77.5	73.5	65.9	57.0
06:00 – 07:00	64.1	46.3	77.5	68.1	61.3	53.9
07:00 – 08:00	64.0	48.5	74.9	67.7	61.9	53.8
08:00 – 09:00	63.9	46.2	77.6	67.6	60.8	54.2
09:00 – 10:00	64.8	49.1	78.1	67.8	62.7	57.2
10:00 – 11:00	64.5	46.3	79.0	67.9	62.0	55.0
11:00 – 12:00	62.3	45.8	80.8	65.7	58.6	51.6
12:00 – 13:00	63.2	46.1	79.3	66.0	60.6	53.4
13:00 – 14:00	61.5	42.9	79.6	63.8	56.6	50.3

Measurements were conducted on June 19 – 29, 2006
CNEL = 68 dBA

The hourly L_{eq} ranged from 41 to 46 dBA (average = 43 dBA) and the hourly L_{90} ranged from 37 to 39 dBA (average = 38 dBA). Refer to Table 5.12-3 for further details.

ML3: This location is northeast of the site. The street address of the property is 43405 West Panoche Road. There is one single-family residential structure, located on the northeast corner of the property, which is otherwise used for commercial purposes. The measurement was conducted in the side yard of the residence. The location was monitored for one hour in

TABLE 5.12-3
SHORT-TERM SOUND LEVEL MEASUREMENTS (DBA)

Measurement Location	Time	L_{eq}	L_{min}	L_{max}	L_{10}	L_{50d}	L_{90}
ML2	14:00 – 15:00	45.6	37.5	60.6	48.8	43.4	39.5
	21:05 – 22:00	42.6	36.9	64.4	39.5	37.5	37.1
	00:35 – 01:35	41.3	38.4	51.2	43.0	40.5	39.1
ML3	15:30 – 16:30	54.6	39.7	80.7	51.8	42.6	40.9
	19:00 – 20:00	48.9	39.1	70.4	47.3	42.0	40.0
	01:40 – 02:40	47.0	40.1	72.6	41.4	41.0	40.6

Measurements conducted on June 19-20, 2006.

each of the daytime, evening, and nighttime periods during the time frame of 2:00 p.m. on June 19, 2006 to 3:00 a.m. on June 20, 2006. Refer to Table 5.12-3 for further details. Noise sources consisted of vehicular traffic on West Panoche Road (including agricultural vehicles, wind in the trees, and industrial noise from mechanical equipment) and processes at the existing Wellhead Power Panoche, LLC power plant and Pacific Gas & Electric (PG&E) substation.

The hourly L_{eq} ranged from 47 to 57 dBA (average = 50 dBA) and the hourly L_{90} ranged from 40 to 41 dBA (average = 40 dBA). Refer to Table 5.12-3 for further details.

One Larson Davis Model 820 American National Standards Institute (ANSI) Type 1 Integrating Sound Level Meter (SLM) was used to conduct the 25 consecutive one-hour measurements at ML1. One Larson Davis Model 720 ANSI Type 2 Integrating SLM was used to conduct the one-hour measurements at ML2, ML3, and the project site, and one-minute measurements of fixed noise sources at the existing facilities adjacent to the site. The Model 720 meter was mounted on a tripod approximately 5 feet above the ground to simulate the average height of the human ear. The meters were calibrated before and after the measurement periods.

Weather conditions during the survey period were warm with clear skies and no precipitation. Air temperature during the measurement period ranged from 71°F to 98°F, with 16 percent to 43 percent relative humidity. The wind speed ranged from 0 to 5 miles per hour, and directed toward the southeast.

5.12.1.3 Local Land Use and Noise Sources

The project site description is located in Section 1.1. The project site is currently agricultural; surrounding land uses are generally agricultural, with some associated residential use. The predominant noise sources in the area include vehicular traffic (automobiles and agricultural equipment) and industrial noise from mechanical equipment and processes at the existing Wellhead Power Panoche, LLC power plant and Pacific Gas & Electric (PG&E) substation.

5.12.1.4 Sound Level Design Goals

Following the California Environmental Quality Act (CEQA) guidelines (California Code of Regulations, Title 14, Appendix G, Section XI), the project would cause a significant impact if it would result in any of the following:

- Exposure of people to noise levels in excess of standards established in the local General Plan or noise ordinance
- Exposure of people to excessive ground-borne noise levels or vibration
- Substantial permanent increase in ambient noise levels in the project vicinity
- Substantial temporary or periodic increase in ambient noise levels in the project vicinity

Generally, the design basis for noise control is the minimum, or most stringent, noise level required by any of the applicable LORS. Therefore, noise from this project is evaluated against Fresno County's requirements, as detailed below.

CEC staff has stated that increases in the background noise lower than 5 dBA at an NSA are clearly not significant or adverse, increases in background noise over 10 dBA at an NSA are clearly significant and adverse, and increases in background noise between 5 and 10 dBA at an NSA may or may not be significant and adverse, depending on the circumstances (CEC, 2002).

CEC staff has also stated that construction noise is typically insignificant if all of the following are true:

- The construction activity is temporary.
- Use of heavy equipment and noisy activities is limited to daytime hours.
- All feasible noise abatement measures are implemented for noise-producing equipment.

The Fresno County General Plan and the Fresno County Ordinance Code have been reviewed; portions relevant to this project are discussed in Section 5.12.4.3.

Existing NSAs in the vicinity of the project site include single- and multi-family residences located on West Panoche Road and South Fairfax Avenue, north and northeast of the site. Sound levels at these receptors are a function of their proximity to roadways and existing industrial noise sources. Noise from the existing Wellhead Power Panoche, LLC power plant and Pacific Gas & Electric (PG&E) substation is audible at the residences on West Panoche Road.

As required by CEC noise guidelines, new-source noise impacts at residential receptors are evaluated with respect to the pre-existing background noise level or specific performance noise level limits. The CEC defines the area impacted by the project as that area where construction or operation of the project potentially increases the noise level by 10 dBA or more over existing ambient background noise levels. The CEC defines the ambient background noise level as the lowest four-consecutive-hour arithmetic-average L_{90} at a 25-hour measurement site, and the lowest L_{90} at a short-term measurement site. Therefore, the intent of the current design is to limit the project noise level such that the cumulative noise level is not more that 10 dBA over the existing ambient background noise level at each NSA.

The ambient background noise level was 42 dBA at ML1, 37 dBA at ML2, and 40 dBA at ML3. The project design noise levels necessary to comply with CEC guidelines would be 52 dBA at ML1, 47 dBA at ML2, and 50 dBA at ML3.

As discussed in the General Plan, an exterior noise level up to 60 dBA CNEL is compatible with residential land uses. Because of the weighting and averaging nature of the CNEL, a constant noise source produces a CNEL approximately 7 dBA higher than its hourly L_{eq}. Therefore, constant noise sources producing exterior noise levels up to 53 dBA L_{eq} are compatible with residential land uses.

As discussed in the Ordinance Code, a project cannot cause the nighttime exterior sound level at any residence to exceed 45 dBA for more than 30 minutes in any one-hour period. To meet this requirement, the project noise level cannot exceed 45 dBA L_{eq} at any residence. This limit is more restrictive than the CEC noise guideline limit and will be used in its place. Therefore, the sound level design goal for this project is 45 dBA L_{eq} at ML1, ML2, and ML3.

5.12.1.5 Noise Prediction Modeling of Operational Noise

In order to evaluate the expected noise emissions of the facility and identify the need for noise control measures, a noise modeling study of the plant has been performed. The A-weighted emissions of all plant sources have been modeled at the receivers.

The Cadna/A Noise Prediction Model was used to estimate the project-generated sound level at the three closest NSAs. Cadna/A is a Windows-based software program that predicts and assesses noise levels near industrial noise sources. The model uses industry-accepted propagation algorithms and accepts sound power levels (in dB re 1 picoWatt) provided by the equipment manufacturer. The calculations account for classical sound wave divergence, plus attenuation factors resulting from air absorption, basic ground effects, and barrier/structure shielding. Air absorption was under “standard day” conditions of 59°F and 70% relative humidity. The site and surrounding areas were assumed to be flat, therefore, no intervening topographical barrier effects were considered. However, major buildings, tanks, and large equipment were included as barriers.

Calculations were performed using linear octave band sound power levels as inputs from each noise source. The model outputs are in terms of octave band and overall A-weighted sound pressure levels. The modeled noise sources and source sound levels are summarized in Table 5.12-4. Source sound levels were obtained from Bibb & Associates. The project site configuration was imported into Cadna/A from the project CAD files. The plant was assumed to operate 24 hours per day; therefore, the noise output would be constant regardless of time of day.

5.12.2 Environmental Consequences

Noise would be produced at the proposed project site, including the intake and discharge structures, during construction and operation of the project. Potential noise impacts from both activities are assessed in this section. To determine the significance of project-generated increases in noise levels, significance criteria were used. Impacts were considered significant if:

- Project operation or construction activities would conflict with Fresno County Ordinance Code requirements
- Project operation would conflict with Fresno County General Plan requirements
- Project operation would result in a substantial noise level increase at NSAs; in this analysis, an increase of more than 10 dBA was considered substantial

5.12.2.1 Plant Site

5.12.2.1.1 Construction Noise. Construction at the project site would result in a short-term temporary increase in the ambient noise level near the construction activity. The magnitude of the increase would depend on the type of construction activity, the noise levels generated by various pieces of construction equipment, the duration of the construction phase, and the distance between the noise sources and receiver. Figure 5.12-2 shows average noise levels generated by individual pieces of construction equipment (U.S. EPA, 1972). Since a detailed construction plan identifying construction sequences, phases, and specific equipment has not been developed, specific projection of sound levels cannot be made. Construction would occur during the daytime hours (7:00 a.m. to 7:00 p.m. [5:00 p.m. on Saturday or Sunday]). Construction noise is expected to comply with Fresno County Ordinance Code requirements. No significant impacts would occur.

TABLE 5.12-4
EQUIPMENT SOUND POWER LEVELS

	Sound Power Level (dB) at Octave Band Center Frequency (Hz)									
Noise Source	31.5	63	125	250	500	1000	2000	4000	8000	A-Wt
Air Compressor Skid	95	102	100	100	97	96	95	94	90	103
Ammonia Forwarding Pumps	91	102	96	96	93	92	91	90	86	98
Ammonia Injection Skid	91	102	96	96	93	92	91	90	86	98
Circulating Water Pumps	96	103	101	101	98	97	96	95	91	103
Cooling Tower (per cell)	105	106	104	100	97	97	97	97	104	106
Auxiliary Skid	85	87	92	104	106	102	99	101	80	108
Cooling/Purge Air Fans	51	90	104	96	96	95	85	80	82	98
Air Inlet Filter House	108	106	101	91	71	66	77	90	90	94
Generator Enclosure Walls	107	106	106	94	89	90	86	77	77	96
Generator Exhaust Silencer, Damper & Exit	111	103	108	96	81	78	77	75	76	94
Generator Vent Fan Motor & Shell Surfaces	-	102	102	91	78	73	71	68	65	88
Inlet Silencer Shell Surfaces	-	101	94	91	84	79	75	71	63	87
Turbine Enclosure Walls	108	105	101	95	91	84	85	87	83	95
Turbine Vent Fan Discharge	103	105	98	96	84	85	86	83	76	93
Turbine Vent Fan Shell, Motor & Silencer Shell Surfaces	101	98	99	99	91	89	84	85	80	96
Step-Up Transformer	95	101	103	98	98	92	87	82	75	98
Demineralized Water Pumps	91	102	96	96	93	92	91	90	86	98
Fire Water Pump Building	101	104	98	92	78	69	62	56	55	86
Fuel Gas Compressor	114	112	107	104	102	102	100	96	92	107
Fuel Gas Compressor Aftercooler	69	109	122	115	109	106	105	105	107	114
Fuel Gas Regulator Skid	-	-	-	88	90	95	105	103	95	109
Raw Water Pumps	91	102	96	96	93	92	91	90	86	98
Selective Catalytic Reduction Unit	121	116	113	106	97	83	76	68	51	102
Wastewater Forwarding Pumps	91	102	96	96	93	92	91	90	86	98
Turbine Exhaust Duct Casing	116	104	103	104	99	90	87	84	65	100
Turbine Exhaust Stack	140	132	134	140	141	133	130	130	118	141
Turbine Exhaust Stack Silencer	-2	-6	-14	-27	-35	-30	-26	-15	-7	-35

Source: Bibb and Associates, Inc.

5.12.2.1.2 **<u>Operation Noise</u>.** Project operation would involve the introduction of noise-generating equipment. The overall noise level generated would depend upon the physical layout of the facility, noise generation of equipment, numbers of individual equipment units, and the noise control measures incorporated into the facility design. Noise-producing equipment is listed in Table 5.12-4. Project noise control measures include an exhaust stack silencer, an enclosure around the fuel gas compressors, and a 30-foot high barrier adjacent to the fuel gas compressors and combustion turbine generators.

Acoustical calculations were performed to estimate the sound level from the project at the NSAs, identified as ML1, ML2, and ML3 on Figure 5.12-1. From the center of the site, ML1 is approximately 1,900 feet northeast, ML2 is approximately 800 feet north and ML3 is approximately 3,300 feet northeast. There are scattered structures that could provide acoustical shielding near ML1 and ML3. There are no other NSAs within one mile of the project site.

Project-related noise contours are depicted in 5-dBA increments on the project site. The estimated sound level would be 51 dBA L_{eq} (57 dBA CNEL) at the 5-unit multiplex residential building to the northeast (ML1), 58 dBA L_{eq} (64 dBA CNEL) at the single-family residence to the north (ML2), and 40 dBA L_{eq} (46 dBA CNEL) at the two single-family residences to the northeast (ML3). The project would increase the sound level at ML1, ML2, and ML3 by approximately 10 dBA, 21 dBA, and 3 dBA above the respective lowest measured L_{90} at each location. Because project-related noise would increase the sound level at ML2 by more than 10 dBA, and because the project-related sound level at ML1 and ML2 would exceed 45 dBA, significant impacts would occur. For further details, refer to Table 5.12-5, which shows the measured ambient sound level, the project noise level, and the cumulative (project plus ambient) sound level.

TABLE 5.12-5
NIGHTTIME AMBIENT SOUND LEVEL AND PLANT DESIGN SOUND LEVEL

NSA	Source-to-Receptor Distance	Ambient Sound Level	Project-Generated Sound Level	Cumulative Sound Level
ML1	1,900 feet	42 dBA	51 dBA	52 dBA
ML2	800 feet	37 dBA	58 dBA	58 dBA
ML3	3,300 feet	40 dBA	40 dBA	43 dBA

Notes:
Ambient sound level = lowest measured four-consecutive-hour arithmetic-average L_{90}
Cumulative = ambient + project

5.12.2.1.3 <u>Worker Exposure to Noise</u>. Occupational noise exposure of employees within the plant cannot be evaluated until the project has been constructed and employee jobs and routines determined. The Project Owner will conduct an occupational noise survey to identify the noise hazardous areas in the facility. The survey will be conducted after the facility is in full operation, and will be conducted by a qualified person in accordance with the provisions of Title 8, California Code of Regulations, Section 5095-5100 (Article 105) and Title 29, Code of Federal Regulations, Part 1910.

5.12.2.2 Pipelines

Construction of the pipeline would result in a short-term temporary increase in the ambient noise level at the ML1 and ML2. Sound levels for pipeline construction typically range from 75 to 90 dBA at 50 feet from the work area. Construction would occur during the daytime hours (7:00 a.m. to 7:00 p.m. [5:00 p.m. on Saturday and Sunday]). Construction noise is expected to comply with the Fresno County Ordinance Code requirements. No significant impacts would occur.

5.12.2.3 Cumulative Impacts

The Starwood project, a 120 MW peaker plant, is proposed to be permitted on the PG&E site east of the PEC. Noise generated by the Starwood project would be expected to increase the ambient noise level at ML1, ML2 and ML3. The amount of the increase would depend on the equipment proposed and the location of the equipment on the site. Specific information about the project is currently unknown. However, is the sound levels from the Starwood project are similar to the PEC, the cumulative effect would result in a minimum increase of 3 dBA at ML1, ML2 and ML3 and would significantly impact these receptors.

5.12.3 Mitigation Measures

Noise levels from the PEC will exceed CEC and local noise standards without noise abatement measures. The applicant and the applicant’s engineer are assessing technically feasible noise mitigation measures. Other mitigation measures being considered include the removal of the use of ML2 as a residence. In addition, efforts are currently ongoing to obtain confirmation from equipment manufacturers and noise control vendors on additional mitigation measures that can be utilized for noise reduction of the PEC. Onsite noise levels in and near the power units would require normal industrial occupational safety measures relating to noise.

5.12.4 Laws, Ordinances, Regulations, and Standards

The LORS applicable to noise for the proposed project are summarized in Table 5.12-6.

5.12.4.1 Federal

There are no noise-related federal LORS that affect this project. However, there are guidelines at the federal level that direct the consideration of a broad range of noise and vibration issues as listed below:

TABLE 5.12-6
APPLICABLE LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

LORS	Applicability	Section
Federal		
EPA 1974 Noise Guidelines	Guidelines for state and local governments.	N/A
Noise Control Act (1972) as amended by the Quiet Communities Act (1978); (42 USC 4901 - 4918)	Separate noise-sensitive areas are encouraged.	N/A
State		
Cal-OSHA Occupational Noise Exposure Regulations (8 CCR, General Industrial Safety Orders, Article 105, Control of Noise Exposure, § 5095, et seq.)	Sets employee noise exposure limits. Equivalent to Federal OSHA standards.	Section 8.5.2.1.3
Local		
County of Fresno General Plan	This requirement is applicable to stationary noise sources such as the proposed project. It refers to the Fresno County Ordinance Code for limits.	Section 8.5.2.1.2
County of Fresno Ordinance Code, Section 8.40.040	This requirement is applicable to noise generated during operation of the proposed project. It sets sound level limits at residences and other outdoor activity areas.	Section 8.5.2.1.2
County of Fresno Ordinance Code, Section 8.40.060	This requirement is applicable to noise generated during construction of the proposed project. It restricts the hours of the day that construction is permitted.	Section 8.5.2.1.2

- National Environmental Policy Act (42 USC 4321, et seq.) (PL-91-190) (40 CPR § 1506.5)
- Noise Control Act of 1972 (42 USC 4910)

The USEPA has not promulgated standards or regulations for environmental noise generated by power plants. However, the USEPA has published a guideline (EPA Levels Document, Report No. 556/9-74-664) containing recommendations for noise levels affecting residential land use of Ldn 55 dBA outdoors and Ldn 45 dBA indoors. The agency is careful to stress that the recommendations contain a factor of safety and do not consider technical or economic feasibility issues, and therefore should not be construed as standards or regulations.

5.12.4.2 State of California

Occupational exposure to noise is regulated by Cal-OSHA in Title 8, Group 15, Article 105, Sections 5095 to 5100. The standard stipulates that protection against the effects of noise exposure shall be provided when sound levels exceed 90 dBA over an 8-hour exposure period. Protection shall consist of feasible administrative or engineering controls. If such controls fail to reduce sound levels to within acceptable levels, personal protective equipment shall be provided and used to reduce exposure to the employee. Additionally, a Hearing Conservation Program must be instituted by the employers whenever employee noise exposure equals or exceeds the Action Level of an 8-hour time-weighted average (TWA) sound level of 85 dBA. The Hearing Conservation Program requirements consist of periodic area and personal noise monitoring, performance and evaluation of audiograms, provision of hearing protection, annual employee training, and record keeping.

5.12.4.3 County of Fresno

5.12.4.3.1 Fixed Noise Sources. Policy HS-G.4 of the Noise Element of the Fresno County General Plan states:

> *So that noise mitigation may be considered in the design of new projects, the County shall require an acoustical analysis as part of the environmental review process where… proposed projects are likely to produce noise levels exceeding the levels shown in the County's Noise Control Ordinance at existing or planned noise-sensitive uses.*

Section 8.40.040 of the Fresno County Ordinance Code (County of Fresno 2006) states:

> *A. It is unlawful for any person… to create any noise… which causes the exterior noise level when measured at any affected single- or multiple-family residence… to exceed the noise level standards as set forth in the following table:*

Category	Cumulative Number of minutes in any one-hour time period	Noise Level Standards, dBA Daytime 7 a.m. to 10 p.m.	Noise Level Standards, dBA Nighttime 10 p.m. to 7 a.m.
1	30	50	45
2	15	55	50
3	5	60	55
4	1	65	60
5	0	70	65

Applicable sound level limits are summarized in Table 5.12-6.

5.12.4.3.2 Construction. Policy HS-G.6 of the Health and Safety Element of the Fresno County General Plan (County of Fresno 2000) states:

> *The County shall regulate construction-related noise to reduce impacts on adjacent uses in accordance with the County's Noise Control Ordinance.*

Section 8.40.060 of the Fresno County Ordinance Code (County of Fresno 2006) states:

> *The following activities shall be exempted from the provisions of this chapter:… C. Noise sources associated with construction, provided such activities do not occur before 6:00 a.m. or after 9:00 p.m. on any day except Saturday or Sunday, or before 7:00 a.m. or after 5:00 p.m. on Saturday or Sunday.*

5.12.5 Involved Agencies and Agency Contacts

No agencies were contacted.

5.12.6 Permits Required and Permit Schedule

No permits are required.

5.12.7 References

California Energy Commission. 1997. Rules of Practice and Procedure, Power Plant Site Certification Regulations.

County of Fresno. 2000. Fresno County General Plan. Health and Safety Element. October.

2006. Fresno County Ordinance Code. Chapter 8.40 Noise Control. May 2.

Edison Electric Institute. 1984. *Electric Power Plant Environmental Noise Guide.* Volume 1, Second Edition.

Harris, Cyril M. 1979. Handbook of Noise Control, Second Edition.

ISO (International Organization Standardization). 1996a. Description and Measurement of Environmental Noise, Basic Quantities and Procedures Part 1, ISO 1996/1.

1996b. Description and Measurement of Environmental Noise, Basic Quantities and Procedures, Acquisition of Data Pertinent to Land Use, Part 2, ISO 1996/2.

1996c. Description and Measurement of Environmental Noise, Basic Quantities and Procedures, Application to Noise Limits, Part 3, ISO 1996/3.

U.S. Environmental Protection Agency (USEPA). 1971. *Noise from Construction Equipment and Operations, Building Equipment and Home Appliances.* (Prepared under contract by Bolt, et al., Bolt, Beranek & Newman, Boston, MA). Washington, DC.

1974. March. Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety, EPA Report 55019-74-004. Washington, DC.

Adequacy Issue: Adequate ____ Inadequate ____ **DATA ADEQUACY WORKSHEET** Revision No. ____ Date ____________

Technical Area: **Noise** 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.	S. 5.12.1.2 S. 5.12.1.3 S. 5.12.2.2 S. 5.12.2.3		
Appendix B (g) (4) (A)	A land use map which identifies residences, hospitals, libraries, schools, places of worship, or other facilities where quiet is an important attribute of the environment within the area impacted by the proposed project. The area impacted by the proposed project is that area where there is a potential increase of 5 dB(A) or more, during either construction or operation, over existing background levels.	Figure 1		
Appendix B (g) (4) (B)	A description of the ambient noise levels at those sites identified under subsection (g)(4)(A) which the applicant believes provide a representative characterization of the ambient noise levels in the project vicinity, and a discussion of the general atmospheric conditions, including temperature, humidity, and the presence of wind and rain at the time of the measurements. The existing noise levels shall be determined by taking noise measurements for a minimum of 25 consecutive hours at a minimum of one site. Other sites may be monitored for duration at the applicant's discretion during the same 25-hour period. The results of the noise level measurements shall be reported in L_{eq} (equivalent sound or noise level), L_{dn} (day-night sound or noise level) or CNEL (Community Noise Equivalent Level) in units of dB(A). The L_{10}, L_{50}, and L_{90} values (noise levels exceeded 10 percent, 50 percent, and 90 percent of the time, respectively) shall also be reported.	S. 5.12.1.2 Tables 5.12-2 & 5.12-3		
Appendix B (g) (4) (C)	A description of the major noise sources of the project, including the range of noise levels and the tonal and frequency characteristics of the noise emitted.	Table 5.12-4		

Adequacy Issue: Adequate ____ Inadequate ____ **DATA ADEQUACY WORKSHEET** Revision No. ____ Date ____

Technical Area: **Noise** 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) (4) (D)	An estimate of the project noise levels, during both construction and operation, at residences, hospitals, libraries, schools, places of worship or other facilities where quiet is an important attribute of the environment, within the area impacted by the proposed project.	S. 5.12.2.1.1 S. 5.12.2.1.2		
Appendix B (g) (4) (E)	An estimate of the project noise levels within the project site boundary during both construction and operation and the impact to the workers at the site due to the estimated noise levels.	Figure 2 S. 5.12.2.1.3		
Appendix B (g) (4) (F)	The audible noise from existing switchyards and overhead transmission lines that would be affected by the project and estimates of the future audible noise levels that would result from existing and proposed switchyards and transmission lines. Noise levels shall be calculated at the property boundary for switchyards and at the edge of the rights-of-way for transmission lines.	N/A		
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;	Table 5.12-6		
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.	Table 5.12-6		
Appendix B (h) (2)	A discussion of the conformity of the project with the requirements listed in subsection (h)(1)(A).	S. 5.12.2.1.2		

Adequacy Issue: Adequate ____ Inadequate ____ **DATA ADEQUACY WORKSHEET** Revision No. ____ Date ____________

Technical Area: **Noise** 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) (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.	S. 5.12.5		
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.	S. 5.12.6		

5.13 VISUAL RESOURCES

This section discusses the potential for the construction, operation, and maintenance of the Panoche Energy Center (PEC) to cause significant impacts to aesthetic values within the project vicinity. The section addresses the inventory of existing visual considerations of the affected environment, the assessment of the environmental consequences of the PEC on visual resources, and the laws, ordinances, regulations, and standards (LORS) pertaining to the aesthetic effects of the PEC.

The visual resource studies were conducted in conformance with California Energy Commission (CEC) guidelines for the inventory and assessment of visual impacts for an Application for Certification (AFC). The CEC guidelines, in turn, comply with the California Environmental Quality Act (CEQA) documentation requirements (summarized in Section 6.11.2, Environmental Consequences). The study methods used (described in more detail in the inventory and impact assessment sections below) were based upon those established by the Bureau of Land Management (BLM) *Visual Resource Management Inventory and Contrast Rating System* (BLM, 1986), the Federal Highway Administration (FHWA) *Visual Impact Assessment* (FHWA, 1981) and *U.S. Forest Service Visual Management System* (USFS, 1974, 1995), previous methodologies used in other CEC studies (e.g., Application for Certification for San Joaquin Valley Energy Center Power Plant Project (01-AFC-22), and other energy related projects. Additionally, the methodology has been tailored to meet the specific issues and regulatory requirements associated with the PEC.

5.13.1 Affected Environment

This section describes the inventory of visual resources within the vicinity of the PEC. A description of the regional landscape setting, the anticipated visual sphere of influence (VSOI) of the project, and the inventory methods and results are included.

5.13.1.1 <u>Regional Landscape Setting</u>

The project is located in the unincorporated area of western Fresno County (Figure 5.13-1). The site is more specifically described as the Southwest Quarter of Section 5, Township 15 South, Range 13 East, on the USGS Quadrangle map. The assessor’s parcel number (APN) is 027-060-78S.

The plant site (Figures 5.13-2 and 5.13-3) will be located on a 12.8-acre site within a 128-acre parcel. The construction area, including laydown and parking, is an eight-acre portion of the 128-acre parcel immediately south of the 12.8-acre plant site. The plant site and construction area are leased by the Applicant from the property owners. The 128-acre parcel is currently in agricultural production with pomegranate trees. Offsite improvements associated with the project include a 400-foot-long paved access road south of West Panoche Road to the plant site, 2,400 linear feet of new gas pipeline, a 300-foot transmission line to tie into the Panoche Substation, and an expansion of the Panoche Substation by approximately 1.1 acres south of the existing substation boundary. The PEC includes the plant site, construction laydown area, and all of the described offsite improvements.

The PEC site (Figure 5.13-1) is within western Fresno County adjacent to the Panoche Hills and east of the San Benito County line. The project is approximately 50 miles west of the city of Fresno and approximately 2 miles to the east of Interstate Highway 5 (I-5). The surrounding area is predominantly used for agriculture with two existing power generation facilities nearby.

Power line easements are located along the western boundary and adjacent to the northeast corner of the site. The site is essentially flat lying, with a slight slope down to the northeast.

The landform within the area is flat to slightly rolling topography, allowing for open, expansive views of several mountain ranges to the west of the valley. These include: the Panoche Mountains and Panoche Hills to the west; Ciervo Mountain and Tumey Hill to the south; and Sugarloaf and Ortigalita peaks to the northwest. The site elevation is approximately 420 feet above mean sea level and slopes gently down to the northeast at less than one percent grade.

The California Aqueduct runs about 2 miles northeast of the PEC site and is the dominant water feature in this region. Other water features in the project area include Panoche Creek, which runs 1 mile north to 2 miles west to of the project site where it connects to Silver Creek. Other significant features within the project area include the Panoche Hills Wilderness Study Areas (North and South) which lie about 5-10 miles west of the project area. These and other BLM-owned lands form a patchwork across the western region surrounding the project area.

In general, the area comprises agricultural lands, industrial facilities, ranch lands, and semi-urban developed areas. Two census tracts cover the project vicinity, and account for approximately 2,000 residents within the region. However, these two tracts cover a large area, including one semi-urban community, Panoche Junction. Panoche Junction, located approximately 10 miles southeast of the project, is characteristic of the semi-urban development in the area with a population of approximately 900 and an area of one half square mile. In addition, several other semi-urban communities surround the project region, although each is located over five miles away from the project site. Those nearest include: Three Rocks, Firebaugh, Mendota, Tranquility, and San Joaquin. The only large incorporated city in the area is Fresno, which lies approximately 40 miles to the east of the project area and contains the largest population in the nearby region, about 430,000.

Fruits and nuts (39 percent) are the predominant crop for Fresno County (Fresno County Agricultural Commissioner Crop Report, 2004), followed by vegetables (27 percent) and livestock and poultry (20 percent). The project area landscape is highly engineered in that its use for intensive agricultural production has been made possible by land clearing and leveling and development of drainage channels, irrigation canals, roads, transmission lines, and electric power facilities. The infrastructure facilities that support the landscape's agricultural use are highly visible components of the landscape pattern. For example, two peaker power plants and a substation are adjacent and therefore highly visible to the site. In addition, transmission lines pass through the area along Panoche Road.

As mentioned previously, cultural modifications within the VSOI include, but are not limited to, agricultural crops, ranch-like development, two existing peaker plants, the existing Panoche Substation, agricultural and/or storage buildings, and other large industrial facilities. Several transmission lines that support electricity transmission also traverse the landscape within the VSOI.

5.13.1.2 Visual Sphere of Influence

The VSOI for the PEC (Figure 5.13-4) represents the area within which the project could be seen and potentially result in significant impacts to visual resources. The furthest distance at which potentially significant visual impacts could occur was identified as five miles. This distance was based primarily on the project description regarding the potential visibility of major project components (e.g., CTG stacks [90 feet tall], cooling tower [42 feet tall], generation switchyard, etc.) from sensitive viewing areas. In addition, the distance was based upon the guidelines established in the *U.S. Forest Service Visual Management System* (USFS, 1974, 1995). Based upon USFS distance definitions, the project was reviewed for sensitive resources within the following view ranges:

Foreground – 0 to 0.5 mile from the observer's position. At this distance, the observer can view details of trees, shrubs, wildflowers, and animals.

Middleground – 0.5 to 5 miles from the observer's position. At this distance, the observer can see forest stands, natural openings, masses of shrubs, and rock outcrops.

Background – 5 miles to horizon from the observer's position. At this distance, the observer can view mountain peaks, ridgelines, and patterns of forest stands and openings.

Based on a five-mile distance limit, the VSOI boundary was refined to account for local viewing conditions, primarily topographic and vegetative screening. Computer viewshed analyses were conducted (using 10-meter-grid cell resolution, generated from 1:24,000 Digital Elevation Model [DEM] data from the USGS) to map the boundaries of the VSOI within the five-mile limit. USGS DEM files were imported into an ArcView 9.1-based geographical information system (GIS) using the spatial analysis extension. Once in GIS, the DEMs are mosaiced. From the combined DEM, a triangulated irregular network (TIN) was created. This TIN was used to run viewshed analyses in relation to the PEC components in

Universal Transverse Mercator, Zone 11, Units Meters, Clarke 1866 Spheroid, North American Datum 83 (UTM 83).

For the PEC, the centroid of the plant site was used (at 6 feet above existing grade) to run an “existing” viewshed map. Next, a centroid of the plant site’s tallest structure, a turbine stack height of 90 feet, was input and the viewshed model was re-run. The results represent a “typical” viewshed for the project area, since final stack locations had not yet been determined. Next, a second viewshed model was run using the entire site area raised to a proposed height of 90 feet. This second viewshed model was meant to represent a “worst-case” viewing scenario. Since exact locations of the four turbine stacks had not yet been determined, this “worse-case” scenario reflected viewing conditions if the stacks were placed anywhere within the project site area.

Overall, the project site is clearly visible from several nearby residents and nearby roadway users (within 0.5 mile), middleground/background views from I-5 (within 2 miles) and sporadic locations within the valley and surrounding mountains (5 miles and beyond). Beyond the mapped VSOI, the PEC would be either not visible due to topography/screening, or of such a small size in the background field of view that significant impacts would not be expected.

The VSOI also takes into account the visibility of the existing industrial development (substation, large transmission lines, and peaker plants), as well as the visibility of the PEC facilities (stacks). Other variables affecting potential visibility of the project include: orientation of the viewer, duration of view, atmospheric conditions, lighting (daylight versus nighttime), and visual absorption capability (VAC). VAC is defined as the extent to which the complexity of the landscape can absorb new elements without changing the overall visual character of the area.

The VSOI was mapped to identify the maximum potential area for significant impacts of the PEC in views from visually sensitive areas. Within the VSOI, varying levels of project visibility have been identified. The highest level of project visibility exists when the viewer is adjacent to the PEC site, is a permanent stationary viewer and there is no screening. Conversely, the lowest level of visibility exists, for example, when the viewer is located at greater distances from the site, the viewer is traveling at a high rate of speed and in partial to fully screened conditions.

Sensitive viewing areas were identified and inventoried within the 5-mile radius of the PEC site. The identification of sensitive viewing areas within the VSOI was conducted through review of existing land use data, agency contacts, and during field reviews. The following is a representative list of sensitive viewing areas that were considered during the inventory:

- Residential areas

- Parks, recreation areas, wildlife areas, visitors centers; or areas used for camping, picnicking, bicycling, boating (e.g., Mendota Wildlife Area), or other recreational activities
- Travel routes: major roads or highways used primarily by origin/destination travelers and designated scenic roads

During field surveys conducted within the immediate project vicinity, it was estimated that several attached and detached homes are present and may have views of the PEC site (Figure 5.13-5). Five attached homes lie just to the east of the existing substation. These viewers will have indirect, partially impeded views through the substation to the project site. In addition, there are three detached homes directly across the street from the site. Two have vegetative screening blocking current views to the site. The third has unimpeded direct views. There are agricultural crops that will be in the immediate foreground views for these residents. However, turbine stacks, possible cooling tower stacks, and other tall structures will be clearly visible from these residences. A nearby recreational area (a flat agricultural field which has been converted by local users to a soccer field/park area) lies approximately 1 mile west of the project site.

Additionally, traffic flow was examined for major and secondary travel routes within the VSOI. Road counts are approximately 51,500 average daily trips (ADT) along I-5 (although views are distant, often screened, and sporadic).

Travelers along West Panoche Road will have indirect views of the site. Agricultural crops adjacent to the road will block portions of the site, however stacks and other highly visible features of the plant will clearly be visible from this roadway. In addition, for areas where the topography gives a more direct view to the project site (e.g., the intersection of West Panoche Road and I-5), travelers will have a clear, albeit distant, view to the site.

Levels of potential impact on sensitive viewing areas were established through an analysis of the following two primary components:

- Impact susceptibility: the degree to which a sensitive viewpoint would be impacted by changes within its viewshed
- Impact severity: the degree of change to the landscape created within a specific viewshed

Character photos of the areas surrounding the project site (Figures 5.13-.6 through 5.13-9) show sensitive viewing areas and sensitive visual resources within the surrounding project area. Some of these character photos do not have views to the project, however have been included to help identify potentially sensitive visual resources within the region. These photos also help the reader understand the general visual character of the surrounding area and the land uses within the region. The results of the viewshed analysis and the field photo survey indicated that most sensitive viewing areas within the VSOI were from those areas immediately adjacent to the PEC site (foreground viewers) and from the overpass on I-5 at West Panoche Road which has middleground/background views to the project.

5.13.1.3 Visual Study Inventory Components

The following sections detail the visual study inventory components used in the assessment of potential impacts. Three primary components that were inventoried include: 1) an evaluation of scenic attractiveness; 2) consideration of Existing Scenic Integrity Levels (ESILs); and 3) the identification of sensitive viewing areas.

5.13.1.3.1 Scenic Attractiveness. When evaluating scenic attractiveness, both natural and the manmade components within the VSOI were considered as they relate to either adding to or detracting from the overall landscape character within a specific setting. Scenic attractiveness levels are established by evaluating the distinctiveness and diversity of a particular landscape setting in relation to the following elements:

- Landform
- Vegetation
- Water
- Color
- Effects of adjacent scenery
- Scarcity of the landscape
- Cultural modifications

The inventory and evaluation of the above elements assist with the characterization of scenic attractiveness within the VSOI. In general, landscapes are characterized by three levels: A through C.

Class A areas have outstanding diversity or interest; characteristic features of landform, water, and vegetation are distinctive or unique in relation to the surrounding region. These areas contain considerable variety in form, line, color, and texture. Class B areas have above-average diversity or interest, providing some variety in form, line, color, and texture. The natural features are not considered rare in the surrounding region but provide adequate visual diversity to be considered of value. Class C areas have minimal diversity or interest; representative natural features have limited variation in form, line, color, or texture in the context of the surrounding region. Discordant cultural modifications (e.g., power plants, transmission lines, and pipelines) can be highly noticeable, which can reduce the inherent value of the natural setting.

The VSOI for the project area was characterized at the C level for scenic attractiveness. No landscapes were considered to have distinctive characteristics as defined for Class A levels. Most landscapes within the VSOI were identified as Class C or as landscapes lacking significant natural amenities.

Scenic Attractiveness Classification Evaluation Forms (Figures 5.13-10 through 5.13-12) were developed for key view areas within the VSOI. The values underlined in the scenic attractiveness rating box on the forms illustrate the assigned values (H – high, M – moderate, L – low) for each natural feature (e.g., landform, vegetation, water, etc.) or negative/positive cultural modification. The combined value of these elements is used to determine in which class the landscape should be characterized. The Visual Resource Management (VRM) system is designed to separate the existing landscape and the proposed project into their features and elements and to compare each part to the other to identify parts that are incompatible (BLM, 1986). The resulting landscape classifications are:

Class I – The objective of this class is to preserve the existing character of the landscape. Changes to the landscape character should not be evident.

Class II – The objective of this class is to retain the existing character of the landscape. Changes to the landscape character may attract slight attention but should be subordinate to the visual setting.

Class III – The objective of this class is to partially retain the existing character of the landscape. Changes to the landscape character may begin to attract attention but should not dominate the visual setting.

Class IV – The objective of this class is to allow for activities that modify the existing character of the landscape. Changes to the landscape character may attract attention and dominate the visual setting. However, these activities should minimize changes to the landscape where possible.

5.13.1.3.2 Existing Scenic Integrity Levels. The ESILs of a specific landscape setting can be defined as the extent to which natural features have been modified by human actions to the point of degrading the natural setting. An inventory of the ESILs within the VSOI was conducted and varying cultural modifications were documented. Varying cultural modifications included, but were not limited to, existing power plants and associated transmission lines, pipelines, substations, and other large industrial facilities. The following ESIL criteria were used to evaluate degrees of modifications:

- **High –** The landscape character appears intact. Deviations are present but repeat form, line, color, texture, and patterns common to the landscape character so completely and at such a scale that they are not evident.

- **Moderate –** The landscape character appears slightly altered. Noticeable deviations remain visually subordinate to the landscape character being viewed.
- **Low –** The landscape character appears heavily altered. Deviations strongly dominate the landscape character. Deviations do not borrow from attributes such as size, shape, edge effects, vegetative type changes, or architectural styles within or outside the landscape being viewed.

Most areas within the VSOI were classified as retaining low existing scenic integrity.

5.13.1.3.3 Viewer Sensitivity and Sensitive Viewing Areas.

***Viewer Sensitivity*.** While conducting this study, no attempt was made to model for varying levels of viewer concern of change within their landscape. Because of the difficulty in inventorying for every individual's sensitivity level, it was determined that all viewers may have a high level of concern related to changes occurring in landscapes within the VSOI. Generally, a viewer's concern level is associated with, but not limited to, the following factors:

- Viewing location, orientation of view, and duration of view
- Activity in which the viewer may be engaged (e.g., water-related recreation activities, bird-watching)
- Visual acuity related to the intensity of visual detail within a landscape setting
- State of mind or attitude
- Preconceived expectations related to scenic quality
- Inherent values related to scenic quality and familiarity within specific landscape settings

***Sensitive Viewing Areas*.** After discussions and a field review with CEC visual staff, and a review of surrounding land uses, it was determined that sensitive viewing areas within the VSOI consisted primarily of adjacent residential areas and travelers along I-5. The nearest residents to the PEC site are located approximately 0.15 mile north of the PEC site (across West Panoche Road) and approximately 0.25 mile northeast of the PEC site (just east and adjacent to the existing Panoche Substation). I-5, located approximately 2 miles west of the PEC site, also maintains distant potentially sensitive views to the PEC. I-5 is not considered a Designated Scenic Highway by federal (FHWA) or state (Caltrans) standards. However, I-5 is considered by the County of Fresno to be a Scenic Highway. No other travel routes within the VSOI are designated as federal, state, or county scenic highways or travel routes subject to aesthetic management goals or objectives.

5.13.1.4 Inventory Results

5.13.1.4.1 Scenic Attractiveness. The VSOI is composed primarily of Class C and marginal Class B landscapes. This is because of the high degree of human modifications present within the VSOI and the absence of distinctive natural amenities (e.g., diverse and distinctive natural elements). Areas inventoried along I-5 possess a slightly higher degree of scenic attractiveness because of the elevations in topography allowing large expansive views of the valley and mountains in the area. However, the natural amenities of the area adjacent to I-5 have been visually impacted because of the presence of numerous power plants, transmission lines, agricultural development, pipelines, canals, and other industrial facilities.

Within the VSOI, agricultural lands add to the general continuity of the visual setting. Checkerboard parcels of an assortment of crops add to the distinctiveness of the rural setting and openness of the landscape. Background views of several large mountain ranges add variety within the background-viewing threshold.

5.13.1.4.2 Existing Scenic Integrity Levels. Most landscapes inventoried within the VSOI can be classified as retaining primarily low ESILs because of the presence of manmade development including: agricultural crops, livestock and farming lands, large ranch developments, agricultural/industrial facilities, power plants, transmission lines, substations, and the California Aqueduct within 5 miles surrounding the PEC site. Areas adjacent to the PEC site were also identified as low ESIL because of the existing substation, transmission lines, two peaker power plants and agricultural crops that characterize the area.

5.13.1.4.3 Sensitive Viewing Areas and Key Observation Points. Key observation points (KOPs) are viewing locations chosen to be representative of the most visually sensitive areas that would view the project. The inventory of KOPs included three components: 1) identification and photo-documentation of viewing areas and potential KOPs; 2) classification of visual sensitivity of KOPs; and 3) description of PEC visibility from KOPs. KOPs were identified based on review of available land use data, field inspection, and discussion with CEC staff responsible for the evaluation of visual resources.

Viewer sensitivity is a measure of the degree of concern for change in the visual character of a landscape. Viewer sensitivity considers type of use, user attitude, volume of use, adjacent land use, visual quality, and special classifications. Three levels of viewer sensitivity (high, moderate, and low) were used to describe the sensitivity of viewers within the study area. High-sensitivity viewpoints identified in the study area include existing and future residences, recreation areas, and existing and future scenic roads/parkways. Moderate-sensitivity viewers identified in the study area consist of commercial areas, as well as existing and future primary (major arterial) roads. Low-sensitivity viewers include industrial areas and are not evaluated in detail for this study because these are considered to be a compatible use with the facility, and therefore would not result in significant visual impacts.

Visibility determines how the project would be seen from a particular viewing area or KOP. The inventory of project visibility documented the distance from the viewpoint to the project. Perception of details (e.g., form, line, color, and texture) diminishes with increasing distance. The distance zones were: foreground (0 to 0.5 mile), middleground (0.5 to 5 miles), and background (beyond 5 miles). In addition, the inventory evaluated if views were open, partially screened (filtered), or screened (e.g., presence of hillside terrain, vegetation, and/or buildings).

Three sensitive viewing areas were identified as representative of viewers who would be most susceptible to visual impact within their viewshed as a result of the PEC. A brief characterization of these areas follows:

***Sensitive Viewing Area and Key Observation Point No. 1*.** This image was taken from one of three residences closest to the PEC site along West Panoche Road (Figure 6.13, see also Figure 6.4 for photo location), approximately 0.15 mile north of the PEC site. The photo from this location represents residential views as well as travelers along West Panoche Road. Although two of the three residences in this area are actually partially or completely screened from view by existing mature vegetation, this residence has the most unobscured view to the PEC site and therefore was chosen as a representative KOP. The PEC site is located approximately 0.10 mile south of West Panoche Road, behind the existing pomegranate trees. This KOP will have intermittent views (through the crop rows) to the project and will have clear unobstructed views to the taller structures of the project (e.g., cooling towers, transmission lines and turbine stacks). In addition, visible plumes and nighttime project lighting added to the area will be clearly visible from this KOP location. This view is also consistent with longer viewing durations (i.e., from residential views) of the PEC, as well as the highest degree of severity because of the close distance. The PEC, in the absence of screening, would be highly visible because of the flat, open viewing conditions. It should be noted however, the viewshed has already been modified with the presence of existing transmission lines, substation, and the peaker power plants in the immediate vicinity. The ESIL from this area can be characterized as low.

***Sensitive Viewing Area and Key Observation Point No. 2*.** This image was taken of the backyard view from the closest of five adjoining residences along West Panoche Road, east of and adjacent to the existing Panoche Substation (Figure 5.13-14, see also Figure 5.13-4 for photo location), approximately 0.25 mile northeast of the PEC site. The photo from this location represents these five residences as well as typical views from travelers along West Panoche Road. All viewers have essentially the same unimpeded backyard views (i.e., they are absent of backyard vegetative screening). However, these residences currently have a backyard view of the two small peaker power plants, a storage yard and the adjacent Panoche Substation. The PEC site will be located west of the substation between existing pomegranate tree crop rows. This KOP will have intermittent views (through the substation) to the PEC. In addition, potential visible plumes and nighttime project lighting added to the area will be clearly visible from this KOP. This view is also consistent with longer viewing durations (i.e., from residential views) of the PEC, as well as a high degree of severity because of the close distance. The PEC, in the absence of screening, would be highly visible because of the flat, open viewing conditions. The ESIL from this area can be characterized as low.

Sensitive Viewing Area No. 3**.** This image was taken from the overpass of I-5 and West Panoche Road (Figure 5.13-15, see also Figure 5.13-4 for photo location), approximately 2 miles west of the PEC site. Fresno County has designated I-5 within Fresno County as a Scenic Highway. Views from this roadway have therefore been considered sensitive and are included as a KOP for this project. The photo from this location represents traveler views from I-5 and West Panoche Road. Portions of I-5 are elevated allowing large expansive views to the valley (and potentially to the project area). In addition, lack of vegetative screening in some areas adjacent to I-5 allows for some unobstructed views. The photo is taken from the overpass to help represent “worst-case” views to the PEC. This location represents the closest unscreened elevated view to the PEC from I-5. Although the view is clearly a middleground/background view, the project is visible. In addition, nighttime lighting and potential plume emissions will draw the viewer’s attention to the area and the PEC. Overall, most views from I-5 will not have a view to the PEC. From this distance (2 miles and beyond) most views to the PEC site will be screened, either by topography or vegetation. This view is consistent with short viewing durations (i.e., from traveler views focusing on the road) and will have a low degree of severity because of distance. It should be noted that the most distinct visual characteristic of the area as you are traveling along I-5 is the patchwork of various agricultural crops. Each crop varies by color and size and the patchwork of patterns and lines along I-5 is more noticeable than facilities within the region. The ESIL from this area can be characterized as moderate.

5.13.2 Environmental Consequences

5.13.2.1 Significance Criteria and Assessment Methodology

The visual resources study included the assessment of impacts on scenic attractiveness and sensitive viewing areas within the VSOI related to the construction, operation, maintenance, and long-term presence of the PEC.

The consideration of significant visual impacts was based predominantly on the requirements of CEQA. Appendix G of the CEQA guidelines states that potential impacts to visual resources would be significant if a proposed project results in:

- A substantial adverse effect on a scenic vista
- Substantial damage of scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings

- Substantial degradation of the existing visual character or quality of the site and its surroundings
- Creation of a new source of substantial light or glare that would adversely affect day or nighttime views in the area

Additionally, the CEC requires that consideration be given to the following:

- Compliance with LORS
- Level of viewshed alteration and ground form manipulation
- Regional effects to visual resources
- Magnitude of impact related to light and glare
- Magnitude of back-light scatter during nighttime hours
- Level of sunlight reduction or increase in shadows in areas used by the public

The matrix presented in Table 5.13-1 aids in the assessment of visual impact significance.

TABLE 5.13-1
VISUAL IMPACT SIGNIFICANCE MATRIX – SENSITIVE VIEWING AREAS

Visual Impact Severity	High Susceptibility	Moderate Susceptibility	Low Susceptibility
High Impact Severity	Significant	Less Than Significant	No Impact
Moderate Impact Severity	Less Than Significant	No Impact	No Impact
Low Impact Severity	No Impact	No Impact	No Impact

5.13.2.1.1 Visual Simulations. A comparison of existing views with visual simulations, depicted in Figures 5.13-13 through 5.13-15 aided in verifying project-related impacts. The simulations served to present a representative sample of the existing landscape settings contained within the VSOI, as well as an illustration of how the PEC may look from specific key viewing locations.

To ensure a high degree of visual accuracy in the visual simulations, computer-aided design (CAD) equipment, GIS, and the use of global positioning systems (GPS) allow for life-size modeling within the computer. This translates to using real world scale and coordinates to locate facilities, other site data, and the actual camera locations corresponding to three-dimensional (3D) simulation viewpoints. The degree of accuracy of the CAD and GIS equipment is absolute; the accuracy for the GPS location data is to within approximately 1 meter, or 3.28084 feet.

A GIS site map is imported as a background reference. CAD drawings of proposed facilities are placed on top of the site map in GIS. GPS locations of sensitive viewing areas are also input into GIS. The GPS camera positioning information is then referenced to the 3D data set. The 3D massing models of both the proposed plant and all ancillary facilities are generated in real-world coordinates, scaled, and input into GIS.

An electronic camera lens matches the camera lens that was actually used in the field. A Nikon 4200 digital camera set to take a 50-mm lens image was used consistently throughout the process. This lens setting selection allows for viewing of the computer-generated model in the same way that the PEC would be viewed in the field.

Next, the photograph is imported into the 3D database and loaded as an environment within which the view of the 3D model is generated. To generate the correct view relative to the actual photograph, the electronic camera is placed at a location (within the computer) from where the photograph was taken. This is supported by the GPS location. From there, the 3D wire frame model is displayed on top of the existing photo so that proper alignment, scale, angle, and distance can be verified. When all lines of the wire frame model exactly match the photograph, the camera target position is confirmed.

It should be noted that final simulations were created using CAD files obtained from Bibb and Associates (the plant designer) to remain consistent with general plant development engineering. Once field KOP location photos and GPS coordinates for photo locations were gathered in the field, these were incorporated into the final simulation production. The processes described above relate to general simulation construction and are included for reader understanding of the procedures. Accuracy levels should also be verified with Bibb and Associates, if needed.

The visual simulations developed for the PEC have been designed to be viewed 18 inches from the viewer's eye. This distance will portray the most realistic life-size image from the location of the sensitive viewing area.

5.13.2.1.2 Assessing Visual Impact Susceptibility on Sensitive Viewing Areas. As stated previously, in Section 5.13.1.2, visual impact susceptibility is the degree to which a sensitive viewpoint would be impacted by changes within its viewshed. Following the identification of the three most sensitive viewing areas within the VSOI, the degree of impact on each area was determined through the analysis of the following components:

- Existing Scenic Integrity Level – The degree of existing disturbance within the natural setting
- Viewer Sensitivity – All identified viewers with foreground views were considered high-sensitivity viewers

- Project Visibility – An assessment of the viewing angle, potential screening, lighting conditions, and time of day
- Viewer Exposure – An assessment of the distance from the proposed project, number of viewers, and duration of views

Table 5.13-2 illustrates the level of visual impact susceptibility anticipated for each sensitive viewing area based on an evaluation of the previously stated factors.

TABLE 5.13-2
VISUAL IMPACT SUSCEPTIBILITY – SENSITIVE VIEWING AREAS

Viewing Areas	Existing Scenic Integrity Level	Viewer Sensitivity	Project Visibility	Viewer Exposure	Visual Impact Susceptibility
Sensitive Viewing Area and KOP No. 1 (Figure 5.13-13, see also Figure 5.13-4 for KOP location) – from unobscured residence of three along West Panoche Road.	Low	High	High	High	High
Sensitive Viewing Area and KOP No. 2 (Figure 5.13-14, see also Figure 5.13-4 for KOP location) – from backyard of closest of five residences along West Panoche Road, adjacent to the existing Panoche Substation.	Low	High	Moderate	Moderate	Moderate
Sensitive Viewing Area and KOP No. 3 (Figure 5.13-15, see also Figure 5.13-4 for KOP location) – from overpass of I-5 and West Panoche Road.	Moderate	Moderate	Moderate	Moderate	Moderate

5.13.2.1.2 <u>Assessing Visual Impact Severity on Sensitive Viewers</u>. The severity of the impact (high to low) on sensitive viewers was assigned a severity level proportionate to the amount of anticipated change to the landscape created within a specific viewshed. The primary criteria for project impacts include:

- The degree of project contrast (e.g., form, line, color, and texture)
- Scale and spatial dominance
- Extent of view blockage/screening (topographic and/or vegetative) and night lighting

Table 5.13-3 describes levels designated to each variable above as they relate to the degree of visual impact severity anticipated on representative sensitive viewing areas.

TABLE 5.13-3
VISUAL IMPACT SEVERITY – SENSITIVE VIEWING AREAS

Viewing Areas	Form Contrast	Line Contrast	Color Contrast	Texture Contrast	Scale Dominance	Spatial Dominance	View Blockage/ Night Lighting	Visual Impact Severity
Sensitive Viewing Area and KOP No. 1 (Figure 5.13-13, see also Figure 5.13-4 for KOP location) – from unobscured residence of three along West Panoche Road.	High	High	High	High	Dominant	Dominant	High/ High	High
Sensitive Viewing Area and KOP No. 2 (Figure 5.13-14, see also Figure 5.13-4 for KOP location) – from backyard of closest of five residences along West Panoche Road, adjacent to the existing Panoche Substation.	Moderate	Moderate	Moderate	Moderate	Co-Dominant	Subordinate	Low/ High	Moderate
Sensitive Viewing Area and KOP No. 3 (Figure 5.13-15, see also Figure 5.13-4 for KOP location) – from overpass of I-5 and West Panoche Road.	Low	Moderate	Moderate	Moderate	Subordinate	Subordinate	Low/ Moderate	Moderate

The final evaluation conducted in the impact assessment was the assignment of potential impact levels on representative sensitive viewing areas by combining viewer susceptibility and impact severity levels at key and characteristic viewing locations.

5.13.2.2 Visual Impact Assessment Results

This section discusses the affected visual resources for the PEC. A description of the potential impacts on scenic attractiveness and on sensitive viewers is provided. A detailed description of the PEC is in Section 3.0. The following are some of the more important project features related to the visual impact assessment:

- Four (4) 90-feet tall combustion turbine generator (CTG) stacks.
- The cooling tower height is proposed at 42 feet tall.
- A proposed 17-foot tall Firewater Pump Engine Stack.
- Visible plumes may occur (please see Section 5.2, Air Quality, for more information on emissions).
- The Cooling Tower height is proposed at 42-feet tall. Visible plumes may occur and are more fully discussed subsequently in Section 5.13.2.2.2.
- A proposed 17-foot tall Firewater Pump Engine Stack is proposed as part of the Project site arrangement. Visible plumes may occur and are more fully discussed subsequently in Section 5.13.2.2.2.
- The power plant is immediately adjacent to the existing Panoche Substation. As such, the plant switchyard will tie in directly with this site minimizing necessary transmission lines.
- The property is predominately disturbed agricultural crop rows. The property is relatively flat sloping gently down to the northwest at less than one percent grade.
- Surrounding site development includes two existing peaker power plants in addition to the existing Panoche Substation and industrial storage lots.
- Transmission line corridors currently exist (Figure 5.13-4) within the immediate and surrounding project vicinity.
- The PEC includes an approximately 2,600-square-foot operations, administration, maintenance, and warehouse building. The building is divided between the control room and office area and the maintenance and warehouse area.

The site slopes downward from the northeast to southwest at a grade of approximately 1 percent. The site has existing swales and channels incised by past surface stormwater runoff that are generally less than 1 foot in depth. The site preparation earthwork includes surface grading to level and maintain the existing natural gradient.

- Storm water will be conveyed by overland flow and swales to an infiltration basin located at the southeast corner of the project site. The infiltration basin will be approximately 0.8 acre, and hold 85 percent of annual storm water runoff.
- Project roadways and parking areas will be paved with asphalt. Unpaved surfaces in and around the main equipment area will be covered with crushed stone or gravel. The entire project site, including stormwater retention ponds, is enclosed by an 8-foot-tall metal fabric security fence with barbed wire or razor wire on top. Access to the site is controlled by security gates.

5.13.2.2.1 Direct Impacts. The following sections describe direct impacts related to the project.

***Visual Impact Significance on Scenic Attractiveness*.** Given the lack of significant topographic features and degree of existing modification and landscape degradation (e.g., substation, peaker power plants, storage yard, and transmission lines) within the VSOI, less than significant impacts on scenic attractiveness would occur. Ground-disturbing activities at the PEC site would occur in areas previously disturbed (agricultural crop rows) or with degraded landscapes and within areas classified as retaining low distinctive or diverse natural amenities or lacking substantial positive cultural modifications. Therefore, less than significant impacts would occur relative to existing scenic attractiveness.

***Visual Impact Significance on Sensitive Viewing Areas*.** Tables 5.13-2, 5.13-3, and 5.13-4 illustrate the visual impact susceptibility, visual impact severity, and resultant visual impact significance on sensitive viewing areas, respectively. Significant impacts will occur only to those residences immediately across the street from the PEC site and to potential travelers along West Panoche Road. As mentioned previously, current views from these residences are degraded due to exiting development. Although the project would be consistent with the land uses within the area, there is found to be a significant visual impact to identified sensitive viewers, and less-than-significant impacts to the majority of sensitive viewers within the region from with the construction, operation, maintenance, or long-term presence of the PEC.

5.13.2.2.2 Lighting. Adequate lighting will be provided for operation, safety, and security around the PEC, specifically in the following areas:

- Building interior, office, control, and maintenance areas
- Building exterior entrances
- Outdoor equipment platforms and walkways
- Transformer areas

TABLE 5.13-4
VISUAL IMPACT SIGNIFICANCE – SENSITIVE VIEWING AREAS

Viewing Areas	Description of Impact	Visual Impact Susceptibility	Visual Impact Severity	Visual Impact Significance
Sensitive Viewing Area and KOP No. 1 (Figure 5.13-13, see also Figure 5.13-4 for KOP location) – from unobscured residence of three along West Panoche Road.	This KOP will have intermittent views (through the crop rows) to the PEC and will have clear unobstructed views to the taller structures of the project (e.g., cooling towers, transmission lines and turbine stacks). In addition, potential visible plumes and nighttime project lighting added to the area will be clearly visible from this KOP location. This view is also consistent with longer viewing durations (i.e., from residential views) of the PEC, as well as the highest degree of severity because of the close distance. The PEC, in the absence of screening, would be highly visible because of the flat, open viewing conditions. It should be noted however, the viewshed has already been modified with the presence of existing transmission lines, substation, and peaker power plants in the immediate vicinity.	High	High	Significant Impact
Sensitive Viewing Area and KOP No. 2 (Figure 5.13-14, see also Figure 5.13-4 for KOP location) – from backyard of closest of five residences along West Panoche Road, adjacent to the existing Panoche Substation.	This KOP will have intermittent views (through the substation) to the PEC. In addition, potential visible plumes and nighttime project lighting added to the area will be clearly visible from this KOP. This view is also consistent with longer viewing durations (i.e., from residential views) of the PEC, as well as a high degree of severity because of the close distance. The PEC, in the absence of screening, would be highly visible because of the flat, open viewing conditions. The KOP will not be significantly impacted because the PEC will be sufficiently absorbed into the existing modified visual environment.	Moderate	Moderate	Less Than Significant

TABLE 5.13-4 (CONTINUED)
VISUAL IMPACT SIGNIFICANCE – SENSITIVE VIEWING AREAS

Viewing Areas	Description of Impact	Visual Impact Susceptibility	Visual Impact Severity	Visual Impact Significance
Sensitive Viewing Area and KOP No. 3 (Figure 5.13-15, see also Figure 5.13-4 for KOP location) – from overpass of I-5 and West Panoche Road.	Fresno County has designated I- 5 within Fresno County as a Scenic Highway. Views from this roadway have therefore been considered sensitive. This location represents the closest unscreened elevated view to the PEC from I- 5. Although the view is clearly a middleground/background view, the project is visible. In addition, nighttime lighting and potential plume emissions will draw the viewer's attention to the area and the PEC. Overall, most views from I- 5 will not have a view to the project. From this distance (2 miles and beyond) most views to the PEC site will be screened, either by topography or vegetation. This view is consistent with short viewing durations (i.e., from traveler views focusing on the road) and will have a low degree of severity because of distance.	Moderate	Moderate	Less Than Significant

- Power island perimeter roads
- Parking areas
- Entrance gate

Lighting on the PEC site will be limited to areas required for operations and safety, directed on-site to avoid back-scatter, and shielded from public view to the extent practicable. Lighting not required to be on during nighttime hours will be controlled with sensors or switch-operated such that lighting will be on only when needed.

No FAA beacons will be required or installed at the PEC site. It should be noted that during construction-related activities, slightly higher amounts of backscatter lighting may be apparent to the casual observer in order to provide for the safety of construction workers during this phase of the project. Upon completion of construction, night lighting at the site will be substantially reduced and less noticeable to the casual observer. It also should be noted that residential areas exist within 0.25 mile of the site and will be adversely impacted during construction-related activities.

***Night Lighting and Light Glare*.** Direct impacts resulting from night lighting and glare are considered to be less than significant for the majority of sensitive viewers in the area. Only travelers on West Panoche Road and those residences immediately across the street from the PEC site will be significantly affected by the night lighting and potential glare from the project structures. Nighttime lighting conditions will be visible to I-5 travelers, although there is much topographic and vegetative screening in the area. Thus, impacts from night lighting will be distinguishable yet intermittent and are therefore considered to be less than significant. In addition, night lighting and light glare is produced by the existing Panoche Substation, immediately adjacent to the PEC site. Safety night lighting for the substation and nearby peaker power plants also exist in the area. Overall, the addition of the PEC would not significantly increase the impact from night lighting, back-scatter light, or glare that a viewer would experience when looking toward the site. The only exception would be for the residences immediately across the street from the PEC and for those travelers along West Panoche Road. Although the project site will be set back behind several crop rows, nighttime lighting and glare conditions are considered to be a significant impact to these select viewers.

***Visible Plumes*.** There are three operational sources of emissions for this project. Those include: the four CTG stacks, the Firewater Pump Engine Stack, and a five-cell evaporative Cooling Tower. Please see the Air Quality Section 5.2 for detailed information on emissions. The frequency, visibility, and size of potential visible plumes are dependent on the atmospheric conditions during viewing. Specifically, visible plume formation depends on local ambient temperature, humidity conditions, and wind patterns. A location with higher temperature and lower humidity (i.e., Fresno’s climate) would have fewer extended visible plumes compared to the same tower operation at a cooler, more humid site. Further, the PEC would be in peak operation during the summer months, at which time the temperature at the Panoche site is generally too high for long plumes to occur. Also important to note is the fact that the prevailing winds at the PEC site are from the northwest and would carry any potential plumes away from West Panoche Road. They would likely dissipate before they reach another main road. Therefore, the potential for visible plumes from the PEC is highly variable and indeterminate. In the event that atmospheric conditions are conducive to visible plumes, the potential plumes could be visible from residences and travelers within and outside the VSOI. During these occasions people at those residences and travelers within 0.5 mile of the PEC (i.e., foreground viewers) would see a significant impact due to the effects of visible plumes. Middleground to background viewers (0.5 mile to the horizon) would experience significant to less than significant impacts. Currently there are few to no visible plumes within the existing viewshed. Although the addition of plumes to the area would create a change to existing conditions, most viewers will be at such distances that impacts from visible plumes are considered to be less than significant. Notably, due to the fact that plume formation depends upon highly variable atmospheric conditions, peak operation of the PEC would be during hot, summer months not conducive to plume formation, and the proximity of most viewers would be at such distances that any potential plumes would be remotely visible.

5.13.2.2.3 Landscaping. Landscaping will not be incorporated into the project description so as not to add incrementally to the overall change in viewsheds.

5.13.2.2.4 Indirect and Construction-related Impacts. Project site preparation includes removing miscellaneous agricultural crop rows of existing pomegranate trees, along with surface grading.

The construction period is expected to last 16 months. The workforce is expected to average roughly 151 construction workers, with 364 workers in the peak month. The workforce will come from the Fresno area, with an average roundtrip commute distance of 45 miles.

Construction access is from West Panoche Road along the existing access road shown on Figure 5.13-1. Construction trailers will be located in the southern portion of the project site. The construction laydown area will be located to the south of the CTGs. Construction parking will be located between the west property boundary and the project site within the transmission line corridor that runs along the west side of the property.

Indirect impacts associated with the construction, operation, and long-term presence of the PEC and ancillary facilities may include impacts associated with fugitive dust plumes, night lighting, and presence of construction equipment. These impacts were considered temporary and insignificant.

5.13.3 Cumulative Impacts

The following projects have been identified within the cumulative impacts assessment in relation to the PEC (see Section 5.18, Cumulative Impacts):

- CalPeak Power Panoche No. 2
- Convenience Store Building
- Starwood Power Project

The areas within the VSOI and greater Fresno County are generally characterized by cultivated farmlands of the valley, foothill grasslands and high mountain peaks supported by small towns and other sparsely populated communities. Accordingly, the number, size, and scale of cumulative projects in the area are substantially less than in other more-urbanized portions of California.

The PEC will contribute to the industrial nature of the immediate project vicinity. The VSOI has already experienced a significant amount of cultural modifications, and the addition of any of these projects, when considered with the PEC, will not significantly affect the visual setting within the VSOI. Based on a review of the projects listed, no significant cumulative impacts have been identified as a result of the construction, operation, maintenance, or long-term presence of the PEC. The addition of the PEC does alter the existing landscape and visual setting. However, because the immediate visual setting is industrial in nature (including two peaker power plants, an existing substation, transmission lines and industrial storage facilities), the PEC will not create a substantial additive impact to the general character of the area.

5.13.4 Mitigation Measures

The PEC design inherently includes mitigation measures, although none are required. For example, the site location was chosen because of its proximity to the existing Panoche Substation. By locating the PEC immediately adjacent to the existing substation, the project can tie directly in via the proposed switchyard. This will eliminate unnecessary transmission lines and prominent transmission poles traversing the area. In addition, the site location has been placed approximately 700 feet south of West Panoche Road, between existing crop rows of pomegranate trees. By placing the PEC within the existing crops and not immediately adjacent to the road, natural screening is provided around the project (Figure 15.3-5). For travelers along West Panoche Road, as well as for residences in the area, this vegetative screening helps mitigate the potential visual impacts associated with the project. Finally, project features have been designed to help minimize visual impacts. These include, but are not limited to, shielding light sources and using non-reflective materials for project components (especially more prominent project features like the combustion turbine stacks and cooling tower).

5.13.4.1 Underground Pipelines

After construction, areas stripped of vegetation will be revegetated or returned to agricultural use.

5.13.4.2 Transmission Lines

Structures and conductors will be treated to reduce sun reflectivity. New or replacement transmission lines will parallel existing linear features, and will be constructed of like materials to the extent practicable, for most of their overall lengths. Transmission lines will tie directly through the switchyard to the adjacent Panoche Substation. Thus, minimal transmission lines will be necessary for this project.

5.13.4.3 Laydown Yard

Upon completion of the project, the laydown yard will be returned to agricultural use.

5.13.5 Applicable Laws, Ordinances, Regulations, and Standards

Applicable visual resources LORS are summarized in Table 5.13-5 and described below. Agency contacts are provided in Table 5.13-6.

5.13.5.1 Federal and State

The PEC is located on property under the jurisdiction of Fresno County; however BLM public domain lands (approximately 5 miles away) may have distant views to the project site. Therefore, VRM guidelines were considered for this project. VRM methodology categorizes impacts based upon changes to scenic quality, sensitivity levels, and distance zones. These are all discussed in detail in Section 5.13.1. Overall, the project is consistent with all federal aesthetic LORS.

State-designated scenic highways or highways eligible for designation were not identified within the VSOI. Further, no other area managed by the state for which the PEC would be required to adhere to aesthetic LORS was identified. Therefore, compliance with state aesthetic LORS is inapplicable.

5.13.5.2 Local

The PEC is located on unincorporated land within Fresno County. In addition, San Benito County is approximately five miles west and may have distant views to the project site. Merced, Kings, and Madera counties are all within 15 to 40 miles but have no views to the project site. Therefore, local LORS were only considered for Fresno and San Benito counties. During the project site field visit on June 23, 2006, CEC staff confirmed that Fresno County and San Benito County would be the only local LORS to be addressed for the project.

The property is zoned A-E 20 (Agriculturally Exclusive – 20-acre minimum) by Fresno County. Allowable uses within A-E 20 zoning include the existing substation and power facilities adjacent to the site. However, a Conditional Use Permit was required.

The Fresno County General Plan (2000) contains several goals and policies relating specifically to aesthetics and minimizing impacts to visual resources. In addition, the San Benito County General Plan (1980) has a Scenic Roads and Highways Element with several objectives and policies outlined relating to the preservation of scenic resources. Finally, San Benito County has a Dark Sky Ordinance in place, regulating light pollution in the county. These local LORS, and the project's conformance to these LORS, are summarized in Table 5.13-5.

In addition, project design elements have been incorporated into the project description that will be effective in minimizing visual impacts (see Project Description, Section 3.0). The PEC will conform to all applicable local LORS related to the preservation of areas identified as retaining high scenic value. Based on the inventory of scenic attractiveness and ESILs, areas retaining high

TABLE 5.13-5
SUMMARY OF LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Jurisdiction	LORS	Requirements	Conformance to Requirements	Administering Agency	Agency Contact
Federal					
	Application for Certification Requirements	Rules of Practice and Procedure & Power Plant Site Certification Regulations, Appendix B.	See Data Adequacy Worksheet.	California Energy Commission (CEC)	1
	Visual Resource Manual	To manage public lands in a manner which will protect the quality of the scenic (visual) values of these lands.	BLM public domain lands and the Panoche Hills Wilderness Study Areas lie five miles west and may have distant views to the project site. See Section 5.13.1.5 for a description of these views. In summary, changes to these views will be indiscernible to minimal.	Bureau of Land Management (BLM)	2
State					
	State Scenic Highway Requirements	Requirements are applicable to state designated scenic highways. There are none in the project area.	There are no Designated or Eligible State Scenic Highways in the VSOI. Therefore, compliance with state aesthetic LORS is inapplicable.	California Department of Transportation (Caltrans)	3
Local					
Fresno County	Fresno County General Plan/Public Facilities and Services - *Goal PF-J*	To provide efficient and cost-effective utilities that serves the existing and future needs of people in the unincorporated areas of the County.	See Project Objectives, Section 2.0.	Fresno County Planning Department	4

TABLE 5.13-5 (CONTINUED)
SUMMARY OF LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Jurisdiction	LORS	Requirements	Conformance to Requirements	Administering Agency	Agency Contact
Fresno County	Fresno County General Plan/Public Facilities and Services - *Goal PF-J.2*	The County shall work with local gas and electric utility companies to design and locate appropriate expansion of gas and electric systems, while minimizing impacts to agriculture and minimizing noise, electromagnetic, visual, and other impacts on existing and future residents.	The proposed site is adjacent to an existing substation and two peaker power plants. By containing power sources to this already disturbed localized area, impacts to visual resources are minimized.	Fresno County Planning Department	4
Fresno County	Fresno County General Plan/Public Facilities and Services - *Goal PF-J.3*	The County shall require all new residential development along with new urban commercial and industrial development to underground utility lines on-site.	The proposed site is adjacent to an existing substation. Necessary transmission lines will go a minimal distance (approximately 300 feet from switchyard to substation).	Fresno County Planning Department	4
Fresno County	Fresno County General Plan/Open Space and Conservation - *Goal OS-K*	To conserve, protect, and maintain the scenic quality of Fresno County and discourage development that degrades areas of scenic quality.	There are no scenic resources within the VSOI. The proposed site lies adjacent to an existing substation and two peaker power plants. By containing the power development to this localized area, changes to visual resources will be minimized. Furthermore, by focusing development within this area, scenic areas within the County can be maintained.	Fresno County Planning Department	4

TABLE 5.13-5 (CONTINUED)
SUMMARY OF LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Jurisdiction	LORS	Requirements	Conformance to Requirements	Administering Agency	Agency Contact
Fresno County	Fresno County General Plan/Open Space and Conservation - *Goal OS-K.1*	The County shall encourage the preservation of outstanding scenic views, panoramas, and vistas whenever possible. Methods to achieve this may include encouraging private property owners to enter into open space easements for designated scenic areas.	There are few scenic views, panoramas, and vistas within the VSOI. The County of Fresno does consider I-5 to be a locally designated Scenic Highway. Views from I-5 to the project site are minimal and short in duration due to vegetative screening and topography within the area. Scenic views and vistas from this roadway will change only slightly by the addition of the project.	Fresno County Planning Department	4
Fresno County	Fresno County General Plan/Open Space and Conservation - *Goal OS-K.4*	The County should require development adjacent to scenic areas, vistas, and roadways to incorporate natural features of the site and be developed to minimize impacts to the scenic qualities of the site.	The site does incorporate natural features of the site including the use of vegetative screening already in the area. In addition, other design features have been incorporated to help minimize impacts to scenic quality as described in the project description, Section 3.0.	Fresno County Planning Department	4
Fresno County	Fresno County General Plan/Open Space and Conservation - *Goal OS-L*	To conserve, protect, and maintain the scenic quality of land and landscape adjacent to scenic roads in Fresno County.	I-5 is designated a Fresno County Scenic Highway and lies approximately two miles west of the project site. Views from this roadway to the project are described in Section 3.0. In summary, the scenic quality of land and landscape adjacent to the highway will not change as a result of this project. Traveler views from the highway will change slightly, but the change will be indiscernible to minimal.	Fresno County Planning Department	4
San Benito County	San Benito County General Plan/Scenic Roads and Highways Element - *Goal*	Preserve scenic qualities of San Benito County. Enhance and preserve the visual qualities of the designated scenic corridors within San Benito County.	San Benito County will have only distant views to the project.	San Benito County Planning Department	5

TABLE 5.13-5 (CONTINUED)
SUMMARY OF LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Jurisdiction	LORS	Requirements	Conformance to Requirements	Administering Agency	Agency Contact
San Benito County	San Benito County - *Dark Sky Ordinance*	Encourage lighting practices and systems which will: minimize light pollution, glare, light trespass, conserve energy and resources while maintaining night-time safety, utility, security and productivity; and curtail the degradation of the night time visual environment.	San Benito County is approximately 10 miles to the west of the project site but project lighting from the project could affect San Benito County. Therefore, mitigation measures have been incorporated into the project description (see Section 3.0), which will minimize impacts due to project lighting and glare. These include but are not limited to, shielded lighting sources and use of non-glare materials.	San Benito County Planning Department	5

TABLE 5.13-6
AGENCY CONTACT LIST FOR LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Agency	Contact Information
Federal	
California Energy Commission Systems Assessment and Facilities Siting Division Environmental Protection Office (1)	1516 9th Street, MS 40 Sacramento, CA 95814-5512 Dale B. Edwards, Supervisor (916) 654-5139
Bureau of Land Management Hollister Field Office (2)	20 Hamilton Court Hollister, CA 95023 (831) 630-5000
State	
California Department of Transportation (Caltrans) Guidelines for the Official Designation of Scenic Highways, Office of Landscape (3)	2800 Gateway Oaks Drive, Suite 100, Sacramento, CA 95833 Ken Murray, L.A. #4345, Senior Landscape Architect (916) 274-6138
Local	
Fresno County Department of Public Works & Planning Development Services Department (4)	2220 Tulare Street, 6th Floor Fresno, CA 93721 Roy Jimenez, Jr., Planning & Resource Analyst (559) 262-4343
San Benito County Planning & Building Department (5)	3224 Southside Rd., Hollister, CA 95023-9174 Rob Mendiola, Director of Planning (831) 637-5313

scenic value were not identified within the VSOI. Therefore, compliance with local aesthetic LORS will be maintained.

5.13.5.3 Permits Required and Permit Schedule

No permits are required pertaining to visual resources.

5.13.6 References

Application for Certification for San Joaquin Valley Energy Center Power Plant Project 01-AFC-22).

Bureau of Land Management. 1986. Visual Resource Management Inventory and Contrast Rating System.

California Department of Transportation Website – California Scenic Highway System: List of Eligible and Officially Designated Routes.

California Department of Transportation. 1992. AFC, p. 5.9-1.

California Energy Commission, Systems Assessment and Facilities Siting Division, Environmental Protection Office, personal correspondence. 2005-2006.

Federal Highway Administration (FHWA). 1981.

Fresno County Agricultural Commissioner Crop Report. 2004. http://www.co.fresno.ca.us/4010/CROP04/index.html.

Fresno County General Plan. 2000. http://www.co.fresno.ca.us/4510/4360/General_Plan/general_plan.htm.

San Benito County General Plan. 1980.

URS. 2004. Salton Sea Unit 6 Geothermal Power Plant AFC.

U.S. Department of Agriculture, Forest Service (USFS). 1995. Landscape Aesthetics – A Handbook for Scenery Management. USDA Handbook 701.

Adequacy Issue: Adequate ____ Inadequate ____ **DATA ADEQUACY WORKSHEET** Revision No. ____ Date ____

Technical Area: **Visual Resources** 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 5.13		
Appendix B (g) (5) (A)	Descriptions of the existing visual setting of the vicinity of the project, the region that can be seen from the vicinity of the project, and the proposed project site. Include:	Section 5.13.		
Appendix B (g) (5) (A) (i)	Topographic maps at a scale of 1:24,000 of the areas from which the project may be seen, identification of the view areas most sensitive to the potential visual impacts of the project, and the locations where photographs were taken for (g)(5)(E);	Section 5.13/Figure 5.4, see also Figures 5.13-1 to 5.13-15		
Appendix B (g) (5) (A) (ii)	Elevations of any existing structures on the site; and	Section 5.13/Figure 5.13-3 Section 5.13.1		
Appendix B (g) (5) (A) (iii)	The visual properties of the topography, vegetation, and any modifications to the landscape as a result of human activities.	Section 5.13.1		
Appendix B (g) (5) (B)	An assessment of the visual quality of those areas that will be impacted by the proposed project.	Section 5.13.2		
Appendix B (g) (5) (C)	After discussions with staff and community residents who live in close proximity to the proposed project, identify the scenic corridors and any visually sensitive areas potentially affected by the proposed project, including recreational and residential areas. Indicate the approximate number of people using each of these sensitive areas and the estimated number of residences with views of the project. For purposes of this section, a scenic corridor is that area of land with scenic natural beauty, adjacent to and visible from a linear feature, such as a road, or river.	Section 5.13.1 Section 5.13/Figure 5.13-4/5.13-5		

Adequacy Issue: Adequate ____ Inadequate ____

DATA ADEQUACY WORKSHEET

Revision No. ____ Date ____

Technical Area: **Visual Resources** 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) (5) (D)	A description of the dimensions, color, and material of each major visible component of the project.	Section 3.0 (Project Description) Section 5.13.2.2		
Appendix B (g) (5) (E)	Full-page color photographic reproductions of the existing site, and full-page color simulations of the proposed project in the existing setting from each location representative of the view areas most sensitive to the potential visual impacts of the project.	Section 5.13/Figures 5.13-13 through 5.13-15		
Appendix B (g) (5) (F)	An assessment of the visual impacts of the project, including light and glare, and visible plumes.	Section 5.13.2		
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 5.13.5/Table 5.13.5		
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 5.13.5/Table 5.13.5		
Appendix B (h) (2)	A discussion of the conformity of the project with the requirements listed in subsection (h)(1)(A).	Section 5.13.5/Table 5.13.5		
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 5.13.5/Table 5.13.6		

Adequacy Issue: Adequate ____ Inadequate ____ **DATA ADEQUACY WORKSHEET** Revision No. ____ Date ____

Technical Area: **Visual Resources** 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.	No permits necessary.		

5.14 WASTE MANAGEMENT

This section presents a discussion of potential impacts from the generation, storage, and disposal of hazardous and non-hazardous wastes from the proposed Panoche Energy Center (PEC). Included in the discussion are descriptions of waste streams generated during construction and operation, descriptions of applicable waste disposal sites to be used by the facility, proposed waste mitigation methods to minimize impacts to the environment, and applicable laws, ordinances, regulations, and standards (LORS).

5.14.1 Affected Environment

5.14.1.1 Plant Site

A Phase I Environmental Site Assessment (ESA) of the proposed PEC site has been prepared in accordance with ASTM Practice E 1527-00. The objective of the Phase I ESA was to identify "Recognized Environmental Conditions" (RECs) that may exist on the PEC site. A site reconnaissance was conducted on May 1, 2006. No RECs were identified on the PEC site. An environmental database review was conducted to identify sites within a one-mile radius of the PEC for potential environmental concerns. No surrounding properties of potential concern were noted. The results of the Phase I ESA are included as Appendix U of this document.

As described in more detail below in Section 5.14.2, the PEC will generate hazardous and non-hazardous wastes during the construction and operational phases of the project typical of a natural gas-fired combustion turbine power plant.

5.14.1.2 Offsite Structures

Natural gas will be supplied by the Pacific Gas and Electric Company (PG&E). The project will connect to the PG&E high-pressure gas trunk line through a new pipeline, up to 16 inches in diameter. The gas lateral will be approximately 2,400 feet in length. The lateral will connect to the PEC project along the east side of the plant. The pipeline will be routed as shown on Figure 3.4-1.

Worker parking and material and equipment staging areas will be required during the construction period. An area of approximately 8 acres adjacent to the plant site is devoted to equipment and materials laydown, storage, construction equipment parking, small fabrication areas, and office trailers. The construction laydown area is shown in Figure 3.4-3. Some grading and placement of gravel or pavement may be required at one or more of the construction laydown and worker parking areas, but these activities are not expected to generate wastes that will require management.

5.14.1.3 Non-Hazardous Solid Waste Disposal

Existing non-hazardous solid waste disposal facilities in the general area of the PEC are listed in Table 5.14-1. Several available Class III landfills are listed in Table 5.14-1. They accept non-hazardous wastes and inert solid wastes, including construction/demolition wastes. Liquid wastes are not accepted by these landfills. Industrial process solid waste is accepted on a case-by-case basis.

There are several soil treatment and soil recycling facilities in California that accept hydrocarbon-impacted soil that is classified by the generator as a non-hazardous waste per the Resource Conservation and Recovery Act (RCRA) and the CCR Title 22. Acceptable levels for treatment or recycling are established by the individual facilities. Three soil treatment and/or recycling facilities listed in Table 5.14-1 are located in Lynwood (American Remedial Technologies), Adelanto (TPS Technologies, Inc.), and Azusa (Thermal Remediation Systems), California.

5.14.1.4 Hazardous Solid Waste Disposal

Hazardous waste generated at the PEC site will be taken offsite for recycling or disposal by a permitted hazardous waste transporter to a permitted treatment, storage, and disposal facility or Class I landfill. There are two Class I landfills located in California: Clean Harbors' Buttonwillow Landfill in Kern County and Chemical Waste Management's Kettleman Hills Landfill in Kings County. The permitted, operating, and remaining capacities of these landfills are described in Table 5.14-1. Hazardous waste generated during construction and operational phases at the PEC is not expected to significantly impact available landfill capacity.

5.14.1.5 Hazardous and Non-Hazardous Wastewater (Non-Effluent Waste Streams)

One California wastewater treatment and recycling facility is listed in Table 5.14-1 that may accept RCRA hazardous, non-RCRA hazardous, and non-hazardous wastewater. The DeMenno/Kerdoon facility located in Compton, California receives an average of approximately 82,200 gallons per day of wastewater. The operating capacity is approximately 4.6 million gallons per month of waste oil and oily water. The permitted capacity is 123 million gallons per year of waste oil and 84.1 million gallons per year of oily water. Oil is recovered and recycled at DeMenno/Kerdoon.

5.14.2 Environmental Consequences

The analysis of impacts related to waste management from the PEC is based on significance criteria summarized as follows:

TABLE 5.14-1
WASTE RECYCLING/DISPOSAL FACILITIES

Solid Recycling/Waste Disposal Site	Title 23 Class	Permitted Capacity	Operating Capacity	Remaining Capacity	Estimated Closure Date	Enforcement Action Taken?
City of Clovis Landfill 16679 Auberry Road Fresno, CA 93626	Class III	2.6 million cubic yards per year	354 tons per day	2.2 million cubic yards	2017	No
Coalinga Disposal Site 30825 Lost Hills Road Coalinga, CA 93210	Class III	3.3 million cubic yards per year	200 tons per day	1.9 million cubic yards	2029	No
American Avenue Disposal Site 18950 W. American Ave. Tranquility, CA 93668	Class III	32.7 million cubic yards per year	2,200 tons per day	29.3 million cubic yards	2031	No
Thermal Remediation Solutions (Solids Recycling) 1211 West Gladstone Ave. Azusa, CA 91702	Class III	200,000 tons per year	2,000 tons per day	Not applicable	Not applicable	No
American Remedial Technologies (Solids Recycling) 2680 Seminole Ave. Lynwood, CA 90262	Class III	200,000 tons per year	19,900 tons per month	Not applicable	Not applicable	One Notice of Violation pertaining to odor in Year 2000
TPS Technologies, Inc. (Soil Recycling) 12328 Hibiscus Ave. Adelanto, CA 92301	Not Applicable	Not Applicable	350,000 tons per year	Not Applicable	Not Applicable	No
Chemical Waste Management Kettleman Hills Landfill (Solids Disposal) 36251 Old Skyline Rd. Kettleman City, CA 93239	Class I	10.7 million cubic yards per year	200,000 cubic yards per year	6-7 million cubic yards	2037 – 2038	No

TABLE 5.14-1 (CONTINUED)
WASTE RECYCLING/DISPOSAL FACILITIES

Solid Recycling/Waste Disposal Site	Title 23 Class	Permitted Capacity	Operating Capacity	Remaining Capacity	Estimated Closure Date	Enforcement Action Taken?
Clean Harbors Buttonwillow Landfill (Solids Disposal) Lokern Road Kern County, CA	Class I	13.25 million cubic yards per year	130,000 – 150,000 cubic yards per year	10.9 million cubic yards	2068 – 2078	No
TPS Technologies, Inc. (Soil Recycling) 12328 Hibiscus Ave. Adelanto, CA 92301	Not Applicable	Not Applicable	350,000 tons per year	Not Applicable	Not Applicable	No outstanding previous violations
Liquid Recycling/Waste Disposal Site						
DeMenno/Kerdoon (Liquids Recycling) 2000 N. Alameda St. Compton, CA 90222	Not applicable	84.1 million gallons per year of oily water and 123 million gallons per year of waste oil	Approximately 30 million gallons per year	Not applicable	Not applicable	No outstanding previous violations

- Non-hazardous solid wastes must not significantly alter available landfill, recycling, or treatment program capacities.
- Non-hazardous liquid wastes must not cause a publicly owned treatment system to violate any applicable waste discharge requirements.
- Hazardous solid wastes must not significantly alter available Class I landfill capacity.
- The facility must comply with all applicable laws regarding the handling of hazardous wastes.

Additionally, according to the CEQA Appendix G Guidelines, a project has a significant impact when it:

- Breaches standards relating to solid waste or litter control
- Creates a potential public health hazard or involves materials which pose a hazard
- Results in a need for new systems or substantial alterations to waste disposal facilities

The following sections describe the wastes that are expected to be generated during construction and operation of the PEC, and how non-hazardous solid waste, wastewater, and hazardous solid and liquid wastes will be disposed of.

5.14.2.1 Construction

5.14.2.1.1 Plant Construction. The PEC will generate wastes typical for the construction of natural gas-fueled combustion turbine power generation plants. Table 5.14-2 summarizes the anticipated waste streams generated during construction, along with appropriate management methods for treatment or disposal.

Non-Hazardous Waste. Solid waste generated from construction activities may include paper, wood, glass, plastics from packing material, waste lumber, insulation, scrap metal and concrete, and empty non-hazardous containers. These wastes will be segregated, where practical, for recycling. Non-recyclable wastes will be placed in covered dumpsters and removed on a regular basis by a certified waste handling contractor for disposal at a Class III landfill.

Hazardous Waste. Small quantities of hazardous wastes will likely be generated over the course of construction. These wastes may include waste paint, spent construction solvents, waste cleaners, waste oil, oily rags, waste batteries, and spent welding materials. Hazardous wastes generated during facility construction and operation will be handled and disposed of in accordance with applicable LORS. Hazardous wastes will be either recycled or disposed of in a licensed Class I disposal facility, as appropriate. Managed and disposed of properly,

TABLE 5.14-2
SUMMARY OF CONSTRUCTION WASTE STREAMS AND MANAGEMENT METHODS[1]

Waste Stream	Waste Classification	Amount	Disposal Method
Paper, wood, glass, and plastics from packing materials, waste lumber, insulation, and empty non-hazardous containers	Non-hazardous	50 tons	Weekly collection for recycling and/or disposal at a Class III Landfill
Concrete	Non-hazardous	34 tons	Weekly collection/disposal at a Class III Landfill
Metal including steel from welding/cutting operations, packing materials, empty non-hazardous containers, aluminum waste from packing materials and electric wire.	Non-hazardous	3 cubic yards/week	Recycling dumpsters. If not recyclable, then disposal as a Class III Landfill
Empty hazardous material containers – drums	Hazardous Recyclable	2 cubic yards/wk	Recondition, recycle, or waste disposal at Class I Landfill
Used and waste lube oil during Combustion Turbine Generator (CTG) and Stream Turbine Generator (STG) Lube Oil Flushes	Hazardous[2] Recyclable	<55 gallons per flush period, approximately three week duration	Recycle
Oil absorbent mats from CTG and STG lube oil flushes and normal construction	Non-hazardous	1,000 sq. ft. per month, as needed	Waste disposal facility or laundry (permitted to wash rags)
Spent batteries; lead acid	Hazardous	Two batteries/year	Recycle
Spent batteries; alkaline type, sizes AAA, AA, C, and D	Hazardous Recyclable	60 batteries/month	Recycle
CTG Cleaning Waste	Hazardous	1,000 gal. per cleaning	Hazardous waste disposal facility or recycle
Sanitary waste-portable chemical toilets and construction office holding tanks	Sanitary	1,500 gal. per week	Weekly collection (minimum) and offsite treatment/disposal
Waste oil including used motor oil, transmission fluid, hydraulic fluid, and antifreeze	Hazardous[2]	20 gal. per week	Hazardous waste disposal facility or recycle
Waste paint, thinners, and solvents	Hazardous	2 gal. per week	Hazardous waste disposal facility or recycle
Oily rags	Hazardous[2]	2-3 55-gallon drums	Hazardous waste disposal facility or recycled
Oil Absorbents	Hazardous[2]	Less than one cubic yard per week	Hazardous waste disposal facility

[1] All numbers are estimates.

[2] Under California regulations.

these wastes will not cause significant environmental or health and safety impacts. Most of the hazardous waste, such as turbine cleaning wastes and used oil, generated during construction can be recycled. The small quantities of hazardous waste that cannot be recycled are not expected to significantly impact the capacity of the Class I landfills in California.

Wastewater. Wastewater generated during construction of the new plant will include sanitary wastes, equipment wash water, and stormwater runoff. Construction-related wastewater will be managed according to appropriate LORS.

5.14.2.1.2 Offsite Structures.

Non-hazardous and Hazardous Waste. During the installation of the natural gas pipeline, non-hazardous soils and surface demolition debris (e.g., concrete, asphalt, and piping) are anticipated. These wastes may be transported and disposed at an appropriate disposal facility. If contaminated soils are encountered during installation, these soils will need to be managed in accordance with applicable LORS. Soil sampling will likely be required to characterize the waste. Soil may be recycled or disposed as a non-hazardous waste at a Class III landfill or soil recycling facility, or disposed as hazardous waste at a Class I landfill. The disposal option will depend on the characterization of the waste per RCRA and CCR Title 22 criteria. Waste disposal facilities are listed on Table 5.14-1.

Non-hazardous and hazardous wastes are not expected to be encountered at paved parking and equipment staging locations. If site grading is necessary to utilize unpaved parking and equipment staging locations, non-hazardous soil and debris (trash, asphalt) may be generated.

5.14.2.2 Operations and Maintenance

5.14.2.2.1 Plant Operations. Operation of the facility will generate wastes resulting from processes, routine facility maintenance, and office activities typical of natural gas-fueled power generation operations. The operating waste streams and management methods are summarized in Table 5.14-3 and are described in more detail below. The primary non-hazardous waste stream is circulating water blowdown generated and discharged as part of normal plant operations. Non-hazardous and hazardous solid wastes will be generated on a smaller scale. Non-hazardous wastes during operation of the facility will be recycled to the greatest extent practical, and the remainder removed on a regular basis by a certified waste-handling contractor. Operation of the natural gas pipeline will not generate a material amount of waste. The types of waste and their estimated quantities are shown in Table 5.14-3.

Non-hazardous Solid Waste. The PEC will produce maintenance and plant wastes typical of power generation operations. The following types of non-hazardous solid waste may be generated: paper, wood, plastic, cardboard, deactivated equipment and parts, defective or

TABLE 5.14-3
OPERATING WASTE STREAMS AND MANAGEMENT METHODS[1]

Waste Stream	Waste Classification	Anticipated Amount	Treatment
Paper, wood, plastic, cardboard, insulation, yard debris, and deactivated equipment and parts	Non-hazardous	TBD	Weekly collection for recycling and/or disposal at a Class III Landfill
Empty hazardous material containers	Hazardous	TBD	Recondition or recycle
Used hydraulic fluids, oils, grease, oily filters	Hazardous[2]	< 5 gallons/day	Recycle
Spent batteries	Hazardous	5 batteries/year	Recycle
Spent selective catalytic reduction (SCR) catalyst	Hazardous	500 lbs every 3 to 5 years	Recycle
Spent carbon monoxide (CO) Catalyst	Hazardous	500 lbs every 3 to 5 years	Recycle
Cooling tower basin sludge	Non-hazardous	2 tons/year	Recycle or dispose at non-hazardous waste facility
Used oil from oil-water separator	Recyclable Hazardous[2]	50 gallons/year	Recycle
Oily rags	Hazardous[2]	200 lbs/year	Hazardous waste disposal facility or recycled
Oily Absorbent	Recyclable Hazardous[2]	55 gallons/month	Recycle or hazardous Waste disposal facility
Used air filters	Non-hazardous	2,000 filters Every 5 years	Recycle
Sanitary wastewater	Non-hazardous	1,400 gallons/day	Liquids disposed to onsite leaching field. Sludge disposed to a sanitary waste disposal facility
Makeup water solids (filter cake)	Non-hazardous	TBD	Recycle or dispose of in a non-hazardous waste facility
Salt cake zero discharge option	Non-hazardous	TBD	Commercial sale or disposal in a non-hazardous waste facility
CTG periodic operational chemical cleaning	Hazardous	1,000 gallons per cleaning (Approx. 2 cleanings every 5 years)	Hazardous waste disposal facility (by licensed subcontractors)

1 All numbers are estimates.

2 Under California regulations.

broken electrical materials, empty non-hazardous containers, and other miscellaneous solid wastes including the typical refuse generated by workers.

Office paper, newsprint, aluminum cans, wood, insulation, yard debris, concrete, gravel, scrap metal, cardboard, glass, plastic containers, and other non-hazardous waste material will be segregated and recycled to the extent practical, and the remainder will be removed on a regular basis by a certified waste-handling contractor for disposal at a Class III landfill.

Liquid Wastes. Industrial wastewater will consist of cooling tower blowdown, blowdown from the CTG evaporative coolers, reverse osmosis (RO) reject, condensation drains from the CTG intercoolers, and oil-water separator effluent.

Circulating (or cooling) water system blowdown will consist of raw makeup water and other recovered process wastewater sources that have been concentrated by evaporative losses in the cooling tower, and residues of the chemicals added to the circulating water. These chemicals will control scaling and biological growth in the cooling tower and corrosion of the circulating water piping and heat exchanger tubes. Cooling water treatment will require the addition of a pH control agent (acid), a mineral scale dispersant (polyacrylate polymer), corrosion inhibitors (phosphate based), and biocide (sodium hydroxide or equivalent). A portion of this concentrated water will then be removed from the cooling tower via the blowdown to prevent the mineral scale formation on heat transfer surfaces and to ensure compliance with air quality regulations. The blowdown will be pumped to a 20,000-gallon wastewater collection tank via an underground drain line.

Water treatment will be provided onsite prior to use for water injection for NO_x control. Demineralized water will be used for NO_x injection water. The demineralized water will be produced by an RO and ion exchange system. The RO rejects will be pumped to the wastewater collection tank via an underground drain line.

CTG intercooler condensation drains and CTG evaporative cooled blowdown will also be directed to the wastewater tank via underground drain lines.

Area drains will be located by mechanical equipment where it is determined that oil could mix with rainwater or other water sources. The water collected by these drains will go to the oil-water separator, which separates out any oil before the effluent goes to the collection tank via an underground drain line. The oil-contaminated fluid will be pumped out by a vacuum truck on an as-needed basis and disposed of at a facility specifically qualified to handle such waste.

Hazardous containments will not have drains but will be pumped out by vacuum pump if hazardous materials are present. Rainwater will be pumped to the storm drain system after first confirming that no hazardous substances exist.

Water from the wastewater collection tank will then be disposed of via a deep well injection system, consisting of two class I non-hazardous deep injection wells. Wastewater will be injected approximately 5,000 feet below the ground into a highly saline, undifferentiated sand formation that is confined vertically by impermeable strata.

The plant site will consist of paved roads, paved parking areas, and graveled areas. Storm water will be conveyed by overland flow and swales to an infiltration basin located at the southeast corner of the proposed site. The infiltration basin will serve as a storm water treatment facility to manage the quality and quantity of storm water runoff from the proposed site. The infiltration basin is sized to capture 85% of the annual storm water runoff from the site according to standards set in the California Stormwater Quality Association's "Stormwater Best Management Practice Handbook." The infiltration basin will also serve to manage peak storm water runoff during the 100-year 24-hour storm event. The peak runoff for the developed conditions will not exceed the peak runoff rate of the existing conditions.

The domestic waste system will collect discharge from sinks, toilets, and other sanitary facilities and will discharge to the plant's onsite septic and leachfield system. The system will include a septic tank constructed of concrete, brick, clay, or fiberglass. The tank will include baffles to promote solid settling and biological digestion. Effluent from the septic tank flows by gravity to a conventional leach field comprised of perforated distribution pipes, for disposal. The perforated pipe is installed on top of gravel bed to promote drainage. Topsoil cover is placed over the leach field to protect it and prevent contact with the wastewater.

Hazardous Wastes. Hazardous wastes generated, will include spent catalyst from the SCR and Oxidation Catalyst systems, used oils from equipment maintenance, and oil-contaminated materials such as spent oil filters, rags, or other cleanup materials. Spent catalyst will be returned to the manufacturer for metals reclamation and/or disposal. Used oil generated will be recycled, and oil or heavy metal contaminated materials (e.g., filters) requiring disposal will be disposed of in a Class I waste disposal facility. Other occasional waste streams include alkaline or acid cleaning solutions used during chemical cleaning of the CTG. Table 5.14-3 summarizes the hazardous waste to be generated from operation of the plant.

Hazardous wastes will be collected by a licensed hazardous waste hauler and disposed of at a hazardous waste facility. Hazardous wastes will be transported offsite using a hazardous waste manifest. Copies of manifest reports, waste analysis, exception reports, destruction certifications, etc., will be kept onsite and accessible for inspection for three years. Land disposal restriction notices/certificates will be kept onsite and accessible for inspection for five years.

5.14.2.3 Abandonment/Closure

Premature closure or unexpected cessation of plant operations will be outlined in the facility's closure plan. The plan will outline steps to secure hazardous and non-hazardous materials and wastes. Such steps will be consistent with best management practices and the Hazardous Materials Business Plan and according to applicable LORS. The plan will include monitoring of vessels and receptacles of hazardous material and wastes, safe cessation of processes using hazardous materials or hazardous wastes, and inspection of secondary containment structures.

Planned permanent closure impacts will be incorporated into the facility closure plan and evaluated at the end of the generating stations' economic operation. The facility closure plan will document non-hazardous and hazardous waste management practices including: the inventory, management, and disposal of hazardous materials and wastes, and permanent closure of permitted hazardous materials and waste storage units.

5.14.2.4 Cumulative Impacts

The Class I and Class III landfills and soil and water recycling facilities in the PEC site area have adequate recycling and disposal capacities for the PEC. Therefore, cumulative impacts from the project site and other projects in the region are not expected to be significant.

5.14.3 Mitigation Measures

5.14.3.1 Construction

WM-1: Prior to the initiation of the project construction phase, construction employees will receive hazardous waste-related training, focusing on the recognition of potentially hazardous building materials and subsurface soil contamination and contingency procedures to be followed to protect worker safety and the public.

WM-2: A detailed waste management plan for all waste generated during construction will be prepared at least 60 days prior to rough grading to assure proper storage, labeling, packaging, recordkeeping, manifesting, waste minimization principles, and disposal of all hazardous materials and waste. A waste management plan will also be prepared for operation of the PEC. The waste management plans will include:

- A description of each hazardous waste stream
- Handling, storage, transport, treatment, and disposal procedures for each waste
- Preparedness, prevention, contingency, and emergency procedures
- Personnel training

WM-3: All hazardous wastes will be stored onsite for fewer than 90 days (or other accumulation periods as allowed by 22 CCR, Section 66262.34 for hazardous waste generators) and will be managed in accordance with state and federal hazardous waste generator requirements. Hazardous wastes, as well as hazardous materials that are spilled or otherwise become unsuitable for use, will be stored in an appropriately segregated hazardous waste storage area surrounded by a containment structure to control leaks and spills. The containment area will be constructed according to local codes and requirements. The hazardous waste storage areas will be inspected and maintained at least weekly, as required.

WM-4: Hazardous wastes will be collected by a licensed hazardous waste hauler and disposed of at a hazardous waste facility. Hazardous wastes are transported offsite using a hazardous waste manifest. Copies of manifest reports, waste analysis, exception reports, destruction certifications, etc., will be kept onsite and accessible for inspection for three years. Land disposal restriction notices/certificates will be kept onsite and accessible for inspection for five years.

WM-5: Spill control and management procedures will be included in the emergency response procedures developed for the proposed PEC prior to operation. The purpose of the spill control and management procedures is to avoid accidental mixing of incompatible chemicals and spills during transfer of chemicals. The design of spill control and management procedures will include the containment, collection, and treatment systems. The spill response procedures are further discussed in Section 5.15, Hazardous Materials Handling.

WM-6: Facility employees will receive hazardous materials training as required by the OSHA, Hazard Communication Standard. Additionally, employees will be trained in hazardous waste procedures, spill contingencies, and waste minimization procedures in accordance with CCR Title 22. Hazardous waste training includes the following subjects:

- Hazardous waste characteristics
- Use and management of containers
- Waste packing
- Marking and labeling
- Accumulation/storage areas
- Inspections
- Emergency equipment preparedness and prevention
- Contingency plan
- Emergency response procedures

- Spill response and containment
- Hazardous waste manifesting and transportation requirements
- Waste minimization practices

WM-7: Procedures to minimize hazardous waste generation will be established. Employees will be trained in procedures to reduce the volume of hazardous wastes generated at the PEC. The procurement of hazardous materials will be controlled to minimize surplus materials onsite and to prevent unused materials from becoming “off-spec.” Non-hazardous materials will be used in lieu of hazardous materials whenever possible. Hazardous materials will be reused whenever possible. Hazardous wastes will be recycled whenever possible.

Implementation of the above waste management procedures for handling demolition and construction-related debris, and hazardous wastes, where encountered will mitigate demolition and constructed-related impacts to a less-than-significant level. No further mitigation is proposed.

5.14.3.2 Operations and Maintenance Phase Mitigations

5.14.3.2.1 Plant Site. The Applicant will update the waste management procedures for construction of the site and implement them for operations at the PEC. In addition the Applicant will develop and implement procedures and requirements as outlined in the Hazardous Materials Business Plan. These procedures and programs will minimize potential plant operations-related impacts.

5.14.3.2.2 Offsite Structures. Periodic inspection and maintenance of the natural gas supply pipeline in accordance with applicable LORS will mitigate potential operations related impacts associated with the pipeline.

5.14.3.3 Monitoring Program

Environmental impacts related to waste management issues caused by construction and operation of the PEC are expected to be minimal. Therefore, extensive monitoring programs are not required. Monitoring of generated waste volumes and characteristics during construction and operation of the PEC project will be conducted in accordance with monitoring and reporting requirements in the appropriate permits that will be obtained for construction and operation.

5.14.4 Applicable LORS

The following summarizes the applicable LORS which govern the handling of non-hazardous and hazardous wastes. The LORS applicable to the handling of waste at the project site are also summarized in Table 5.14-4.

TABLE 5.14-4
LORS APPLICABLE TO WASTE MANAGEMENT

LORS	Applicability	Conformance (Section)
Federal		
RCRA Subtitle C and D, 42 USC §§ 6901 to 6992k, and Section 6.12.2.1.	Regulate non-hazardous and hazardous wastes. Laws implemented by the state.	Section 5.14.4.1
40 CFR 260, et seq.	Implementing regulations for RCRA Subtitle C law. Implemented by USEPA by delegating to the state.	Section 5.14.4.1
Federal Clean Water Act, 33 USC § 1251 et seq.	Regulates wastewater discharges to surface waters of the U.S. The NPDES program is administered at the state level.	Section 5.14.4.1
State		
California Integrated Waste Management Act, Public Resources Code § 40000 et seq.	Implements RCRA regulations for non-hazardous waste.	Section 5.14.4.2
Porter-Cologne Water Quality Control Act of 1998, Water Code § 13000 et seq.	Regulates wastewater discharges to surface and groundwater of California. NPDES program implemented by SWRCB.	Section 5.14.4.2
22 CCR § 66262.34	Regulates accumulation periods for hazardous waste generators. Typically hazardous waste cannot be stored onsite for more than 90 days.	Section 5.14.4.2
California Hazardous Waste Control Law, California Health and Safety Code § 25100 et seq.	Regulates hazardous waste handling and storage. Implemented by the County of FCDCH, Environmental Health Division.	Section 5.14.4.2
Local		
Fresno County Department of Community Health (FCDCH), Environmental Health Division	Regulates enforcement responsibility for the implementation of Title 23, Division 3, Chapters 16 and 18 of the CCR, as it relates to hazardous material storage and petroleum UST cleanup.	Section 5.14.4.3
FCDCH, Environmental Health Division	Regulates hazardous waste generator permitting, and hazardous waste handling and storage.	Section 5.14.4.3
Fresno County General Plan Public Facilities Element	Will ensure all new development complies with applicable provisions of County Integrated Solid Waste Management Plan.	

5.14.4.1 Federal

The RCRA, 42 USC, Section 6901 to 6992k, provides the basic framework for federal regulation of non-hazardous and hazardous waste. RCRA's Subtitle D establishes state responsibility for regulating non-hazardous wastes, while Subtitle C controls the generation, transportation, storage and disposal of hazardous waste through a comprehensive "cradle to grave" system of hazardous waste management techniques and requirements. The United States Environmental Protection Agency (USEPA) is responsible for implementing the law, and the implementing regulations are set forth in 40 CFR 260, et seq. The law allows USEPA to delegate the administration of the RCRA programs to the various states provided that the state programs meet the federal requirements. California's program was authorized by USEPA on August 1, 1992, and the California USEPA's Department of Toxic Substances Control (DTSC) is responsible for administering the program.

The Clean Water Act (CWA) 33 USC, Section 1251 et seq. provides the regulatory framework for managing the discharge of wastewater to surface waters of the U.S. USEPA has nationwide authority to implement the CWA, but states may be authorized to administer various aspects of the National Pollutant Discharge Elimination System (NPDES) as well as pretreatment programs. California is authorized under the CWA to administer the NPDES program, implement publicly owned treatment works' pretreatment programs, oversee federal facilities, and issue general permits.

5.14.4.2 State

Non-hazardous solid waste is regulated by the California Integrated Waste Management Act, Public Resources Code, Section 40000 et seq. The law provides a solid waste management system to reduce, recycle, and reuse solid waste generated in the state to the maximum extent feasible in an efficient and cost-effective manner to conserve natural resources, to protect the environment, and to improve landfill safety. Local agencies are required to develop and establish recycling programs, reduce paper waste, purchase recycled products, and implement integrated waste management programs that conform to the state's requirements. The Fresno County Department of Community Health (FCDCH) Local Enforcement Agency (LEA) has the authority to assure the proper storage and disposal of solid waste in Fresno County.

Wastewater is regulated under California's Porter-Cologne Water Quality Control Act, which established a statewide system for water pollution control, Water Code, Section 13000 et seq. The State Water Resources Control Board and the nine Regional Water Quality Control Boards are the principal agencies responsible for control of water quality and issuing permits under the NPDES program.

Accumulation of hazardous waste onsite is regulated under the CCR, Section 66262.34. Hazardous waste cannot be stored onsite for more than 90 days, so any hazardous waste stored onsite at the PEC would have to be appropriately transferred within that time period.

As stated previously, RCRA allows states to develop their own programs to regulate hazardous waste. California has developed its own program by passage of the California Hazardous Waste Control Law, California Health and Safety Code, §25100 et seq. It should be noted that California's Hazardous Waste Control Law includes non-RCRA hazardous wastes. In addition, the law specifies two hazardous waste criteria (Soluble Threshold Limit Concentration and Total Threshold Limit Concentration) that are not required under RCRA. Primary authority for the statewide administration and enforcement of California's Hazardous Waste Control Law rests with the DTSC. However, the FCDCH, Environmental Health Division, provides most regulatory functions covering hazardous waste generators.

5.14.4.3 Local

For hazardous waste, the designated Certified Unified Program Agency for the PEC site area is the FCDCH, Environmental Health Division. They have delegated authority to administer state and federal programs. The FCDCH, Environmental Health Division regulates the storage of hazardous materials in underground storage tanks and cleanup of petroleum releases from USTs under Ordinance No. 617.4. The FCDCH, Environmental Health Division as well as the Fresno County Fire Protection Division will be contacted in the event of a release of hazardous wastes or materials to the environment. The FCDCH, Environmental Health Division assumes enforcement responsibility for the implementation of Title 23 of the CCR and regulates the generation, and storage of hazardous waste for the PEC area.

5.14.4.4 Agency Contacts

Agencies with jurisdiction to issue applicable permits or enforce LORS related to waste management are shown in Table 5.14-5.

5.14.4.5 Applicable Permits

The PEC facility will apply for a USEPA hazardous waste generator identification number from the DTSC and a hazardous waste generator permit from the FCDCH, Environmental Health Division

The facility will be required to develop a Hazardous Materials Business Plan for the FCDCH, Environmental Health Division.

A summary of applicable permits is presented in Table 5.14-6.

TABLE 5.14-5
AGENCY CONTACTS

Agency	Contact	Title	Telephone
Department of Toxic Substances Control	Noel Laverty	DTSC Duty Officer Clovis Field Office	(916) 255-3618 (559) 297-3901
FCDCH, Environmental Health Division	Gustavo Gomez or Specialist On Call	Hazardous Materials Specialist	(559) 445-3271
FCDCH, Environmental Health Division	Specialist On Call	Solid Waste Specialist	(559) 445-3271
Fresno County Fire Protection Division, Station #96	Fire Station Captain	Fire Station Captain	(559) 655-4107

TABLE 5.14-6
APPLICABLE PERMITS

Jurisdiction	Potential Permit Requirements
Federal	No federal permits are required
State	No state permits are required
Local	
Fresno County Department of Community Health (FCDCH), Environmental Health Division	Hazardous Waste Generator Program Permit Hazardous Materials Business Plan

5.14.5 References

Barclays Law Publishers. ND. Barclays Official California Code of Regulations.

California Stormwater Quality Association. 2004. *Stormwater Best Management Practice Handbook, Industrial and Commercial.*

Environmental Data Resources Database Report. May 2006.

Office of the Federal Register. 1997. Code of Federal Regulations, Title 40, Parts 260 to 265, Revised July 1.

URS. 2006. Phase I Site Assessment.

Adequacy Issue: Adequate ____ Inadequate ____ **DATA ADEQUACY WORKSHEET** Revision No. 0 Date ____

Technical Area: **Waste Management** 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 (b) (1) (C)	A detailed description of the design, construction and operation of the facilities, specifically including the power generation, cooling, water supply and treatment, waste handling and control, pollution control, fuel handling, and safety, emergency and auxiliary systems, and fuel types and fuel use scenarios; and	Section 5.14.1.1 and 5.14.1.2		
Appendix B (e) (2)	A discussion of how facility closure will be accomplished in the event of premature or unexpected cessation of operations.	Section 5.14.2.3		
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 5.14.2 and 5.14.3		
Appendix B (g) (12) (A)	A Phase I Environmental Site Assessment for the proposed power plant site using methods prescribed by the American Society for Testing and Materials (ASTM) document entitled “Standard Practice for Environmental Site Assessments: Phase 1 Environmental Site Assessment Process” (Designation: E 1527-93, May 1993), which is incorporated by reference in its entirety; or an equivalent method agreed upon by the applicant and the CEC Staff that provides similar documentation of the potential level and extent of site contamination.	Section 5.4.1.1		

Adequacy Issue: Adequate ____ Inadequate ____

DATA ADEQUACY WORKSHEET

Revision No. 0 Date ____

Technical Area: **Waste Management** 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) (12) (B)	A description of each waste stream estimated to be generated during project construction and operation, including origin, hazardous or nonhazardous classification pursuant to Title 22, California Code of Regulations, § 66261.20 et seq., chemical composition, estimated annual weight or volume generated, and estimated frequency of generation.	Section 5.14.2.1.1, 5.14.2.1.2, and 5.14.2.2.1 Table 5.14-2 and 5.14-3		
Appendix B (g) (12) (C)	A description of all waste disposal sites which may feasibly be used for disposal of project wastes. For each site, include the name, location, classification under Title 23, California Code of Regulations, § 2530 et seq., the daily or annual permitted capacity, daily or annual amounts of waste currently being accepted, the estimated closure date and remaining capacity, and a description of any enforcement action taken by local or state agencies due to waste disposal activities at the site.	Section 5.14.1.3, 5.14.1.4 and 5.14.5 Table 5.14-1		
Appendix B (g) (12) (D)	A description of management methods for each waste stream, including methods used to minimize waste generation, length of on- and off-site waste storage, re-use and recycling opportunities, waste treatment methods used, and use of contractors for treatment.	Section 5.14.2.1.1, 5.14.2.1.2 and 5.14.2.2.1 Table 5.14-2 and 5.14-3		
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 5.14.4 Table 5.14-4		

Adequacy Issue: Adequate ____ Inadequate ____

DATA ADEQUACY WORKSHEET

Revision No. 0 Date ____

Technical Area: **Waste Management** 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) (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 5.14.4.4 Table 5.14-5		
Appendix B (h) (2)	A discussion of the conformity of the project with the requirements listed in subsection (h)(1)(A).	Section 5.14.2, 5.14.3 and 5.14.4		
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.	Table 5.14-5		
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 5.14.4.5 Table 5.14-6		
Appendix B. (i) (1) (B)	A discussion of any measures proposed to improve adverse site conditions.	Section 5.14.3		
Appendix B (i) (1) (D) (v)	The waste disposal system and on-site disposal sites;	Section 5.14.2.2.1		

5.15 HAZARDOUS MATERIALS HANDLING

This section presents a discussion of the potential impacts from storage and use of hazardous materials during construction and operational phases of the proposed Panoche Energy Center (PEC). Design features have been incorporated into the PEC regarding the use of hazardous materials, specifically storage procedures, in order to keep maximum potential impacts below defined thresholds of significance. Hazardous waste generation and management is further discussed in Section 5.14, Waste Management.

The discussion below includes the existing conditions; the environmental consequences associated with hazardous materials usage during construction, and operation of the proposed PEC; cumulative impacts; mitigation measures; and applicable laws, ordinances, regulations and standards (LORS).

5.15.1 Affected Environment

The PEC is located in an area zoned for agriculture/commercial/industrial uses as specified in the Fresno County General Land Use Plan. Surrounding land uses include agricultural land and West Panoche Road to the north; agricultural lands to the south; the existing PG&E substation and agricultural land to the east; and agricultural land to the west. Future residential development in the immediate vicinity of the site is not anticipated. Sensitive receptors were identified within 550 feet of the PEC. See Section 5.16 (Public Health) for additional information on sensitive receptors.

A summary of hazardous materials to be used and stored for construction of the PEC is provided in Table 5.15-1. A summary of hazardous materials to be used and stored onsite for operation of the PEC is provided in Table 5.15-2.

TABLE 5.15-1
HAZARDOUS MATERIALS AND WASTES USAGE AND STORAGE DURING CONSTRUCTION[1]

Material	Purpose	Usage/Day	Maximum Stored	Storage Type
Acetylene	Welding	As needed	270 cf	Cylinder
Argon	Welding	As needed	270 cf	Cylinder
Diesel fuel oil	Emergency generator	As needed	2,000 gal	Tank, UL C.S.
Lubricating oil	Lubricating equipment parts	As needed		Drum
Oxygen – gaseous	Welding operation	As needed	275 cf	Cylinder
Paint	Painting	25 gallons	100 gal	Can
Sodium hydroxide	Spill neutralization	As needed	2 gal	Carboy

[1] All numbers are approximate.
cf = cubic feetgal = gallon(s)

TABLE 5.15-2
HAZARDOUS MATERIALS AND WASTES USAGE AND STORAGE DURING OPERATIONS[1]

Material	Purpose	Usage/Day	Maximum Stored	Storage Type
Acetylene	Welding	As needed	270 cf	Cylinder
Aqueous ammonia ([19%] NH_4 (OH))	NO_x emissions control	300 lbs/day	20,000 gal	Aboveground tank
Acid (Sulfuric of HCL)	Cooling tower pH control		5,000 gal	Aboveground tank
Argon	Welding	As needed	270 cf	Cylinder
Cleaning Chemicals and Detergents	Miscellaneous cleaning	As needed	20 gal	Manufacturer containers
Diesel Fuel Oil	Emergency generator	As needed	2,000 gal	Tank.
Dispertant	Prevent particulate settlement deposit on cooling tower basin	As needed	200 gal	Aboveground container
Hydraulic Oil	Power transmission medium in hydraulically operated equipment	As needed	500 gal	55-gallon drums
Laboratory Reagents	Miscellaneous lab work	As needed	20 gal liquid 100 lbs solid	Manufacturers containers
Lubricating Oil	Bearing and sleeves lubrication	As needed	24,000	Lubricating sumps of turbines and 55-gallon drums
Mineral Transformer Insulating Oil	Provides overheating and insulation protection for transformers	As needed	60,000 gal	Transformers
Nitrogen	Transformers	As needed	275 cf	Cylinder
Scale/Corrosion Inhibitor	Prevent scale and corrosion in cooling tower circulation water lines	As needed	200 gal	Aboveground container
Sodium hypochlorite (12% wt NaOCl)	Biocide for condenser cooling water system water treatment	As needed	5,000 gal	Aboveground storage tank, plastic
Sulfuric acid for station batteries	Electrical/ctrl. Bldg., Combustion turbine, miscellaneous	As needed	100 gal	Battery

[1] All numbers are approximate.
cf = cubic feet
gal = gallon(s)

5.15.2 Environmental Consequences

The following sources are referenced in support of the identification and assessment of hazardous materials within this section: *Sax's Dangerous Properties of Industrial Materials*

(Lewis, 1992) and the *NIOSH Pocket Guide to Chemical Hazards* (National Institute for Occupational Safety and Health [NIOSH], 1997).

5.15.2.1 Construction Phase

Hazardous materials to be used during construction include gasoline, diesel fuel, oil, lubricants, solvents, adhesives, and paint materials. There are no feasible alternatives to these materials for construction or operation of construction vehicles and equipment. No acutely hazardous materials (AHMs) will be used or stored onsite during construction. No storage of hazardous materials is planned outside of the plant site.

In general, construction contractors will utilize lubricating oils, solvents and other hazardous materials during construction of the PEC. The contractor will be responsible for assuring that the use, storage and handling of these materials will be in compliance with applicable federal, state, and local LORS, including licensing, personnel training, accumulation limits, reporting requirements and recordkeeping. A Hazardous Materials Business Plan (HMBP) which outlines hazardous materials handling, storage spill response, and reporting procedures will be prepared prior to construction activities.

The following site services will also be provided, either by separate contract or incorporated into individual construction subcontracts for the PEC:

- Environmental health and safety training
- Site security
- Site first aid
- Construction testing (e.g., soil, concrete)
- Furnishing and servicing of sanitary facilities
- Trash collection and disposal
- Disposal of hazardous materials and waste in accordance with local, state, and federal regulations

Small quantities of spilled fuel oil and grease drippings from construction equipment may occur during construction. Such materials generally have a low relative risk to human health and the environment. If there is a large spill, the spill area will be bermed or controlled as quickly as is practical to minimize the footprint of the spill. Contaminated soil materials produced during cleanup of a spill will be placed into drums for offsite disposal as a hazardous waste at a permitted hazardous waste, transfer, storage, and disposal facility. If a spill or leak into the environment involves hazardous materials equal to or greater than the specific reportable quantity, federal, state, and local reporting requirements will be adhered to. In particular, the Fresno County Fire Protection Division will be notified. The Fresno County Fire Protection Division will also be called in the event of a fire or injury. Contractors will be expected to implement best management practices consistent with hazardous materials storage, handling, emergency spill response, and reporting specified in the HMBP. Impacts associated with the use of hazardous materials will be insignificant as a result of the Applicant implementing the above procedures.

5.15.2.2 <u>Operations Phase</u>

The major hazardous materials to be stored and/or used at the site during PEC site operations are included in Table 5.15-2.

The following potential hazards associated with the storage of hazardous or acutely hazardous materials were identified:

- Fire and explosion from the use of natural gas, and other gases
- Accidental release of aqueous ammonia

5.15.2.2.1 <u>Fire and Explosion Risks</u>.

<u>Natural Gases</u>**.** Natural gas, which will be used as a fuel for the PEC, poses a fire and/or explosion risk as a result of its flammability. While natural gas is used in significant quantities, it is and will be continuously delivered to the generating plant site through an existing pressurized natural gas pipeline and will not be stored onsite. There are no changes proposed to the gas pipeline; therefore impacts to the affected environment will not change. The risk of a fire and/or explosion will be minimized through adherence to applicable codes and design features, including isolation valves, and the continued implementation of effective safety management practices.

<u>Other Gases</u>**.** Other gases expected to the stored and used at the PEC include gases typically used for maintenance activities such as shop welding and emissions monitoring. These gases include small amounts of acetylene, argon, carbon monoxide, nitric oxide, nitrogen, and oxygen. The potential impacts presented by the use of these gases are not considered to be significant based on the following:

- A limited quantity of each gas is stored at the facility.
- The gases are stored in DOT-approved safety cylinders, secured to prevent upset and physical damage.
- Incompatible gases (e.g., flammable gases and oxidizers) are stored separately.

- The gases are stored in multiple standard-sized portable cylinders, in contrast to larger cylinders, generally limiting the quantity released from an individual cylinder failure to less than 200 cubic feet.

There will be no significant changes resulting from the proposed PEC. Therefore, the potential impacts presented by the use of these gases at the facility will not change and are considered insignificant.

5.15.2.2.2 Acutely Hazardous Materials. The chemicals proposed for use at the PEC site are not Regulated Substances subject to the requirements of the California Accidental Release Prevention (CalARP) Program and process safety management (PSM), with the exception of aqueous ammonia (approximately 19 percent solution) which will be stored in a single 20,000-gallon, single-walled aboveground storage tank.

In September 1996, Senate Bill (SB) 1889 was enacted to change the California Health and Safety Code (CHSC) § 25531 et seq., replacing the Risk Management and Prevention Program requirements with the Risk Management Plan (RMP) requirements established pursuant to Section 112(r) of the federal Clean Air Act (42 USC Section 7412). Pursuant to SB 1889, the California Office of Emergency Services (OES) is required to adopt implementing regulations, initially as emergency regulations, and to seek and maintain delegation of the federal program. The CalARP Program merges federal and state programs for the prevention of accidental releases of regulated toxic and flammable substances. The goal was to eliminate the need for two separate and distinct chemical risk management programs. The CalARP Phase I Final Regulations were approved on November 16, 1998.

The CalARP Program final regulations (CCR Title 19, Division 2, Chapter 4.5) provide two sets of lists of Regulated Substances: one for Federal Regulated Substances and one for State Regulated Substances.

- Section 2770.5 – Tables 1 and 2 of Section 2770.5 list Federal Regulated Substances and threshold quantities for accidental release prevention, including flammable substances. Aqueous ammonia, hydrochloric acid and sulfuric acid are on the list. The quantities of aqueous ammonia, sulfuric acid, and hydrochloric acid proposed for use during PEC operation do not exceed the threshold quantity limits and therefore are not regulated substances in this setting.
- Section 2770.5 – Table 3 of Section 2770.5 lists State Regulated Substances and threshold quantities for accidental release prevention. Aqueous ammonia, hydrochloric acid and sulfuric acid are included on this list. The quantities of sulfuric acid and hydrochloric acid proposed for use during PEC operation do not exceed the threshold quantity limits, and therefore are not regulated substances in this setting. The proposed quantity of aqueous ammonia does, however, exceed the threshold quantity limits.

Based on the above regulations and the future use of aqueous ammonia at the PEC, an RMP is required and will be submitted to the Fresno County Department of Community Health, Environmental Health Division.

No special regulatory requirements or management practices related to the storage or use of sulfuric acid or hydrochloric acid are anticipated.

An Offsite Consequences Analysis (OCA) for accidental releases of aqueous ammonia has been conducted in accordance with California Energy Commission (CEC) regulations. The analysis is included in Section 5.15.2.3.

5.15.2.2.3 Other Hazardous Materials. No adverse environmental impacts related to other hazardous materials used at the facility are anticipated. Only small quantities of paints, oils, solvents, pesticides, and cleaners, typical of those packaged for retail consumer use, are or will be present during operation of the facility. Small volumes of petroleum products associated with construction equipment will be onsite during construction. As described in Sections 5.15.2.2 and 5.15.3.1, long-term or cumulative impacts will be avoided by cleaning up any accidental leaks or spills of these materials as soon as they occur.

5.15.2.2.4 Material Safety Data Sheets. Material Data Safety Sheets for the hazardous materials will be kept onsite as required by 29 CFR 1910 OSHA Hazard Communication rules and regulations.

5.15.2.3 Offsite Consequence Analysis

This section of the report discusses the offsite consequence analysis (OCA) for the aqueous ammonia storage tank onsite at the PEC located in Firebaugh, Fresno County, California. This analysis has been performed with the intended purpose of informing the public of the potential offsite consequences of an accidental release of aqueous ammonia. The OCA examines a worst-case release scenario and an alternative release scenario. Results from the analysis of these scenarios will express the potential areas of concern surrounding the PEC.

The PEC will use aqueous ammonia, at an average concentration of 19 percent by weight, in the Selective Catalytic Reduction (SCR) technology to control nitrogen oxide (NO_x) emissions. To support the SCR with a continuous supply, an ammonia storage tank will be located within the northwest sector of the facility and will be periodically filled from tanker trucks, at a rate that corresponds to ammonia use in the SCR.

The storage tank found within the PEC will consist of a single-walled, carbon steel, above ground horizontal tank containing 20,000 gallons of aqueous of ammonia. It will have a cylindrical shape with a 10-foot diameter and 35-foot length. The tank will be surrounded by a secondary containment berm to contain any release from the tank. This secondary containment area will consist of a concrete enclosure with the following approximate dimensions: 42-foot length x 25-foot width x 3.5-height. The enclosure will be open to the atmosphere and have a volumetric capacity of 27,425 gallons. The secondary containment area will be able to hold the entire contents of the storage tank (20,000 gallons) and rainwater from a 24-hour 25-year rainfall event (22 CCR 66265.192(j)).

The storage tank will also be equipped with an ammonia delivery truck loading area located adjacent to it. This loading area will have an underground tank/vault, which will gather any ammonia spills in the event that the ammonia delivery truck accidentally looses some of its load while filling the storage tank. The underground tank/vault will have an approximate capacity of 10,000 gallons. The delivery truck loading area will be sloped down grade towards the underground tank/vault in order to allow any accidental release of ammonia to reach the tank/vault by gravity flow alone.

The OCA is regularly performed as a component of the Risk Management Program (RMP) required under the Clean Air Act (CAA). This OCA has been developed within this report in order to provide the public of Firebaugh, California immediate information about the potential off-site consequences of an accidental release of aqueous ammonia from the PEC. The PEC will require the completion and implementation of an RMP at a later stage in its development.

Federal RMP regulations for usage of aqueous ammonia stand at a 20,000-pound threshold and at concentrations equal to or greater than 20 percent by weight (19 CCR 2770.5 Table 1). The state of California has more stringent regulations over usage of aqueous ammonia. California State regulations, under the California Accidental Release Prevention (CalARP), present a threshold for usage of ammonia (in either anhydrous or aqueous forms) at 500 pounds (19 CCR 2770.5 Table 3). Conditions at the PEC will be in agreement within federal threshold regulations, but will exceed state threshold regulations for the usage of aqueous ammonia. The PEC will store approximately 26,000 pounds (20,000 gallons) of aqueous of ammonia at 19 percent concentration by weight.

The primary objective of the OCA is to determine the maximum distance from the release location to the toxic endpoint. The toxic endpoint refers to any point where the concentration of ammonia can potentially reach the threshold level for serious injury from exposure. Federal regulations specify the toxic endpoint for ammonia to be 0.14 milligrams per liter (mg/L) or 200 parts per million (ppm).

Calculations for the rate of dispersion and distance to the toxic endpoint for this OCA was performed through the use of the United States Environmental Protection Agency's (EPA) RMP*Comp™ (version 1.07) modeling program. The RMP*Comp™ modeling program is considered to provide conservative results as it uses very conservative input parameters. The program contains some specified parameters that cannot be altered based on the conditions found within particular scenarios. These parameters include: meteorological data and concentration levels. RMP*Comp™ sets the ambient temperature of conditions examined to be 77°F and the wind speed to be 1.5 meters/second and 3.0 meters/second (for worst-case and alternative case scenarios, respectively). Concentrations levels for the use of aqueous ammonia in the modeling program have a specified range with a lowest point of 20 percent concentration by weight.

Based on data recovered from the National Environmental Satellite, Data, and Information Service, meteorological conditions commonly found for Firebaugh, California are similar to those established by the RMP*Comp™ program. According to data obtained for temperature normals from 1971 to 2000, the average mean daily temperature in the area is 63.2°F and the maximum average daily temperature found is 96.6°F. Data obtained regarding the average wind speed through 2005 showed the annual average wind speed to be 2.9 meters/second and the lowest average wind speed to be 2.1 meters/second.

The aqueous ammonia that will be stored onsite at the PEC will have a concentration of 19 percent by weight. Due to RMP*Comp™ restrictions, calculations performed for this OCA were done for aqueous ammonia with a 20 percent concentration amount by weight. Results from sensitivity analysis show no appreciable difference between the use of 19 percent and 20 percent ammonia when performing calculations to determine the distance to the toxic endpoint.

Conditions examined for the PEC under the worst-case scenario have been directly defined by the RMP*Comp™ Program. During a worst-case scenario it is assumed that the maximum amount of contents within a tank or pipes being examined are spilled (taking into account administrative controls that may limit that maximum amount). The loss of contents is assumed to occur over a period of 10 minutes. Passive mitigation features (such as physical containment enclosures) can be taken into account, but not active features (such as human intervention). The worst-case scenario must be analyzed even if there is no credible series of events that could lead to the release.

The worst-case release scenario for the PEC consists of the entire 20,000 gallons of ammonia being released from the tank within a 10-minute period. The only passive mitigation feature taken into account for the analysis of the worst-case release scenario is the secondary containment. This worst-case scenario will determine the distance to the toxic endpoint if all 20,000 gallons of aqueous ammonia are spilled into the secondary containment and are allowed to evaporate into the ambient air from a pool with a 1,050-square foot surface area.

In contrast to conditions set by the worst-case scenario, an alternative release scenario must also be examined to determine the extent of damage under a more plausible scenario. It is not necessary to estimate the exact probability of occurrence or to demonstrate how it is more likely to occur than the worst-case scenario. Both passive and active mitigation features can be taken into account during this scenario.

The alternative scenario examined for the PEC is one in which ammonia is released from an accidental decoupling of the transfer hose from the delivery truck and the tank. Due to active mitigation, the spill will only last over a 3-minute period. For this particular scenario it will be also be assumed that the underground tank/vault is not yet in existence. Although the explicit purpose of the underground tank/vault is to contain spills caused from accidents while unloading the delivery truck, omitting the use of the underground containment unit allows for more conservative results to be developed for the OCA. The alternative scenario will assume that all the liquid released by the truck will spill into the secondary containment area (1050-ft^2 x 3.5-ft diked area). This alternative release scenario will be discussed in greater detail in sections to follow.

The worst-case and alternative release scenarios have been developed and analyzed in accordance with methods provided in the CCR Title 19, Division 2, Chapter 4.5 ("CalARP Guidelines") and the Risk Management Program Guidance for Offsite Consequence Analysis (EPA, 1999).

Both of the release scenarios and associated data, assumptions, and calculations are described in this section. All of the input data used to calculate the toxic end point distance, and the results of the offsite consequence modeling scenarios for both the worst-case and alternative release scenarios are presented in Table 5.15-3.

5.15.2.3.1 Worst-case Release Scenario. The worst-case release scenario calculations, methodology, and results are described below.

***Event*.** The worst-case scenario analyzed for purposes of this OCA entails an extreme breach of the tank containing 20,000 gallons of aqueous ammonia onsite at PEC. The entire 20,000-gallon contents of the tank are assumed to be spilled instantaneously into the secondary containment and evaporate into the ambient air over a 10-minute period. Therefore, the ammonia would be escaping the tank and filling the 1,050-squarefoot diked containment area at a rate of 2,000 gallons/minute.

***Chemical Name and Physical State*.** Aqueous ammonia (19 percent by weight) stored as liquid. (RMP*Comp™ dispersion modeling uses aqueous ammonia at 20 percent concentration by weight.)

***Toxic Endpoint*.** The toxic endpoint for ammonia is 0.14 mg/L (140 mg/m^3 or 200 ppm).

***Offsite Consequence Analysis Method and Calculations*.** USEPA's RMP*Comp™ model (version 1.07) program was implemented to estimate the furthest distance to the ammonia endpoint. This program uses the U.S. EPA's OCA methods for accidental release calculations. Results obtained through the RMP*Comp™ modeling program have been defined as conservative by both the U.S. EPA and CalARP program.

TABLE 5.15-3
OFFSITE CONSEQUENCE ANALYSIS DATA, METHODS, AND RESULTS FOR THE PEC PROJECT

Model Input Data	Units	Worst-case Scenario	Alternative Scenario
Chemical[a]	---	Aqueous Ammonia (20%)	Aqueous Ammonia (20%)
Release Form	---	Liquid	Liquid
Dispersion Model	---	RMPComp	RMPComp
Dispersion Algorithm	---	Program Defaults	Program Defaults
Release Quantity	Gallons	20,000[b]	300
Release Rate	Gallons/Minute	2,000	100
Release Time	Minutes	10	3
Surface Area of Spill[c]	Square Feet	1,050	1,050
Release Temperature	ºF	77	77
Release Pressure	Psig	Atmospheric	Atmospheric
Relative Humidity	Percent	50	50
Stability Class	---	F	F
Wind Speed	Meters/Second	1.5	2.5
Cloud Cover	Percent	N/A	N/A
Surface Roughness	---	Rural	Rural
Concentration Averaging Time	Minutes	10	10
Level of Concern	Ppm	200	200
Results (Zone of Vulnerability)			
Distance to Endpoint	Mile	0.3	0.1
Public Receptors Present	---	Yes	Possibly
Ecological Receptors Present	---	No	No
Sensitive Receptors Present	---	No	No
Major Commercial, Office, Industrial Areas Present	---	No	No
Total Residential Population[d]	---	1	0

N/A = not applicable

a. Concentrations of aqueous ammonia onsite will be 19% by weight. A 20% concentration by weight was used for the model due to OCA Guidance has detailed chemical properties for this concentration and it is the lowest concentration available in the RMPComp model program. Sensitivity analysis performed for the 19% and 20% concentrations showed no appreciable difference in the results.

b. The worst-case scenario includes the instantaneous release of 20,000-gallons of aqueous ammonia. The ammonia is assumed to evaporate over a ten-minute period.

c. Area of spill includes 1,050 ft^2 surface area of containment area.

d. Number of residences located within vulnerability zone.

The RMP*Comp™ program uses OCA Guidance reference tables to calculate the distance to the toxic endpoint of ammonia from an accidental release during a worst-case scenario analysis.

Through the use of the RMP*Comp™ program the distance to the endpoint for this worst-case scenario analysis was determined to be approximately 0.3 miles (0.5 kilometers). Based on this information the only sensitive receptor that will be affected, under these worst-case scenario conditions, is the Agricultural Worker Housing. All other sensitive receptors identified in the surrounding area are at a distance well beyond the toxic point.

***Scenario Description*.** Ammonia used for the selective catalytic reactor (SCR) NO_x air pollution control system is stored at PEC in a single above ground horizontal tank with a 20,000-gallon capacity. In accordance with federal rule 40 CFR 68.25(c), the entire 20,000-gallon contents of the tank are assumed to be spilled instantaneously and the contents of the spill evaporate to the ambient air over a 10 minute period.

***Height of Release*.** The release during the worst-case scenario is analyzed as a ground level release.

***Meteorology*.** The worst-case meteorological scenario involves the following conditions (Required parameters from the OCA Guidance incorporated into RMP*Comp™):

Wind Speed	1.5 m/s (3.4 mph)
Wind Direction	Any
Atmospheric Stability	Pasquill Class F
Temperature	77.0ºF (25.0ºC)
Relative Humidity	50%

***Topography (Surface Roughness)*.** The assessment assumes a rural topography. Rural topography is characterized as generally flat and unobstructed terrain with few or no other buildings or obstacles that may inhibit wind flow from area of release.

***Distance to Endpoint*.** The results to this analysis indicate the distance to the toxic endpoint to be approximately 0.3 mile (0.5 kilometer).

5.15.2.3.2 Alternative Release Scenario. The alternative release scenario calculation, methodology, and results are described below.

***Event*.** The alternative release scenario for the PEC entails a spill from the delivery truck transfer hose as the truck is unloading ammonia into the tank. This event assumes the connection between the delivery truck and the tank decouples, spilling all of the contents of the transfer hose (25 feet long with a 2-inch diameter) and a three-minute release of ammonia at the maximum truck transfer pump rate (100 gallons/minute) before the pumps shuts off.

The alternative release scenario is identified as 300 gallons of aqueous ammonia spilling directly into the 1,050-square foot diked area and not entering the underground containment tank. The use of the underground containment tank/vault was omitted in order to achieve more conservative results for this analysis.

***Chemical Name and Physical State*.** Aqueous ammonia (19 percent by weight) stored as liquid. (RMP*Comp™ dispersion modeling uses aqueous ammonia at 20 percent concentration by weight.)

***Toxic Endpoint*.** The toxic endpoint for ammonia is 0.14 mg/L (140 mg/m^3 or 200 ppm).

5.15.2.3.3 Offsite Consequence Analysis Method and Calculations. The U.S. EPA's RMP*Comp™ model (version 1.07) program was implemented to estimate the furthest distance to the ammonia endpoint. This program uses the U.S. EPA's OCA methods for accidental release calculations. Results obtained through the RMP*Comp™ model program have been defined as conservative by both the U.S. EPA and CalARP program.

The RMP*Comp™ program was used to calculate the distance from the accidental release of ammonia to the toxic endpoint for the alternative scenario.

Through the use of RMP*Comp™, the distance to the toxic endpoint was determined to be 0.1 mile (0.2 kilometers). All identified sensitive receptors are located beyond the distance to the toxic endpoint and will therefore remain unaffected by this accidental release.

***Scenario Description*.** The ammonia tank located at the PEC receives periodic deliveries of ammonia to replenish its supply. During one of the ammonia deliveries, the transfer hose from the truck to the tank decouples as ammonia is being unloaded into the tank. The spill lasts for approximately three minutes before the truck transfer pump is shut off by the technician. About 300 gallons of ammonia is spilled into the secondary containment area.

***Height of Release*.** The release during the worst-case scenario is analyzed as a ground level release.

***Meteorology*.** The worst-case meteorological scenario involves the following conditions (Required parameters from the OCA Guidance incorporated into RMP*Comp™):

Wind Speed	3.0 m/s (6.7 mph)
Wind Direction	Any
Atmospheric Stability	Pasquill Class D
Temperature	77.0ºF (25.0ºC)
Relative Humidity	50%

***Topography (Surface Roughness)*.** The assessment assumes a rural topography. Rural topography is characterized as generally flat and unobstructed terrain with few or no other buildings or obstacles that may inhibit wind flow from area of release.

***Distance to Endpoint*.** The results to this analysis indicate the distance to the toxic endpoint to be approximately 0.1 mile (0.2 kilometer).

5.15.2.3.4 Estimation of Population and Environmental Receptors.

***Worst-case Scenario*.** The worst-case scenario is used as required by the Rule to outline a "vulnerability zone." This zone is the circular area with a maximum 0.3-mile radius originating from the center of the ammonia tank containment area that will be affected in the event of a catastrophic breach of the ammonia tank.

Data collected for the area surrounding the PEC identifies seven receptors at varying distances from the facility (as shown in the table below). The following sections assess how these receptors will be affected during a worst-case release scenario. See Section 5.16 (Public Health) for additional information of sensitive receptors.

Receptor	Location from Facility
"Park"	1.34 mi W SW
Resident	2.63 mi NE
Resident	3.65 mi W
Resident	2.72 mi WNW
Resident	2.48 mi WNW
Resident	3.75 mi SE
Agricultural Worker Housing	0.25 mi W

***Total Estimated Residential Population*.** The only residence found within the 0.3-mile radius vulnerability zone is the Agricultural Worker Housing. All other residences in the area are well beyond the toxic endpoint zone.

***Presence of Public Receptors*.** No schools, hospitals, parks, or other public recreational areas are located within the vulnerability zone. The only public receptor found with the toxic endpoint zone is the Agricultural Worker Housing. The presence of other public receptors may occasionally be found within the PG&E Panoche Substation or on the 0.5-mile of Panoche Road that will be affected by the release.

***Sensitive and Ecological Receptors*.** No sensitive (e.g., schools, hospitals, etc.) or ecological receptors are located within the worst-case scenario vulnerability zone.

***Alternative Scenario*.** The alternative case scenario is used to determine a "vulnerability zone" (due to an accidental release that is more likely to occur than the worst-case scenario).

The vulnerability zone is defined as the circular area with a maximum 0.1-mile radius from the center of the ammonia tank containment area that will be affected by this release.

Data collected for the area surrounding the PEC identifies seven receptors at varying distances from the facility (as shown in the table below). The following sections assess how these receptors will be affected during a worst-case release scenario. See Section 5.16 (Public Health) for additional information of sensitive receptors.

Receptor	Location from Facility
"Park"	1.34 mi W SW
Resident	2.63 mi NE
Resident	3.65 mi W
Resident	2.72 mi WNW
Resident	2.48 mi WNW
Resident	3.75 mi SE
Agricultural Worker Housing	0.25 mi W

***Total Estimated Residential Population*.** No residences are located within the alternative scenario vulnerability zone.

***Presence of Public Receptors*.** No schools, hospitals, residences, parks or other areas of public congregation are present within the vulnerability zone for the alternative scenario. The presence of some public receptors may be found within the 0.09-mile of Panoche Road that will be affected by the release.

***Sensitive and Ecological Receptors*.** No sensitive (i.e., schools, hospitals, etc.) or ecological receptors are located within the alternative scenario vulnerability zone.

5.15.2.3.5 Discussion of Conclusions Derived from the Offsite Consequence Analysis. The OCA discusses the potential area of impact from accidental release scenarios of aqueous ammonia (19 percent concentration by weight) stored onsite at PEC. A worst-case release and an alternative release scenario were analyzed for this OCA. The worst-case scenario consisted of the entire contents of the storage tank (20,000 gallons) spilling within 10 minutes into the 1,050-square foot containment area, which is open to the ambient air. The alternative scenario consisted of 300 gallons of ammonia being spilled into the containment area while unloading was being performed from the delivery truck to the storage tank.

Distances to the toxic endpoints for both worst-case and alternative scenarios were determined through the use of the RMP*Comp™ modeling program. RMP*Comp™ is defined as a conservative model (by both CalARP Guidance and U.S. EPA) and has specific ambient temperature, atmospheric stability, and wind speeds that cannot be altered for each specific scenario. Assessments of the worst-case and alternative case scenarios through

RMP*Comp™ calculated distances to the toxic endpoint of 0.3 miles (0.5 kilometers) and 0.1 miles (0.2 kilometers) respectively.

Receptors in surrounding area were analyzed to determine if any would fall within the "vulnerability zone" of either scenario. The vulnerability zone is any point within the circular area (with a radius equivalent to the calculated distance to the toxic endpoint) surrounding the ammonia tank containment area that will have ammonia concentrations that can pose potential hazards to receptors. For the worst-case scenario, there was only one receptor found to lie within the vulnerability zone (the Agricultural Housing). While for the alternative scenario, none of the surrounding receptors were found to be within the vulnerability zone. Vulnerability zones for both scenarios showed to affect portions of Panoche Road, which presents the possibility of some public receptors being affected by the release. Due to the facility being located within a rural setting, the presence of public receptors on Panoche Road has a low probability since the road is not heavily traveled. The worst-case scenario vulnerability zone also identified the possible occasional presence of public receptors in the PG&E Panoche Substation located northeast to the facility. Presence of public receptors at the PG&E Panoche Substation also has a low probability that would be determined by the amount of repair and monitoring needed for the substation. No environmental receptors were found within either of the scenario's vulnerability zones.

5.15.2.4 Cumulative Impacts

The Fresno County Planning Department was contacted regarding future projects with the potential to handle hazardous materials in quantities that would create a potential cumulative impact in combination with the proposed PEC. No large-scale industrial developments are planned in the near future. Based on this information, no significant cumulative impacts due to hazardous material handling are expected from future projects in combination with the PEC.

Cumulative impacts considered for the PEC focused on accidental releases of hazardous materials. Specifically, the increased risk to public health and safety when multiple facilities handling hazardous materials were considered together with the proposed project.

The hazardous material that has the greatest potential to migrate offsite is aqueous ammonia. To determine cumulative impacts, other sites in the vicinity of the proposed project as well as planned projects with the potential to handle aqueous ammonia were identified and analyzed. In addition, sites handling hazardous materials that could negatively interact with ammonia and with the potential for offsite migration were identified, analyzed, and discussed in Section 5.15.2. Based on results of the OCA for the aqueous ammonia release scenario and the evaluation of other projects in the area, cumulative hazardous materials impacts for the PEC are expected to be insignificant.

5.15.3 Mitigation Measures

The CEC standard conditions provide appropriate mitigation and compliance conditions that ensure that the PEC utilizes hazardous materials in compliance with all applicable LORS, and in a manner than ensures no significant environmental impacts.

5.15.3.1 Construction Phase

During construction, hazardous materials to be stored onsite will be limited to small quantities of paint, coatings, adhesives, and emergency refueling containers. These materials will be stored in a locked utility shed or in a secured fenced area with secondary containment. It is anticipated that fuels, lubricants, and other various fluids needed for operation of construction equipment will be transported to the construction site on an as-needed basis by equipment service trucks. Personnel working on the project during construction will be trained in handling hazardous materials, and will be alerted to dangers associated with these materials. An onsite safety officer will be designated to implement health and safety guidelines and contact emergency response personnel and the local hospital, if necessary.

Construction contractors for the PEC will be required to develop standard operating procedures for servicing and fueling construction equipment. These procedures will, at a minimum, include the following:

HAZMAT-1: The following measures will be implemented related to fueling and maintenance of vehicles and equipment:

- No smoking, open flames, or welding will be allowed in the fueling/services areas.
- Servicing and fueling of vehicles and equipment will occur only in designated areas.
- Fueling service and maintenance will be conducted only by authorized, trained personnel.
- Refueling will be conducted only with approved pumps, hoses, and nozzles.
- All disconnected hoses will be handled in a manner to prevent residual fuel and fluids from being released into the environment.
- Catchpans will be placed under equipment/hose connections to catch potential spills during fueling and servicing.
- Service trucks will be provided with fire extinguishers and spill containment equipment, such as absorbents, shovels, and containers.
- Service trucks will not remain on the job site after fueling and service are complete.

<u>HAZMAT-2</u>: Spills that occur during vehicle maintenance will be cleaned up immediately, and contaminated soil will be containerized and sent for subsequent evaluation and offsite disposal. A log of all spills and cleanup actions will be maintained.

<u>HAZMAT-3</u>: Emergency telephone numbers will be available onsite for the fire department, police, local hospitals, ambulance service(s), and environmental regulatory agencies.

<u>HAZMAT-4</u>: Containers used to store hazardous materials will be properly labeled and kept in good condition.

It is anticipated that these standard operating procedures will minimize the potential for incidents involving hazardous materials during construction.

5.15.3.2 <u>Operational Phase</u>

A listing of anticipated hazardous materials to be used onsite can be found in Table 5.15-2 General mitigation measures are detailed below for containerized and bulk hazardous materials.

5.15.3.2.1 <u>General Mitigation Measures</u>.

<u>HAZMAT-5: Containerized Materials</u>. Containerized materials will typically consist of returnable tanks (approximately 100-gallon capacity), 55-gallon drums, or 5-gallon pails of lubricants and oils, and smaller containers of paints and solvents. These materials will be managed as described below to mitigate potential releases.

- Hazardous materials will be stored in accordance with applicable regulations and codes, i.e., the Uniform Fire Code.
- Trucks delivering hazardous materials will be parked adjacent to the usage area or storage area where the chemicals are to be stored to minimize potential unloading and transportation accidents.
- Incompatible materials will be stored separately.
- Containerized hazardous materials will be stored in original containers appropriately designed for the individual characteristics of the contained material. Containers will be labeled with contents and identification of fire hazards as required by NFPA 704.
- Containers of flammable materials will be stored in inflammable storage cabinet(s) when not in use.
- Hazardous materials will be stored within secondary containment structures, typically constructed of sealed concrete. These structures will have capacity for the largest container plus an allowance for rainwater equivalent to a 24-hour, 50-year storm, if the

area is outdoors. Alternatively, containerized hazardous materials may also be stored in commercially available hazardous materials storage sheds with built-in secondary containment.

- Commercially available secondary containment pallets may also be used for containers stored in warehouse facilities to augment other spill control measures.
- Empty containers, especially portable tanks and drums, will be emptied, drained, and returned to the supplier for reuse to the maximum extent possible or recycled offsite.
- Pollution prevention efforts such as replacement of hazardous materials with less hazardous materials, reduction of hazardous waste generation volumes, and recycling will be employed at the facility, as practical.

HAZMAT-6: Bulk Hazardous Materials. Bulk hazardous materials at the facility will consist primarily of aqueous ammonia for emissions control of the SCR system. This material will be stored in an aboveground storage tank with secondary containment of 110 percent of the tank volume plus an allowance for rainwater for a 24-hour, 25-year storm. Hazardous materials will be managed as described below to mitigate the potential for releases to the environment.

Each bulk chemical storage tank will be equipped with a local level gauge and a level switch. The level switch is interlocked with the storage tank high- and low-level alarms and the metering pump controls. The storage tank high-level alarm rings at the local common alarm panel when the storage tank level reaches the high level set point. The storage tank low-level alarm rings at the local feed system control panel when the storage tank liquid level reaches the low-level set point.

Associated skid-mounted equipment includes the feed pumps, valves, interconnecting piping, controls, etc. A separate control panel is mounted on each chemical equipment skid. Controls, instrumentation, and interlocks are provided for safe operation of the equipment during all modes of operation. The metering pumps will also be located within the secondary containment and will be elevated to prevent flooding during rainstorms.

Aqueous ammonia (19 percent) will be stored onsite in one 20,000-gallon tank. The tank will be single walled with the outer wall providing secondary containment. The aqueous ammonia will be delivered to the facility in tank trucks.

Out-of-doors secondary containment will employ a valve to empty the containment of rainwater, after a visual inspection to evaluate potential for contamination. The valve will be equipped with a lock and will remain locked shut unless rainwater is being actively emptied from the secondary containment. Contaminated water will run through the oil-water separator or will be disposed of offsite, as appropriate.

Tank trucks will be unloaded in a tank truck unloading area. This unloading area will be paved with concrete and with sufficient secondary containment to hold the contents of the worst case release scenario.

The ammonia truck unloading pad will be equipped with an underground containment vault. This vault will be specifically designed for minimization of ammonia evaporation in case of aqueous ammonia spills during truck unloading operations.

The containment vault noted in the above paragraph will be sealed with a non-reactive concrete coating to minimize potential migration of liquids from the vault into the surrounding soil. This vault will be emptied using a vacuum truck after a spill event had occurred. The truck pad will be covered to prevent the accumulation of rainwater in the vault.

Seismic loads for hazardous materials storage and containment areas will be determined by the static lateral force procedures of the Uniform Building Code and site-specific design features will be incorporated into these storage facilities. These structures will be designed and constructed in accordance with applicable codes, regulations, and standards.

Underground piping and piping runs outside of secondary containment structures will be constructed with single-wall (secondary containment) piping to minimize the potential for releases and enable the facility staff to detect leaks, when and if they should occur.

HAZMAT-7: Personnel Training and Equipment. Personnel working with chemicals will be trained in proper handling and emergency response to chemical spills or accidental releases. Additionally, designated personnel will be trained as a plant hazardous materials response team.

Safety equipment will be provided for use as required during chemical containment and cleanup activities, and will include safety showers and eyewash stations. Service water hose connections will be provided near chemical usage and storage areas to allow flushing of chemical spills, if needed.

HAZMAT-8: Hazardous Materials Management – Plans and Procedures. Several programs will address hazardous materials storage locations: emergency response procedures; employee training requirements; hazard recognition fire safety; first-aid/emergency medical procedures; hazardous materials release containment/control procedures; hazard communication training; personnel protective equipment; training; and release reporting requirements. These programs will include the HMBP, workers safety program, fire response program, plant safety program, and facility standard operating procedures. The HMBP will include procedures on hazardous materials handling, use, and storage, emergency response, spill prevention and control, training, record keeping, and reporting.

As discussed previously, a RMP for aqueous ammonia will also be prepared.

HAZMAT-9: Spill Response Procedures. The following describes the general spill response procedures for the PEC. Personnel will be trained in spill response reporting and cleanup procedures. The facility will maintain onsite one or more spill response kits. These kits will contain absorbents appropriate for the hazardous materials kept onsite and each kit will be clearly designated for the type of spilled material it should be used for. Typically these kits contain a barrel, shovel, and absorbents. In addition, the facility will maintain a supply of gloves and protective clothing for use during spill response events.

Personnel discovering a spill will report to the on-shift Control Room Operator. The Control Room Operator will notify the Operations Superintendent or the Plant Manager. The Superintendent or Manager will function as the Onsite Coordinator and will be in charge of activities related to spill containment, control and cleanup, and regulatory agency reporting, if needed.

The Onsite Coordinator will assess the situation, contain the leak or spill, begin cleanup operations with onsite staff or offsite contractors, as needed, and collect information for reporting, if needed. The following information will be needed for reporting:

- Type of chemical released
- Amount of release or spill, i.e., volume and description, liquid, vapor, etc.
- Direction of release and distance traveled if the release is outside the secondary containment
- Cause of spill or release
- Potential hazard to offsite personnel and local water bodies, including groundwater
- Actions undertaken to mitigate the spill or release

Outside authorities, e.g., the Fresno County Fire Prevention Division, Emergency Medical Assistance, Office of Emergency Services, RWQCB, and California DFG, will be contacted if required by laws and regulations, or as deemed necessary by the Onsite Coordinator.

In the case of a small spill involving 55 gallons or less of liquid hazardous materials, the spill would typically be retained by a secondary containment structure. This type of spill would be confined to as small a space as possible using absorbent pigs or pillows, and be cleaned up with properly trained employees using absorbents available onsite. Similarly, small spills outside of secondary containment structures could be cleaned up by trained employees with onsite spill kit equipment.

Larger spills would normally be contained within secondary containment and would be cleaned up by outside contractors using trained spill response personnel if onsite employees could not handle the spill using available onsite spill response equipment.

Waste generated from spill cleanup will be placed in closed, labeled containers, typically 55-gallon drums or roll-off containers. Labeling will include the name of the facility (PEC), date of start of accumulation, name of the spilled material, and Hazardous Waste identification language from CCR 22 66262.32, and the established DOT shipping name, as needed.

Collected waste would be properly disposed of offsite at an approved recycling, landfill, or other appropriate disposal facility. Offsite transportation of spill wastes will be contracted with a licensed hazardous materials transportation company. Hazardous waste spill cleanup residues will be properly manifested.

5.15.4 Applicable Laws, Ordinances, Regulations, and Standards (LORS)

The LORS applicable to the PEC are discussed in this section in the context of hazardous materials handling. Construction and operation of the PEC will be in accordance with all applicable LORS pertaining to hazardous materials.

Federal, state, and local laws will govern the storage and use of hazardous materials and acutely hazardous materials at the PEC. Applicable laws and regulations address the use and storage of hazardous materials to protect the environment from contamination, and facility workers and the surrounding community from exposure to hazardous and acutely hazardous materials. The applicable LORS related to hazardous materials handling are summarized in Table 5.15-4.

5.15.4.1 Federal

The Superfund Amendments and Reauthorization Act of 1968 (SARA) Title Ill (Sections 302, 304, 311, and 313) and regulations pursuant to the Clean Air Act of 1990 (40 CFR 68) established a nation-wide emergency planning and response program, and imposed reporting requirements for businesses that store, handle, or produce significant quantities of extremely hazardous materials. The Acts require the states to implement a comprehensive system to inform local agencies and the public when a significant quantity of such materials is stored or handled at a facility (see 40 CFR, Section 68.115). The requirements of these Acts are reflected in the California Health and Safety Code, Section 25531 et seq.

Title 49, Code of Federal Regulations, Parts 171-177, govern the transportation of hazardous materials, the types of materials defined as hazardous, and the marking of the transportation vehicles.

TABLE 5.15-4
LORS APPLICABLE TO HAZARDOUS MATERIALS HANDLING

LORS	Applicability	Conformance (Section)
Federal		
Clean Air Act (40 CFR 68)	Requires an RMP if listed hazardous materials are stored above threshold quantities (TQ)	Section 5.15.4.1
SARA Title III, Section 302	Requires certain planning activities when hazardous materials are present in excess of TQ	Section 5.15.4.1
SARA Title III, Section 304	Requires notification if there is a release of hazardous materials in excess of TQ	Section 5.15.4.1
SARA Title III, Section 311	MSDSs to be kept onsite for each hazardous materials. Required to be submitted to the Fresno County Fire Department District, Mendota Station 96	Section 5.15.4.1
SARA Title III, Section 313	Requires annual reporting of releases of hazardous materials	Section 5.15.4.1
29 CFR, Section 1910.120, Occupational Safety and Health Administration (OSHA); Cal/OSHA	Describes worker safety and health procedures and safe handling of hazardous materials and wastes	Section 5.15.4.1 and 5.15.4.2
U.S. DOT Regulations, 49 CFR 171-177	Governs the transportation of hazardous materials, including the marking of the transportation vehicles	See Section 5.15.4.1 Traffic and Transportation
State		
Health and Safety Code Section 25500, et seq. (Waters Bill)	Requires preparation of an HMBP if hazardous materials are handled or stored in excess of TQ	Section 5.15.4.2
Health and Safety Code Section 25531, et seq. (La Follette Bill)	Requires registration of facility with local authorities and preparation of an RMP if hazardous materials stored or handled in excess of TQ	Section 5.15.4.2
CCR, Title 8, Section 5189	Facility owners are required to implement safety management plans to ensure safe handling of hazardous materials	Section 5.15.4.2
California Uniform Building Code	Requirements regarding the storage and handling of hazardous materials	Section 5.15.4.2
California Government Code Section 65850.2	Restricts issuance of COD until facility has submitted an RMP	Section 5.15.4.2
Local		
Fresno County Department of Community Health, Environmental Health Division	Requires new/modified businesses to complete a hazardous materials business, and RMP prior to final plan/permit approval	Section 5.15.4.3
Industry Standards		
Uniform Fire Code, (Articles 79 and 80)	Requirements for secondary containment, monitoring, etc. for extremely hazardous materials	Section 5.15.4.4

5.15.4.2 State

The California Health and Safety Code, Section 25500, requires companies that handle hazardous materials in sufficient quantities to develop a HMBP. The HMBP includes basic information on the location, type, quantity, and health risks of hazardous materials handled, stored, used, or disposed of that could be accidentally released into the environment. It also includes a plan for training new personnel, and for annual training of all personnel in safety procedures to follow in the event of a release of hazardous materials. It also includes an emergency response plan and identifies the business representative able to assist emergency personnel in the event of a release. The PEC will develop a HMBP prior to construction and operation of the PEC.

The California Health and Safety Code, Section 25531, directs facility owners storing or handling acutely hazardous materials in reportable quantities to develop an RMP and submit it to appropriate local authorities, the USEPA, and the designated local Administering Agency for review and approval. The RMP includes: an evaluation of the potential impacts associated with an accidental release; the likelihood of an accidental release occurring; the magnitude of potential human exposure; any pre-existing evaluations or studies of the material; the likelihood of the substance being handled in the manner indicated; and the accident history of the material. This new, recently developed program supersedes the California Risk Management and Prevention Plan and is known as the CalARP. The PEC will develop and submit an RMP prior to operation of the PEC.

The CCR, Title 8, Section 5189, requires facility owners to develop and implement effective Safety Management Plans to ensure that large quantities of hazardous materials are handled safely. While such requirements primarily provide for the protection of workers, they also indirectly improve public safety and are coordinated with the RMP process.

California Government Code Section 65850.2, states that a city or county shall not issue a final certificate of occupancy unless there is verification that the applicant has met the applicable requirements of Health and Safety Code, Section 25531 and requirements, if any, for a permit from the air pollution control district.

The Uniform Building Code contains requirements regarding the storage and handling of hazardous materials. The Chief Building Official must inspect and verify compliance with these requirements prior to issuance of an occupancy permit.

5.15.4.3 Local

The designated certified unified program agency for the PEC site is the Fresno County Department of Community Health, Environmental Health Division (FCDCH) and is responsible for 1) the implementation of the HMBP and emergency response plan, and 2) the storage of hazardous materials in underground storage tanks and cleanup of petroleum releases. The FCDCH, Environmental Health Division will be contacted in the event of a release of hazardous wastes or materials to the environment. The City also assumes enforcement responsibility for the implementation of CCR, Title 23.

5.15.4.4 Industry Standards

The Uniform Fire Code (UFC) contains provisions regarding the storage and handling of hazardous materials. These provisions are contained in Articles 79 and 80. Article 80 was extensively revised in the latest edition (1994). These articles contain requirements that are generally similar to those contained in the California Health and Safety Code Section 25531 et seq. The UFC does, however, contain unique requirements for secondary containment, monitoring, and treatment of toxic gases emitted through emergency venting. These unique requirements are generally restricted to extremely hazardous materials.

5.15.4.5 Agencies and Agency Contacts

There are a number of federal and state agencies that regulate hazardous materials, including the USEPA at the federal level and the California/EPA at the state level. However, local agencies are the primary enforcers of hazardous materials laws. For the PEC site, the local agency is the FCDCH, Environmental Health Division and the contact is shown in Table 5.15-5.

TABLE 5.15-5
AGENCY CONTACT

Agency	Contact	Title	Telephone
Fresno County Department of Community Health (FCDCH), Environmental Health Division	Gustavo Gomez or Specialist On Call	Hazardous Materials Specialist	(559) 445-3271
Fresno County Fire Protection Division, Station #96	Rusty Souza	Battalion Chief	(559) 655-4107
Department of Toxic Substances Control	Noel Laverty	DTSC Duty Officer Clovis Field Office	(916) 255-3618 (559) 297-3901

5.15.4.6 Permits Required and Permit Schedule

The PEC will develop a Hazardous Materials Business Plan prior to construction activities.

The PEC will submit an RMP prior to the storage of aqueous ammonia onsite. See Table 5.15-6 for a list of potential permit requirements.

TABLE 5.15-6
PERMIT TABLE FOR HAZARDOUS MATERIALS

Jurisdiction	Potential Permit Requirement
Federal	No permits required
State	No permits required
Local	Hazardous Materials Business Plan, Risk Management Plan

5.15.5 References

Lees, F. P. 1983. *Loss Prevention in the Process Industries*. Volumes I and II. Butterworths.

Lewis, Richard J., Sr. 1992. *Sax's Dangerous Properties of Industrial Materials. Eighth Edition.* Van Nostrand Reinhold. New York, New York.

National Institute of Occupational Safety and Health. 1997. NIOSH Pocket Guide To Chemical Hazards. DHHS Publication No. 97-140. U.S. Government Printing Office. Washington, D.C.

U.S. Environmental Protection Agency. 1999. Risk Management Program Guidance for Offsite Consequence Analysis. EPA Document EPA550B99009. April, 1999.

1996. RMP Offsite Consequence Analysis Guidance. EPA Document EPA550B96014. May 24, 1996.

1995. SCREEN3 Model User's Guide. EPA-454/B-95-004. September 1995.

1993. Guidance on the Application of Refined Dispersion Models to Hazardous/Toxic Air Pollutant Releases. EPA-454/R-93-002. April 30, 1993.

Wray, Thomas, K. 1991. "HazMat Chemist: Ammonia." *HazMat World*. p. 86. November.

Adequacy Issue: Adequate ____ Inadequate ____ **DATA ADEQUACY WORKSHEET** Revision No. ____ Date ________

Technical Area: **Hazardous Materials Handling** 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 5.15.1, 5.15.2 and 5.15.3.		
Appendix B (g) (10) (A)	A list of all materials used or stored on-site which are hazardous or acutely hazardous, as defined in Title 22, California Code of Regulations, § 66261.20 et seq., and a discussion of the toxicity of each material.	Section 5.15.2.1 and 5.15.2.2, 5.16.2.1 Table 5.15-1, 5.15-2 and 5.16-1		
Appendix B (g) (10) (B)	A map at a scale of 1:24,000 depicting the location of schools, hospitals, day-care facilities, emergency response facilities and long-term health care facilities, within the area potentially affected by any release of hazardous materials.	Figure 5.16-1		
Appendix B (g) (10) (C)	A discussion of the storage and handling system for each hazardous material used or stored at the site.	Section 5.15.2.1, 5.15.2.2 and 5.15.3.2.1 Table 5.15-1 and 5.15-2		
Appendix B (g) (10) (D)	The protocol that will be used in modeling potential consequences of accidental releases that could result in off site impacts. Identify the model(s) to be used, a description of all input assumptions, including meteorological conditions. The results of the modeling analysis can be submitted after the AFC is complete.	Section 5.15.2.3		
Appendix B (g) (10) (E)	A discussion of whether a risk management plan (Health and Safety Code § 25531 et seq.) will be required, and if so, the requirements that will likely be incorporated into the plan.	Section 5.15.3.2.1		

Adequacy Issue: Adequate ____ Inadequate ____

DATA ADEQUACY WORKSHEET

Revision No. ____ Date ____

Technical Area: **Hazardous Materials Handling** 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) (10) (F)	A discussion of measures proposed to reduce the risk of any release of hazardous materials.	Section 5.15.3.2.1		
Appendix B (g) (10) (G)	A discussion of the fire and explosion risks associated with the project.	Section 5.15.2.2.1		
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 5.15.4 Table 5.15-4		
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 5.15.4.5 Table 5.15-5		
Appendix B (h) (2)	A discussion of the conformity of the project with the requirements listed in subsection (h)(1)(A).	Section 5.15.2, 5.15.3 and 5.15.4		
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.	Table 5.15-5		
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.	Table 5.15-6		

5.16 PUBLIC HEALTH AND SAFETY

This section describes the health risk assessment (HRA) that was conducted to assess the potential health impacts of the proposed 400 megawatt (MW) Panoche Energy Center (PEC or the project), which will be located in western Fresno County. This section describes the methodology and results of the HRA for the project. The purpose of the HRA is to evaluate potential public exposure to toxic air pollutant emissions from routine operations. Exposure to criteria pollutants, NO_2, SO_2, CO, VOC, and PM_{10}, is examined in Section 5.2, Air Quality. A limited number of hazardous materials will be used during normal operations at the PEC. These are discussed further in Section 5.15, Hazardous Materials. Only aqueous ammonia will be stored on site in sufficient quantity to require a hazardous material offsite consequence analysis, which is also discussed in Section 5.15, Hazardous Materials. The details of the Public Health analysis are contained in the following sections:

- Section 5.16.1, Affected Environment, describes the local environment surrounding the project site. Topographical information is provided. Sensitive receptors within a 3-mile radius of the project site are identified on Figure 5.16-1.
- Section 5.16.2, Environmental Consequences, discusses the potential public health consequences of the project. The HRA approach is described. The project's emissions of toxic air pollutants are discussed, and the potential impacts of these emissions are evaluated. The results of the HRA show that the maximum incremental offsite cancer risk from the project will be 3.46 in 1 million. This is well below the accepted cancer risk significance threshold for new sources of 10 in 1 million. The results of the assessment also show that the chronic total hazard index (THI) and the acute THI are 0.0026 and 0.051, respectively, which are both well below the significance criteria of 1.0.
- Section 5.16.3, Cumulative Impacts, addresses the cumulative impacts of the project with other nearby sources of toxic air contaminants.
- Section 5.16.4, Mitigation Measures, discusses mitigation measures to minimize the impacts of the project's emissions of toxic air contaminants.
- Section 5.16.5, Laws, ordinances, regulations, and standards (LORS), describes all applicable LORS pertaining to the public health aspects of the project.
- Section 5.16.6, Involved Agencies and Agency Contacts, lists the agency contacts consulted in conducting the public HRA.
- Section 5.16.7, Permits Required and Permit Schedule, lists the permits required and provides the permit schedule.
- Section 5.16.8, References, lists the references used to conduct the public HRA.

5.16.1 Affected Environment

The project site is located in far western Fresno County in the San Joaquin Valley southeast of the intersection of 4wd Road and West Panoche Road. The project site is about 2 miles east of Interstate 5 and approximately 3 miles west of the California Aqueduct. The site abuts the existing Pacific Gas & Electric (PG&E) Substation on the west. Land use within 10 miles of the site is dedicated almost exclusively to the cultivation of agricultural crops, and is considered rural for the purposes of conducting the air quality modeling within the HRA.

The nearest communities include Mendota, El Porvenir, Firebaugh, Tranquility, Cantua Creek, and San Joaquin. These communities are between 13 and 22 miles from the PEC. The project site is at an elevation of approximately 420 feet above sea level in terrain that slopes gently downward to the north, northeast, and east toward the San Joaquin River and Fresno Slough about 15 miles from the site. Terrain elevations as high as the stacks of the proposed combustion turbine generators (CTGs) of the project are found within about 2 miles of the project site to the southwest and south and the elevation rise continues in this direction to the Ciervo Hills (foothills of the Diablo Range Mountains) about 6 miles away. Topography within a 6- and 10-mile radius of the project site is shown on Figure 5.2-1 of the Air Quality section of this document.

For purposes of this analysis, sensitive receptors are defined as the locations occupied by groups of individuals that may be more susceptible to health risks from a chemical exposure. Schools (public and private), day care facilities, convalescent homes, parks, and hospitals are of particular concern. The nearest sensitive receptor is a residence approximately 550 feet north of the northwestern edge of the project boundary. All sensitive receptors located within a 3-mile radius of the project are shown on Figure 5.16-1; however, the HRA approach treated all receptors as sensitive receptors.

5.16.2 Environmental Consequences

This section describes the potential public health risks due to the construction and operation of the project, and the methodology and results of the HRA. Significant impacts are defined as a maximum incremental cancer risk greater than 10 in 1 million, a chronic THI over 1.0 or an acute THI over 1.0. Also, uncertainties in the HRA are discussed and other potential health impacts are described.

5.16.2.1 <u>Public Health Impact Assessment Approach</u>

The potential human health risks posed by the project's emissions were assessed using procedures consistent with the Office of Environmental Health Hazard Assessment (OEHHA) *Air Toxics Hot Spots Program Risk Assessment Guidelines – The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments* (OEHHA, 2003a). The OEHHA guidelines were developed to provide risk assessment procedures, as required under the Air Toxics Hot Spots Information and Assessment Act of 1987, Assembly Bill 2588 (Health and Safety Code Sections 44360 et seq.). The Hot Spots law established a statewide program for inventorying emissions of toxic air contaminants from individual facilities, as well as requirements for risk assessment and public notification of potential health risks.

The HRA was conducted in four steps using the Hotspots Analysis and Reporting Program (HARP):

- Hazard Identification and Emission Quantification
- Exposure Assessment
- Dose-response Assessment
- Risk Characterization

Step 1 – The purpose of this step was to identify whether pollutants emitted from the plant include known or suspected human carcinogens, or have been linked by health effects specialists to other types of adverse health effects. The OEHHA guidelines provide lists of pollutants with potential cancer and noncancer health effects that are potentially emitted by various categories of sources. The pollutants that are listed for the specific types of equipment that will be present at the operational project are presented in Table 5.16-1.

Step 2 – An exposure assessment was conducted to estimate the extent of potential public exposure to the project emissions. Public exposure is evaluated in terms of the predicted short- and long-term ground-level concentrations resulting from project emissions, the pathway(s) of exposure, and the duration of exposure to the emissions. Dispersion modeling was performed using the ISCST3 model within HARP to estimate the ground-level concentrations near the project site. The methods used in the dispersion modeling were consistent with the approach described in Section 5.2, Air Quality, and the modeling protocol that was submitted for the project for review by the California Energy Commission (CEC) and the San Joaquin Valley Unified Air Pollution Control District (SJVAPCD) (URS, 2006).

Step 3 – A dose-response assessment was performed using the HARP model to characterize the relationship between pollutant exposure and the potential incidence of an adverse health effect in exposed populations. The dose-response relationship is expressed in terms of potency factors for cancer risk and reference exposure levels (RELs) for acute and chronic noncancer risks. The OEHHA guidelines provide potency factors and RELs for an extensive list of toxic air contaminants. Potency factors and RELs are constantly being revised by the OEHHA, and the most recent values were applied in this HRA (Cal-EPA/OEHHA, 2005). All exposure pathways available in HARP were included in this analysis, except for drinking

TABLE 5.16-1
TOXICITY VALUES USED TO CHARACTERIZE HEALTH RISKS

Compound	Sources of Emissions	Inhalation Cancer Potency Factor (mg/kg-day)-1	Chronic REL ($\mu g/m^3$)	Acute REL ($\mu g/m^3$)
Diesel particulate (PM_{10})	Diesel firewater pump engine	1.1E+00	5.0E+00	--
Ammonia	gas turbine stacks	--	2.0E+02	3.2E+03
Acetaldehyde	gas turbine stacks	1.0E-02	9.0E+00	--
Acrolein	gas turbine stacks	--	6.0E-02	1.9E-01
Benzene	gas turbine stacks	1.0E-01	6.0E+01	1.3E+03
Ethylbenzene	gas turbine stacks	--	2.0E+03	--
Formaldehyde	gas turbine stacks	2.1E-02	3.0E+00	9.4E+01
Hexane	gas turbine stacks	--	7.0E+03	--
Propylene	gas turbine stacks	--	3.0E+03	--
Toluene	gas turbine stacks	--	3.0E+02	3.7E+04
Xylenes	gas turbine stacks	--	7.0E+02	2.2E+04
Polycyclic Aromatic Hydrocarbons	gas turbine stacks	3.9E-01	--	--
Naphthalene	gas turbine stacks	1.2E-01	9.0E+00	--
Arsenic	Cooling tower	1.2E+01	3.0E-02	1.9E-01

Notes:
-- = not applicable
mg/kg-day = milligrams per kilogram per day
$\mu g/m^3$ = micrograms per cubic meter
PM_{10}= particulate matter less than 10 micrometers in diameter
REL = reference exposure levels

water and fish. For the calculation of cancer risk, the duration of exposure to project emissions was assumed to be 24 hours per day, 365 days per year, for 70 years, at all receptors. The cancer risk was calculated in HARP using the "Derived (Adjusted) Method" and the chronic THI was calculated in HARP using the "Derived (OEHHA) Method."

Step 4 – Risk characterization was performed to integrate the health effects and public exposure information and provide quantitative estimates of health risks from project emissions. Risk modeling was performed using HARP to estimate cancer and noncancer health risks for the project. The HARP model utilizes OEHHA equations and algorithms to calculate health risks, based on input parameters that include emission rates, "unit" ground-level concentrations, and toxicological data.

Detailed descriptions of the model input parameters and results of the HRA are presented later in this section.

5.16.2.2 Construction-phase Emissions

Due to the relatively short duration of the project's construction phase (i.e., approximately 16 months), significant long-term public health effects are not expected. To ensure worker safety during actual construction, safe work practices will be followed. A detailed analysis of the potential environmental impacts due to criteria pollutant emissions during construction and control of these emissions is discussed in Section 5.2, Air Quality.

5.16.2.3 Operational-phase Emissions

Facility operations were evaluated to determine whether particular substances will be used or generated that may cause adverse health effects if released to the air. The primary sources of potential emissions from facility operations are the four simple-cycle CTGs burning exclusively natural gas fuel, and the ammonia slip-stream from the SCR control system used to minimize emissions of NO_x. Secondary sources of potential emissions from the facility are the emergency diesel firewater pump engine and the evaporative cooling tower. The emergency fire pump will normally be operated only for short periods in testing mode to ensure operability if needed. The cooling tower will employ a high-efficiency drift elimination system to minimize the release of drift droplets containing trace amounts of hazardous substances. The substances emitted from these sources (with associated toxicological information) are shown in Table 5.16-1, Toxicity Values Used to Characterize Health Risks.

Upon the specific recommendations of SJVAPCD staff (SJVAPCD, 2006), emission factors for the identified air toxic substances emitted from internal combustion natural gas turbines were obtained from data provided by the Ventura County Air Pollution Control District (VCAPCD, 1995). In addition, ammonia slip emissions from the CTG SCR system were calculated based on stack parameters provided by the turbine vendor and a Best Available Control Technology (BACT) limit of 10 ppmvd at 15 percent O_2, as described in Section 5.2, Air Quality. Arsenic emissions would result only from operation of the cooling tower, as this chemical was identified in the analysis of the tower's circulating water. Diesel particulate emissions would result only from the weekly tests of the diesel internal combustion engine used to drive the plant firewater pump.

Annual CTG emissions were estimated by assuming that all four CTGs would operate simultaneously under full-load conditions (100% load) for 5,000 hours per year, including startups, shutdowns, and maintenance operations. The cooling tower is also assumed to operate for 5,000 hours per year. CTG stack parameters (i.e., exit temperature and velocity) for the full-load condition were used in the model simulations to assess the hourly and annual ground-level impacts and health risks.

For calculation of both maximum hourly and annual project emission rates, the maximum natural gas consumption rate of 909.7 MMBtu/hr (HHV) per CTG was assumed for all operating hours. To calculate the cooling tower emissions of particulate matter, the makeup water concentration of total dissolved solids was assumed to be 1,700 mg/liter. A water circulating rate of 27,600 gallons per minute with 3 cycles of concentration was used, and a drift elimination system capable of limiting drift to no more than 0.0005 percent of the circulating water rate, as guaranteed by the equipment vendor. The emergency diesel firewater pump emissions were estimated assuming that this equipment would run at its full rated capacity (160 hp) for one hour per week for emergency preparedness. Any hours of actual emergency firewater pump usage were not included.

Emission factors for the CTGs were obtained from the Ventura County Air Pollution Control District’s AB2588 emission factors for internal combustion natural gas turbines (1995). These emission factors are expressed in units of pounds per million cubic feet (lb/MMcf) of natural gas fuel usage, which were divided by the higher heating value of the natural gas (1024 Btu/scf) to arrive at emission factors for individual pollutants in units of pounds per million British thermal unit (lb/MMBtu). These factors were then multiplied by the Btu equivalent of the maximum hourly CTG gas consumption rate to obtain maximum toxic air contaminant emission rates in units of pounds per hour. The emission factors and estimated maximum hourly and annual CTG emissions are summarized in Table 5.16-2. The emission factors and estimated maximum hourly and annual cooling tower emissions are summarized in Table 5.16-3.

A vendor-guaranteed diesel particulate mater emission factor of 0.15 grams per horsepower-hour was used to estimate emissions from the engine driver for the emergency diesel firewater pump. The estimated maximum hourly and annual emissions from the firewater pump are summarized in Table 5.16-4.

5.16.2.4 Model Input Parameters

The HRA was conducted using worst-case emissions (short- and long-term) from all sources of the operational project. Cancer and chronic noncancer health effects were estimated using the annual CTG, cooling tower and firewater pump emission estimates in pounds per year. Acute noncancer health effects were estimated using the worst-case maximum hourly emissions for all four CTGs, the cooling tower, and the firewater pump in pounds per hour. These were used as direct input to the HARP model.

TABLE 5.16-2
EMISSION RATES FROM OPERATION OF NATURAL-GAS-FIRED COMBUSTION TURBINES

Chemical Species	Emission Factor (lb/MMBtu)	Emission Factor (lb/MMcf)	Maximum Hourly Emissions per CTG[1]	Annual Emissions Per CTG[1,2]
			(lb/hr)	(lb/yr)
Ammonia	10 ppm[3]	10 ppm[3]	11.9	5.95E+04
Acetaldehyde	3.61E-05	0.037	3.29E-02	1.64E+02
Acrolein	8.79E-06	0.009	8.00E-03	4.00E+01
Benzene	1.10E-05	0.0113	1.00E-02	5.02E+01
Ethylbenzene	1.29E-05	0.0132	1.17E-02	5.86E+01
Formaldehyde	9.18E-05	0.094	8.35E-02	4.18E+02
Hexane	1.71E-03	1.75	1.55E+00	7.77E+03
Propylene	1.03E-03	1.0522	9.35E-01	4.67E+03
Toluene	7.09E-05	0.0726	6.45E-02	3.22E+02
Xylenes	2.82E-05	0.0289	2.57E-02	1.28E+02
PAHs	1.95E-07	0.0002	1.78E-04	8.88E-01
Naphthalene	7.81E-07	0.0008	7.11E-04	3.55E+00

Notes:

1 See Appendix O, Public Health and Safety Data, Attachment A, Toxic Air Contaminant Emission Calculations, for detailed emission calculations. Natural gas fuel heat rate assumed at 1,024 Btu/scf.

2 Annual emissions calculations based on 5,000 operating hours per year for each CTG, including startups, warm-ups, shutdowns and maintenance operations.

3 Based on estimated ammonia slip from NO_x control (10 ppmvd at 15% oxygen).

CO = carbon monoxide
lb/hr = pounds per hour
lb/yr = pounds per year
lb/MMBtu = pounds per million British thermal units
lb/MMcf = pounds per million cubic feet
SCR = selective catalytic reduction
PAH = polycyclic aromatic hydrocarbons

Dispersion modeling was performed using the ISCST3 model in HARP and methods consistent with the approach (e.g., building downwash, meteorological data, etc.) described in Section 5.2, Air Quality, and the modeling protocol submitted for the project (URS, 2006). The ISCST3 model uses the CTG, cooling tower, and firewater pump stack parameters to

TABLE 5.16-3
EMISSION RATES FROM OPERATION OF COOLING TOWER

Chemical Species	Emission Factor (μg/L)	Emission Factor Source	Maximum Hourly Emissions[1] (lb/hr)	Annual Emissions[1,2] (lb/yr)
Arsenic	0.021	Source water analysis	4.35E-09	2.18E-05

Notes:

[1] Total emissions for the 5 cells of the cooling tower are presented in the table.

[2] Annual emissions based on 5,000 operating hours per year for the cooling tower and a drift rate of 0.0005 percent.

See Appendix O, Public Health and Safety, Attachment A, Toxic Air Contaminant Emission Calculations, for detailed emission calculations.

μg/L = micrograms per liter
lb/hr = pounds per hour
lb/yr = pounds per year

TABLE 5.16-4
EMISSION RATES FROM OPERATION OF THE EMERGENCY DIESEL FIREWATER PUMP ENGINE

Chemical Species	Emission Factor[1] (g/hp-hr)	Emission Factor Source	Maximum Hourly Emissions[2] (lb/hr)	Annual Emissions[2] (lb/yr)
Diesel particulate (PM_{10})	0.15	Supplied by Engine Vendor	5.29E-02	2.75E+00

Notes:

[1] Hourly emissions are based on one full hour of test operations.

[2] Annual emissions based on one hour of test operations per week (52 tests per year).

See Appendix O, Public Health and Safety, Attachment A, Toxic Air Contaminant Emission Calculations, for detailed emission calculations.

g/hp-hr = grams per horsepower hour
lb/hr = pounds per hour
lb/yr = pounds per year
PM_{10} = particulate matter less than 10 micrometers in diameter

calculate the concentration per unit emissions. HARP then uses this information along with the emission rates (provided in the input file as described above) to calculate ground-level concentrations for each chemical species. Meteorological data for the years 1987-1991 (the same years used in the air quality analysis in Section 5.2, Air Quality) were used in the HRA. Risk values were modeled for all sensitive receptors within 3 miles of the project and all grid, boundary, and census receptors within 6 miles of the project, to assess potential health effects at all these locations. Boundary receptors were placed every 82 feet along the property fence line. Grid receptors were spaced every 328 feet out to 6.21 miles from the site in every direction. Any risks calculated by the HARP model at on-site receptor locations were ignored.

Toxicological data, cancer potency factors and RELs for specific chemicals are built into the California Air Resource Board's (CARB) HARP model. The pollutant-specific cancer potency factors and RELs used in the HRA were listed in Table 5.16-1, Toxicity Values Used to Characterize Health Risks. The HARP model uses the toxicological data in conjunction with the other input data described above to perform health risk estimates based on OEHHA equations and algorithms.

5.16.2.5 Calculation of Health Effects

Adverse health effects are expressed as cancer or noncancer health risks. Cancer risk is typically reported as “lifetime cancer risk.” Lifetime cancer risk is the maximum estimated increased risk of contracting cancer caused by long-term exposure to a pollutant suspected of being a carcinogen. Cancer risk is calculated by assuming that an individual is exposed continuously to pollutants at the computed long-term average concentration 24 hours per day for a period of 70 years. Although this continuous lifetime exposure is unlikely, the goal of the approach is to produce a worst-case estimate of potential cancer risk. Noncancer risk is typically reported as a “THI.” The THI is calculated for each target organ as a fraction based on the maximum acceptable exposure level to a pollutant. The acceptable exposure level is generally the level at (or below) which no adverse health effects are expected. THI values are calculated for both short- (acute) and long-term (chronic) exposures.

Both cancer and noncancer risk estimates provided in this HRA represent incremental risks (i.e., risks due to project sources only) and do not include potential health risks posed by existing background concentrations. This approach is consistent with the significance criteria used to evaluate predicted impacts, which are also based on the incremental contributions to risk by project sources. The HARP model performs all of the necessary calculations to estimate the potential lifetime cancer risk and THI resulting from project emissions.

5.16.2.6 Health Effects Significance Criteria

Various state and local agencies use different significance criteria for cancer and noncancer health effects. For carcinogenic health effects, an exposure to a new emissions source is normally considered potentially significant when the predicted incremental lifetime cancer risk of the source exceeds 10 in 1 million (10×10^{-6}). For non-carcinogenic health effects (chronic or acute), an exposure that affects each target organ is considered potentially significant when the THI exceeds a value of one.

5.16.2.7 Estimated Lifetime Cancer Risk

Based on the risk assessment methodology described in the foregoing subsections, the maximum incremental cancer risk resulting from project emissions based was estimated to be 3.46 in 1 million. The maximum cancer risk was located on the southern boundary of the project site at the elevation of the facility (receptor located at UTM North American Datum [NAD] 83 coordinates 715,978 m east, 4,058,830 m north), as shown in Figure 5.16-2.

Figure 5.16-2 also shows the one in a million cancer risk contour, i.e., the area within which the HARP model predicted an excess cancer risk of greater than one in a million. The sensitive receptor with the highest predicted cancer risk is the nearest residence located approximately 550 feet north of the facility across West Panoche Road (715,803 m east, 4,059,161 m north); the maximum incremental cancer risk at this location was estimated to be 0.147 in 1 million. Table 5.16-5 presents the results of the HRA for the project operations for cancer, chronic, and acute health risks. All HARP model files, along with all air quality modeling files are provided electronically on a DVD that is supplied separately with this Application.

TABLE 5.16-5
ESTIMATED CANCER RISK AND ACUTE AND CHRONIC TOTAL HAZARD INDICES

Cancer Risk at Point of Maximum Impact	Chronic Risk at Point of Maximum Impact	Acute Risk at Point of Maximum Impact
3.46 excess risk in 1 million	0.0026 total hazard index	0.051 total hazard index

The estimated cancer risk at all locations is well below the significance criteria of 10 in 1 million. Thus, it is concluded that the project's emissions will not pose a significant cancer risk to any populations potentially exposed to these emissions.

5.16.2.8 Estimated Chronic and Acute Total Hazard Indices

The maximum chronic THI resulting from project emissions was estimated to be 0.0026. The location of the maximum estimated chronic THI is approximately 5 miles west-southwest of the site (the receptor is located at UTM coordinates of 707,573 m east, 4,057,025 m north). This receptor is in an unpopulated agricultural area. The sensitive receptor with the highest impact is a residence located approximately 3.75 miles southeast of the facility (at 718,925 m east, 4,053,861 m north); the maximum chronic THI at this receptor was estimated to be 0.0009.

The maximum acute THI resulting from project emissions was estimated to be 0.051 approximately 4 miles southwest of the site (UTM coordinates 710,773 m east, 4,053,725 m north). The sensitive receptor with the highest predicted acute THI impact is a residence located approximately 0.75 mile east-northeast of the facility on South Fairfax Avenue (at 717,331 m east, 4,059,299 m north); the maximum acute THI at this location was estimated to be 0.012. Table 5.16-5 presents the detailed noncancer results of the HRA for the project operations.

The estimated chronic and acute THIs are both well below the significance criterion of one. Thus, it is concluded the project's emissions will not pose a significant non-cancer health risk to any populations potentially exposed to these emissions.

5.16.2.9 Uncertainty in the Public Health Impact Assessment

Sources of uncertainty in HRAs include emissions estimates, dispersion modeling, exposure characteristics, and extrapolation of toxicity data in animals to humans. For this reason, assumptions used in HRAs are designed to provide sufficient health protection to avoid underestimation of risk to the public. Some sources of uncertainty applicable to this HRA are discussed below.

The CTG emission rates of individual toxic air contaminants were derived using vendor data for ammonia slip and from emission factors (VCAPCD, 1995) for the other air toxics. Both the short- and long-term CTG emissions were developed assuming all four CTGs would operate at the maximum load for the maximum number of annual operating hours requested in this application. Under actual operating conditions, the CTGs may operate less and the average loads will be lower than 100 percent of capacity. Consequently, the emissions used for this HRA are likely to be higher than those that would occur under normal operation of the proposed project.

The dispersion models used in HRAs contain assumptions that tend to lead toward over-prediction of ground-level contaminant concentrations. For example, the modeling performed in the HRA assumed a conservation of mass (i.e., all of the pollutants emitted from the sources remained in the atmosphere while being transported downwind). During the transport of pollutants from sources to receptors, none of the material was assumed to be converted or removed through chemical reaction or lost at the ground surface through reaction, gravitational settling, or turbulent impaction. In reality, these mechanisms work to reduce the level of pollutants remaining in the atmosphere during plume travel.

The exposure characteristics assessed in the HRA included the assumption that all receptors (including residents) were continuously exposed to the emissions from the CTGs, cooling tower, and firewater pump at the same location for 24 hours per day, 365 days per year, for 70 years. It is extremely unlikely that any resident would actually be subject to such continued, long-term exposure. This conservative exposure assumption tends to cause risks to be over estimated by the HRA methods used in this analysis.

The toxicity data used in the HRA contain uncertainties resulting from the extrapolation of health effects data from animals to humans. Typically, safety factors are applied when doing the extrapolation. Furthermore, the human population is much more diverse both genetically and culturally than bred experimental animals. The intraspecies variability among humans is expected to be much greater than in laboratory animals. With all of the uncertainty in the assumptions used to extrapolate toxicity data, significant measures are taken to ensure that there is sufficient health protection built into the health effects criteria used in assessments such as this one.

The conservatism introduced at each step in the HRA to compensate for all of these sources of uncertainty is compounded in the predicted health risks. Therefore, the actual risks resulting from exposure to emissions from the project are expected to be well below the values presented in this analysis.

5.16.2.10 Criteria Pollutants

Emissions of the criteria pollutants (NO_2, CO, SO_2, and PM_{10}) from the project were modeled and an evaluation of their impacts on air quality is presented in Section 5.2, Air Quality. The federal and state NAAQS specify allowable levels of specific air pollutants that should not be exceeded in order to protect the public health. The results presented in Section 5.2, Air Quality, show that the project will not cause or significantly contribute to exceedances of any state or federal AAQS. Thus, no significant adverse health effects are anticipated to result from the project’s criteria pollutant emissions.

5.16.3 Cumulative Impacts

CEC requirements specify that an analysis must be conducted to determine the cumulative impacts of the project and other projects within a 6-mile radius that have received construction permits but are not yet operational or that are in the permitting process 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 six miles from the proposed site. The resulting list of projects will be submitted to CEC for final determination of which new projects, if any, need to be evaluated by cumulative modeling. If an additional HRA is required to include nearby sources, it will be submitted as an addendum to this application at a later date.

5.16.4 Mitigation Measures

The criteria pollutant emissions from the project will be mitigated by the use of BACT and through emissions offsets. A complete discussion of these measures is included in Section 5.2, Air Quality. The toxic pollutant emissions from the proposed CTGs will also be mitigated by the exclusive use of natural gas fuel. In addition, pollution control technologies employed to control criteria pollutants, specifically, the CO oxidation catalysts on the CTGs, will also have the effect of significantly reducing organic toxic air contaminants, including those listed in Table 5.16-1, Toxicity Values Used to Characterize Health Risks.

Emissions of toxic pollutants from the cooling tower are small due to the use of BACT to reduce the drift and owing to the low concentrations of toxic inorganic chemicals in the water (see Table 5.16-3, Emission Rates from Operation of Cooling Tower).

Emissions of toxic pollutants from the emergency diesel firewater pump are negligibly small (Table 5.16-4, Emission Rates from Operation of the Emergency Diesel Fire Water Pump Engine), due to the limitation on operations to just a few hours per year.

The HRA presented in the foregoing subsections shows that the health effects impacts of the project as proposed will be well below the significance thresholds identified in Section 5.16.2.6, Health Effects Significance Criteria. Therefore, no further mitigation of emissions from the project is required to protect public health.

5.16.5 Laws, Ordinances, Regulations, and Standards

The relevant LORS that have been established to protect public health are identified in Table 5.16-6. This table also summarizes the agencies that are principally responsible for public health, as well as the general category(ies) of public health concerns regulated by each of these agencies. The conformity of the project to each of the LORS applicable to public health is also presented in this table, as well as references to the locations in this document where each relevant issue is addressed. Points of contact with the primary agencies responsible for public health are identified in Section 5.16.6, Involved Agencies and Agency Contacts.

5.16.6 Involved Agencies and Agency Contacts

Agency contacts regarding public health assessment of the project are as listed in Table 5.16-7.

5.16.7 Permits Required and Permit Schedule

The Permit to Operate (PTO) to be issued by the SJVAPCD and the CEC's Final Decision Document on this Application will serve as the principal approvals required to ensure that the project's impacts to public health will be within acceptable levels. Award of the Authority to Construct (ATC) permit is expected to occur at roughly the same time as the Final Decision is issued by CEC.

5.16.8 References

California Environmental Protection Agency (Cal-EPA) & Office of Environmental Health Hazard Assessment (OEHHA). 1999. Air Toxics Hot Spots Risk Assessment Guidelines, Part I. Technical Support Document for the Determination of Acute Reference Exposure Levels for Airborne Toxicants.

2003a. Air Toxics Hot Spots Program Risk Assessment Guidelines – The Air Toxics Hot Spots Program Guidance Manual for EPA Preparation of Health Risk Assessments.

TABLE 5.16-6
SUMMARY OF COMPLIANCE WITH PUBLIC HEALTH LORS

Authority	Administering Agency	Requirement	Panoche Energy Center Project Compliance
Clean Air Act (CAA)	USEPA CARB SJVAPCD	Protect public from unhealthful exposure from air pollutants	Based on the results of the risk assessment, air toxics do not exceed acceptable levels (5.16, Public Health and Safety) Emissions of criteria pollutants will be minimized by applying BACT to the facility. Increases in emissions of nonattainment pollutants and their precursors will be fully offset (Section 4.0, Alternatives)
California Public Resource Code § 25523(a); 20 CCR § 1752.5, 2300-2309, and Division 2 Chapter 5, Article 1, Appendix B, Part(1)	CEC	Assure protection of environmental quality, requires quantitative HRA	The HRA in 5.16, Public Health and Safety, of this Application satisfies this requirement
California Clean Air Act, TAC Program, H&SC § 39650, et seq.	SJVAPCD with CARB oversight	Requires quantification of TAC emissions, use of BACT, and preparation of an HRA	The project will not cause unsafe exposure to TACs based on results of HRA (Section 5.16, Public Health and Safety), and has performed a BACT assessment (Section 5.2, Air Quality)
H&SC, Part 6, § 44300 et seq. (Air Toxics “Hot Spots”)	SJVAPCD with CARB/OEHHA oversight	Regulates public exposure to air toxics. Requires inventory of TACs and HRA	The HRA presented in Section 5.16, Public Health and Safety, of this application satisfies this requirement
H&SC § 41700	SJVAPCD with CARB oversight	Prohibits emissions in quantities that adversely affect public health, other businesses or property	Section 5.2, Air Quality, and the HRA (Section 5.16, Public Health and Safety) presented in this application satisfy this requirement
Integrated Air Toxic Program	SJVAPCD	Integrates the all state and federal TAC requirements, primarily “Hot Spots” and California Airborne Toxic Control Measures (ATCM)	Section 5.16, Public Health and Safety and Section 5.2, Air Quality presented in this application satisfy this requirement
SJVAPCD Rule 3110	SJVAPCD	Requires annual fees for the Air Toxic “Hot Spots” (AB2588)	The HRA presented in 5.16, Public Health and Safety, of this application and the payment of fess to SJVAPCD satisfy these requirements

TABLE 5.16-6 (CONTINUED)
SUMMARY OF COMPLIANCE WITH PUBLIC HEALTH LORS

Authority	Administering Agency	Requirement	Panoche Energy Center Project Compliance
SJVAPCD Rule 4102	SJVAPCD	No source shall cause injury, detriment, nuisance or annoyance to the public, which could endanger their comfort, repose, health and safety, or property	Section 5.2, Air Quality, and the HRA (5.16, Public Health and Safety) presented in this application satisfy this requirement

Notes:
BACT = Best Available Control Technology
CARB = California Air Resources Board
CEC = California Energy Commission
HRA = Health Risk Assessment
SJVAPCD = San Joaquin Valley Air Pollution Control District
OEHHA = Office of Environmental Health Hazard Assessment
RMP = Risk Management Plan
TAC = Toxic air contaminant
TBACT = Toxic Best Available Control Technology
USEPA = United States Environmental Protection Agency

TABLE 5.16-7
AGENCY CONTACTS FOR PUBLIC HEALTH ASSESSMENT

Agency	Contact/Title	Telephone
California Energy Commission	Keith Golden Air Quality Specialist 1516 Ninth Street Sacramento, CA 95814	(916) 654-4287
California Air Resources Board	Mike Tollstrup 1001 I Street, Sacramento, CA 95814	(916) 322-6026
San Joaquin Valley Air Pollution Control District	Ester Davila Permitting Specialist 1990 E. Gettysburg Avenue Fresno, CA 93726-0244	(559) 230-6000

2003b. Air Toxics Hot Spots Risk Assessment Guidelines, Part II: Technical Support Document for the Determination of Noncancer Chronic Reference Exposure Levels.

2005. Air Toxics Hot Spots Risk Assessment Guidelines, Part II: Technical Support Document for Describing Available Cancer Potency Factors.

San Joaquin Valley Air Pollution Control District (SJVAPCD). 2006. Telephone conversation between modeling specialist Esther Davila of SJVAPCD and Julie Mitchell of URS Corporation, June 15, 2006.

URS Corporation. 2006. Modeling Protocol for the Panoche Energy Center. Prepared by URS on behalf of Panoche Energy Center LLC for submittal to the San Joaquin Valley Air Pollution Control District and the California Energy Commission. May. 2006.

Ventura County Air Pollution Control District. 1995. Ventura County Air Pollution Control District AB2588 Emission Factors.

Adequacy Issue: Adequate ____ Inadequate ____

DATA ADEQUACY WORKSHEET

Revision No. ____ Date ____

Technical Area: **Public Health** 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 5.16		
Appendix B (g) (9) (A)	A list of all toxic substances emitted by the project under normal operating conditions, which may cause an adverse public health impact as a result of acute, chronic, or sub-chronic exposure and to which members of the public may be exposed. This list should include, at a minimum, any pollutants emitted by the project that are listed pursuant to Health and Safety Code § 25249.8.	- Table 5.16-1		
Appendix B (g) (9) (B)	A protocol describing the analysis which the applicant will conduct to determine the extent of potential public exposure to substances identified in subsection (g)(9)(A) resulting from normal facility operation. The analysis itself can be submitted after the AFC is complete.	- Section 5.16.2.1		
Appendix B (g) (9) (C)	A map at a scale of 1:24,000, showing all terrain areas exceeding the elevation of the stack within a 10 mile radius of the facility.	- Figure 5.16-1		
Appendix B (g) (9) (D)	A map at a scale of 1:24,000, showing the distribution of population and sensitive receptors within the area exposed to the substances identified in subsection (g)(9)(A).	- Figure 5.16-1		

Adequacy Issue: Adequate ______ Inadequate ______

DATA ADEQUACY WORKSHEET

Revision No. ______ Date ______

Technical Area: **Public Health** 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) (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;	- Table 5.16-6		
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.	- Table 5.16-7		
Appendix B (h) (2)	A discussion of the conformity of the project with the requirements listed in subsection (h)(1)(A).	- Section 5.16-5		
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.	- Table 5.16-7		
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 5.16.7		

5.17 WORKER SAFETY

This section addresses safety and health issues and describes or outlines systems and procedures that will be implemented to provide occupational safety and health protection for the Panoche Energy Center (PEC) workers in accordance with all applicable worker health and safety laws, ordinances, regulations, and standards (LORS). All applicable elements of the Title 8 California Code of Regulations (CCR), General Industry Safety Orders (GISO), Construction Safety Orders (CSO), and Electrical Safety Orders (ESO), with special attention paid to Section 3203, Injury and Illness Prevention Program, are addressed below. Section 5.17.1 describes the affected environment relative to worker health and safety. An outline of the principal components of the health and safety programs to be implemented during construction and operation is presented in Section 5.17.2, Environmental Consequences. Mitigation measures are discussed in Section 5.17.3. Section 5.17.4 addresses compliance with LORS and Section 5.17.5 presents references.

5.17.1 Affected Environment

The PEC includes the construction and operation of a simple cycle natural gas fired facility with ancillary facilities such as a switchyard, transmission lines, pipelines, and access roads. Maps depicting the physical plant layout are presented as Figures 3.4-1 through 3.4-3. Descriptions of the facility fire protection and safety features are presented in Section 3.4.11 and shown on Figure 3.4-10. Descriptions of hazardous material and wastes to be used and stored on the PEC site are discussed in Section 5.15, Hazardous Materials Handling, and Section 5.14, Waste Management.

5.17.2 Environmental Consequences

5.17.2.1 Occupational Health and Safety

Construction, operation, and maintenance activities may expose workers to the hazards identified in Table 5.17-1. Exposure to these hazards can be minimized through adherence to appropriate engineering design criteria and administrative controls, use of applicable personal protective equipment (PPE), and compliance with all applicable health and safety LORS. The programs, regulations, and preventive measures intended to control potential worker health and safety impacts associated with these hazards are described in the remainder of this section. This encompasses a comprehensive health, safety, and fire prevention program and an accident/injury prevention program intended to ensure healthful and safe operations at the facility.

5.17.2.1.1 Construction Health & Safety Program. To protect the health and safety of workers during construction, the applicant (or construction contractor) will ensure

TABLE 5.17-1
POTENTIAL WORKER HAZARDS DURING
FACILITY CONSTRUCTION AND OPERATION

Activity	Potential Hazard
Facility Construction	
Elevated work	Slips/trips/falls
Welding	Flash burns, explosion, thermal burns, toxic welding fumes
Excavations	Excavation/trench wall collapse, spoil movement, oxygen deficiency, buildup of toxic gases, fumes, vapors, dusts or mists, wet exposures, crushing hazards, confined spaces, potentially contaminated soil/waste
Cement/forms work	Slips/trips/falls, protruding objects, caustics, punctures, and lacerations
Equipment operation	Noise exposure, vehicle accidents, load hazards, induced current
Transmission lines/ transformer station	Slips/trips/falls, electrocution, flash burns
Painting	Paint solvents, paint vapors, chemical burns, fire/explosion, slips/trips/falls
Abrasive blasting	Dust, flying particles, pressure vessels, noise
Powered hand tools	Noise, dust, flying particles, cuts, amputation, crushing
Fueling	Fire, explosion, environmental contamination
Facility Operations	
Generation enclosure	High voltage
Operations building	High voltage, repetitive trauma
Cooling unit	Slips/trips/falls, noise, wet exposure, chemical exposure
Transformer	Electrocution, flash burns
Gas compressor	Fire, noise, temperature, rotating equipment, pressure
Compressed gas storage	Fire, explosion
Chemical storage	Chemical splashes, burns, reactions, gases, vapors, fumes
Machinery, general	Noise, temperature extremes, rotating equipment, electrocution

compliance with the Construction Health & Safety Program, and all federal, state, and local health standards that pertain to worker health and safety.

***Construction Injury and Illness Prevention Program*.** The Construction Safety Program will meet the California Occupational Safety and Health Administration's (Cal-OSHA) Injury and Illness Prevention Program (IIPP) requirements. The IIPP will include:

- A written Code of Safe Practices that relates to construction operations
- Identification of the person or persons responsible for implementing the program

- Posting of the Code of Safe Practices at a conspicuous location at each job site office or providing it to each supervisor who shall have it readily available
- A system for identifying workplace hazards, including inspections
- System of ensuring employee and subcontractor compliance
- "Toolbox" or "tailgate" meetings conducted by supervisors with employees to discuss job hazards and mitigation measures
- Methods of communicating with employees that encourage employees to expose unsafe activities
- Procedures for correcting unsafe conditions

When workers are first employed, they will be given instructions regarding the hazards and safety precautions applicable to the type of work in question and directed to read the Code of Safe Practices. When employees are to work near known job site hazards, they will be instructed in the recognition of the hazard, the procedures for protecting themselves from injury, and the first aid procedures in the event of injury.

Construction Written Health & Safety Programs**.** Written safety programs that will be implemented in conjunction with the Code of Safe Practices may include:

- Accident/Incident Reporting Procedures
- Blood-borne Pathogens Exposure Control Program
- Compressed Gas and Air Handling Systems
- Confined Space Entry Procedures
- Contractor Safety Program
- Electrical Safety Procedures
- Emergency Action Plan
- Emergency Response Procedures
- Excavation, Trenching, and Shoring Program
- Fall Protection Program
- Fire Protection and Prevention Plan
- Hand Tools and Equipment Guarding Safety Procedures
- Hazard Communication Plan (Including Proposition 65 Requirements)
- Hazardous Materials Handling Procedures

- Hazardous Waste Awareness Training
- Hearing Conservation Program
- Heat Stress/Cold Stress Prevention
- Heavy Equipment Procedures
- Hoist/Chain/Wire Rope/Webs/Rope Slings/Crane Procedures
- Hot Work Program (Welding, Cutting, and Brazing)
- Industrial Hygiene Program
- Industrial Truck (Forklifts) Safety
- Ladders, Scaffolds, and Work Platforms
- Lock Out/Tag Out Procedure
- Motor Vehicle Safety
- PPE Program
- Portable Electric and Pneumatic Tools
- Preventing Slips, Trips, and Falls
- Repetitive Stress Injuries/Ergonomics/Lifting Hazards
- Respiratory Protection Program
- Safety and Housekeeping Inspection Program
- Safety Committee and Toolbox/Tailgate Safety Meetings
- Security Program
- Signs, Tags, and Barricades
- Tools, Power- and Hand-operated

Construction Personal Protective Equipment Program**.** Employees will be required to use the required PPE during construction. Required PPE will be approved for use and distinctly marked to facilitate identification. PPE will be used in accordance with the manufacturer's instructions. The PPE will be of such design, fit, and durability as to provide adequate protection against the hazards for which it is designed. The type of PPE required for each job task will be described in the job safety analysis for that task. The use of PPE for site activities includes, but is not limited to, the items specifically described in Table 5.17-2, and will comply with Cal-OSHA requirements. When protective-insulating equipment is used, it will comply with the Electrical Safety Codes.

TABLE 5.17-2
BASIC PROTECTIVE EQUIPMENT GUIDE

Body Area	Hazards	Recommended Protection
Eyes/Face	Low-velocity flying particles	Safety glasses with side shields
	High-velocity chips and sparks	Impact goggles or safety glasses with full face shield
	Corrosive liquid splash during transfer	Splashproof goggles and face shield
	Breaking into an acid storage system	Acid hood
	Welding - injurious light rays	Welding hood with appropriate eye filter lenses
Head/Ears	General wear, overhead rigging, material handling, maintenance, and general construction processes	Hard hat
	High noise level	Ear plugs or muff
Respiratory System	Low-hazard inert dusts	Dust mask
	Low concentration solvent vapors	Cartridge-type organic vapor respirator
	Acid mists	Cartridge-type acid mist respirator
	High-concentration dusts or vapors	Air line respirator
	Oxygen deficiencies or gases	Self-contained breathing apparatus
Hands and Arms	Handling rough or sharp objects	Leather gloves
	Handling hot objects	Insulated gloves
	Using solvents	Impervious synthetic gloves
Feet and Legs	General wear for light handling	Safety toe shoes
	Handling heavy objects	Metatarsal safety shoes
	Using brush hooks or scythes	Shin guards
	Working with corrosive liquids	Safety toe boots
	Underground work	Safety toe synthetic boots
Trunk and Full Body	Hot or corrosive liquids	Synthetic apron
	Punctures, impact, or cuts	Canvas or leather kickback apron or metal mesh apron
	Breaking acid containers	Full body suit made of appropriate materials
Fall Protection/ Rescue	Working from elevated structure or platform without standard railings	Safety belt and lanyard
	Vessel entry	Harness and lifeline or wristlets and lifeline
	Suspended scaffolds	Lifeline, safety belt/lanyard

A respiratory protection program complying with 8 CCR, Section 5144 and GISO requirements will be developed, including respirator training, fit testing, monitoring, selection, etc. The work atmosphere will be tested/sampled per established protocols.

***Fire Protection and Prevention Plan*.** The PEC will rely on both onsite fire protection systems and local fire protection services. A Fire Protection and Prevention Plan will be developed and followed throughout all phases of construction. The specified firefighting equipment will be provided to site personnel.

During construction, the permanent facility fire protection system will be placed in service as early as practicable. An interim fire protection system will be in place during construction until the permanent system is completed. The fire protection systems for the PEC site are described in Section 3.4.11. Construction fire regulations in 8 CCR, Section 1620 et seq. will be followed as necessary to prevent construction fires. Applicable local fire requirements include:

- 1998 Edition of California Fire Code and all applicable National Fire Protection Association (NFPA) standards (24 CCR Part 9)
- Uniform Fire Code Standards
- California Building Code Title 24, California Code of Regulations (24 CCR § 3, et seq.)

Special attention will be paid to operations involving open flames, such as welding, and use of flammable materials. Personnel involved in such operations will have appropriate training. A fire watch utilizing appropriately classed extinguishers or other equipment will be maintained during hot work operations. Site personnel will not be expected to fight fires past the incident stage. The local responding fire officials will be given information on the site hazards and the location of these hazards, and the information will be included in the emergency response planning.

Materials brought onsite must conform to contract requirements, insofar as flame resistance or fireproof characteristics are concerned. Specific materials in this category include fuels, paints, solvents, plastic materials, lumber, paper, boxes, and crating materials. Specific attention will be given to compressed gas, fuel, solvent, and paint storage. Electrical wiring and equipment located in inside storage rooms used for Class I liquids will be stored in accordance with ESOs. Outside storage areas will be graded to divert possible spills away from buildings and will be kept clear of vegetation and other combustible materials. Precautions will be taken to protect storage areas against tampering where necessary.

Onsite fire prevention during construction will consist of portable and fixed fire fighting equipment. Portable firefighting equipment will consist of fire extinguishers and small hose lines in conformance with Cal-OSHA and the NFPA for the potential types of fire from construction activities. Periodic fire prevention inspections will be conducted by the contractor's safety representative.

Fire extinguishers will be inspected routinely and replaced immediately if defective or in need of recharge. All firefighting equipment will be conspicuously located and marked with unobstructed access. A water supply of sufficient volume, duration, or pressure to operate the required firefighting equipment will be provided onsite. Designated, approved storage areas and containers for flammable materials shall be used with adequate fire control services.

5.17.2.1.2 Plant Operational Safety Program. The locations of potential worker hazards during the operational phase are listed in Table 5.17-3. Programs that address these hazards will include:

- Regular employee education and training in safe work practices for general and particular task areas
- Communication of hazards in accordance with federal and state standards
- Accident and incident evaluations
- Administrative safety procedures
- Emergency response
- Fire prevention and fire response
- Security
- Maintenance of safety performance data

All operations personnel will be provided with written safety guidance. All construction safety programs and procedures that apply to facility operations will be incorporated into the plant operational safety program.

***Operations Injury Illness Prevention Program*.** The primary mitigation measures for worker hazards during operation are contained in the IIPP, which is required by 8 CCR, Section 3203. The written IIPP contains the following information:

- Identity of the person(s) with authority and responsibility for implementing the program
- A system for ensuring that employees comply with safe and healthy work practices
- A system for communicating with employees in a readily understandable form
- Procedures for identifying and evaluating workplace hazards including inspections to identify hazards and unsafe conditions

TABLE 5.17-3
LOCATION OF POTENTIAL WORKER HAZARDS AT THE PANOCHE ENERGY FACILITY (OPERATIONAL PHASE)

Location	Acid[1]	Flammable Material	Hazardous Material	High Voltage	Noise[2]	Pressure Vessel	Pressurized Gas Cylinders	Rotating Equipment	High Temperature
Control Room	X			X					
Maintenance Shop/Warehouse		X	X		X			X	
CTG[3]	X	X	X		X	X			
Switchyards			X	X					
Stacks							X		
Deareator									X

[1] Acid - Areas containing acids (sulfuric acid in batteries or sulfuric acid and hydrochloric acid for pH control).

[2] Noise - Area requiring noise protection.

[3] CTG - combustion turbine generator.

- Methods for correcting unhealthy/unsafe conditions in a timely manner - when the hazard is discovered and/or when there is an imminent danger
- A training program for:
  - Establishing the program initially
  - New, transferred, or promoted employees
  - New processes and equipment
  - Supervisors
- Methods of documenting inspections and training and maintaining records for 3 years

The IIPP designates a safety representative who is responsible for implementing the program. It also describes safety training for new employees and procedures for tracking safety training. The IIPP provides job hazard assessments (JHAs) for each job. The JHA will identify safety hazards related to each work task and establish procedures for avoiding, correcting, reporting, and notifying employees of these hazards.

***Operational Written Safety Programs*.** The IIPP is used in conjunction with other written safety programs. These programs may include the following:

- Accident/Incident Reporting Procedures
- Blood-borne Pathogens Exposure Control Program
- Chemical Hygiene Plan
- Code of Safe Practices for Equipment and Operation
- Compressed Gas and Air Handling Systems
- Confined Space Entry Procedures
- Electrical Safety Procedures
- Emergency Action Plan
- Emergency Response Procedures
- Fall Protection Program
- Fire Protection and Prevention Plan
- Hand Tools and Equipment Guarding Safety Procedures
- Hazard Communication Plan (Including Proposition 65 Requirements)
- Hazardous Materials Handling Procedures

- Hazardous Waste Awareness Training
- Hearing Conservation Program
- Heat Stress/Cold Stress Prevention
- Heavy Equipment Procedures
- Hoist/Chain/Wire Rope/Webs/Rope Slings/Cranes
- Hot Work Program (Welding, Cutting, and Brazing)
- Industrial Hygiene Program
- Industrial Truck (Forklifts) Safety
- Ladders, Scaffolds, and Work Platforms
- Lock Out/Tag Out Procedure
- Motor Vehicle Safety
- PPE Program
- Portable Electric and Pneumatic Tools
- Preventing Slips, Trips, and Falls
- Repetitive Stress Injuries/Ergonomics/Lifting Hazards
- Respiratory Protection Program
- Safety and Housekeeping Inspection Program
- Safety Committee and Toolbox/Tailgate Safety Meetings
- Security Program
- Stop Work Authority
- Signs, Tags, and Barricades
- Tools, Power- and Hand-operated

These programs will be reviewed annually to determine if they are affected by any new regulations and to determine the effectiveness of their implementation. Other written programs or plans may relate to worker safety in that they enable work to be performed in a safe manner. These include standard operating procedures, worker qualifications programs, and site security.

Operations Safety Training Programs**.** All PEC workers will be given instructions regarding their responsibility for safe conduct of their work. These instructions will be given in part at the time the employee is first hired and as an ongoing training program of hazard recognition and avoidance.

Workers will be instructed in the safety regulations pertinent to their employment tasks. Safe working conditions, work practices, and protective equipment requirements will be communicated in the following manner:

- New, promoted, or transferred employees receive safety training orientation.
- Weekly safety meetings are held with employees.
- Toolbox/tailgate safety meetings are conducted periodically for each crew. General safety topics and specific hazards that may be encountered will be discussed. Comments and suggestions from all employees will be encouraged.
- Regularly scheduled safety meeting will be held for supervisors.
- Hazard communication training, including California Proposition 65 warnings and discharge prohibitions, will be conducted as new hazardous materials are introduced to the workplace.
- Material Safety Data Sheets (MSDSs) will be provided for all appropriate chemicals.
- A bulletin board with required postings and other information will be maintained at the plant site.
- Warning signs will be posted in hazardous areas.

Safety training will be provided to each new employee as described below:

- A list of safe work rules for the PEC will be explained to each new employee.
- A copy of the applicable Safe Work Practices will be given to each new employee. The provisions will be incorporated into training for the qualifications programs so that employees may fully understand what the protective provisions mean.
- The Hazard Communication Program and other applicable training and requirements for personal protection for the types of hazards that may be encountered at the PEC site will be explained to employees. This training will be documented.
- Unusual hazards that are found onsite will be explained in detail to each new employee, including any specific requirements for personal protection
- Safety requirements for the new employee's specific job assignment will be explained by the foreman upon initial assignment and upon any reassignment.

***Operations Personal Protective Equipment Program*.** Personal protective clothing and equipment will be used during specified work operations. Each employee will be provided the following information pertaining to the protective clothing and equipment:

- Proper use and maintenance
- When the protective clothing and equipment are to be used
- Benefits and limitations
- When and how the protective clothing and equipment are to be replaced
- Each employee is checked for proper fit and to see if they are medically capable of wearing the equipment

All safety equipment meets National Institute of Occupational Safety and Health (NIOSH) or American National Standards Institute (ANSI) standards and has all required markings, numbers, or certificates of approval. Table 5.17-2 contains a list of the basic protective equipment that will be used at the PEC.

***Hazardous Materials Handling and Storage*.** Various hazardous materials will be stored and used during construction and operation of the PEC. The storage, handling, and use of all chemicals will follow applicable LORS to minimize risks to workers. All hazardous materials will be appropriately labeled and stored in hazardous materials storage facilities. Bulk hazardous materials will be stored in aboveground storage tanks. Other hazardous materials will be stored in their delivery containers. Hazardous materials storage and chemical feed areas will be surrounded by containment or curbing to contain leaks and spills. The containment areas will be sized to hold an appropriate volume (considering the potential for the local hazard contingencies) as designated by a California registered Professional Engineer. At a minimum, this volume equals the full contents of the largest single tank plus sufficient capacity for precipitation from a 25-year, 24-hour storm event in the case of outdoor storage tanks. A Risk Management Plan (RMP) will be developed for the storage and use of aqueous ammonia onsite. The RMP will detail specific safety requirements, procedures, and training to protect workers from exposure to ammonia.

Safety showers and eyewash stations will be provided in or adjacent to corrosive chemical storage areas and in required areas in accordance with regulatory requirements. PPE and spill response equipment for the exposure and cleanup will be readily available for plant personnel for use during spill containment and cleanup activities. A hazardous material emergency response team, trained in the handling of these emergencies and accidental releases of hazardous materials, will be available to the PEC through contract. Emergency contact numbers will be available for spill response contractors and for notification to local agencies of spill incidents. These and other procedures will be detailed in the PEC Emergency Action Plan.

***Operations Emergency Action Plan/Emergency Response Plan*.** In addition to the incorporation of various safety and environmental features and design measures to minimize emergencies and their effects on public and worker safety, the PEC will develop a site-specific Emergency Action Plan/Emergency Response Plan. A typical Emergency Action Plan/Emergency Response Plan outline is provided in Table 5.17-4. The Emergency Action Plan/Emergency Response Plan is designed to address potential emergencies, including hazardous materials releases, fires, bomb threats, pressure vessel ruptures, and other catastrophic events. It describes evacuation routes, warning devices, points of contact, assembly areas, responsibilities, and other actions to be taken in the event of an emergency. The plan has a layout map and a fire extinguisher list, and describes arrangements with local emergency response agencies for responding to emergencies.

***Fire Prevention Plan*.** Fire protection at the PEC plant site will include measures relating to safeguarding human life, preventing personnel injury, preservation of property, and minimizing downtime due to fire or explosion (National Safety Council, 1992). It involves physical arrangements, such as sprinkler systems, water supplies, and fire extinguishers. Fire protection measures include fire prevention measures to prevent the inception of fires. Of concern are adequate exits, fire-safe construction, reduction of ignition sources, and control of fuel sources.

The Fire Prevention Plan provides for fire protection practices including routine inspections of the PEC plant by the designated safety representative. It requires prompt action to correct situations deemed to be a fire hazard. It identifies firefighting equipment and systems at the plant as well as methods to safely store flammable and combustible materials. Facilities have been designed by a California Registered Fire Protection Engineer and fire protection equipment is installed and maintained in accordance with all applicable NFPA standards and recommendations (NFPA, 1994). A fire reporting protocol (depending on the size of the fire) and an investigation protocol are detailed in the Fire Protection and Prevention Plan.

The comprehensive onsite fire protection system and procedures will be designed and implemented to protect both personnel and property. A Program Fire Protection Station Order will be developed to address:

- Names and/or job titles responsible for maintaining equipment and accumulation of flammable or combustible material control
- Procedures in the event of fire
- Fire alarm and protection equipment

TABLE 5.17-4
SAMPLE EMERGECNY ACTION/EMERGENCY RESPONSE PLAN OUTLINE

Section Number	Description
1.0	**Introduction**
1.1	Purpose
1.2	Scope
2.0	**Responsibilities**
2.1	Incident Command System
	Emergency Response Coordinator
	Emergency Evacuation Coordinator
	Alternate
	Safety Coordinator
2.2	Position Description Assignments
	Construction/Facility Manager
	Construction/Facility Supervisor
	Operators
	Health and Safety Manager
	Security
3.0	**Response and Notification Plan (Points of Contact)**
3.1	Supervisor/Emergency Coordinator
3.2	Health and Safety Manager
4.0	**Response Procedures**
4.1	Evacuation Routes and Procedures
4.2	Accidents Involving Serious Injury and/or Death
4.3	Fire
4.4	Hazardous Waste or Chemical Spills
4.5	Earthquake
4.6	Bomb Threat
4.7	Emergency Plant Shutdown
4.8	Site Security
4.9	Emergency Medical Treatment and First Aid
4.10	Decontamination
4.11	Documentation and Recordkeeping
4.12	News Media

TABLE 5.17-4 (CONTINUED)
SAMPLE EMERGECNY ACTION/EMERGENCY RESPONSE PLAN OUTLINE

Section Number	Description
4.13	Emergency Notification List
4.14	Emergency Telephone Numbers List
5.0	**Reference Procedures**
5.1	Evacuation Plan
5.2	Emergency Equipment Locations
5.3	Fire Extinguisher Locations
5.4	Security
5.5	Accident Reporting and Investigation
5.6	Lockout/Tagout
5.7	Hazard Communication
5.8	Spill Containment and Reporting
5.9	First Aid and Medical Response
5.10	Respiratory Protection
5.11	Personal Protective Equipment
5.12	Sanitation
5.13	Work Site Inspections

- System and equipment maintenance
- Monthly inspections
- Annual inspections
- Firefighting demonstrations
- Housekeeping practices
- Training

Fire Suppression**.** The following fire suppression systems are proposed:

- **Carbon Dioxide Fire Protection System.** This system protects the combustion turbine, its generator, and its accessory equipment compartments from fire. The system will have fire detection sensors in all compartments.

- **Deluge Spray System.** This system provides fire protection to the generator transformers (outdoor design) and auxiliary power transformer in the event of fire. The deluge system will be fed by the firewater storage and supply system.
- **Fire Hydrants/Hose Stations.** This system will supplement the plant fire protection system. Water will be supplied from the plant underground firewater/domestic water system. These will be located at approximately 300-foot intervals around the facility in accordance with NFPA 850 and local fire codes.
- **Sprinkler System.** This system will provide protection to the administration and maintenance buildings.
- **Smoke Detectors, Combustible Gas Detectors, and Fire Extinguishers.** These will be provided at all locations having potential fire hazards due to the presence of combustible liquids, solids, or other highly flammable materials, and where major property damage could result. Extinguishers will be strategically located at code-approved intervals throughout the facility and selected for the appropriate class of service.

Water will be used as the primary extinguishing agent. Chemical and gas extinguishing agents (permanently installed or in portable extinguishers) will be provided in special hazard areas where water would be ineffective or harmful to the equipment being protected.

The PEC onsite fire suppression systems will be backed up by fire suppression support from the Fresno County Fire Protection Division (FCFPD). Both fire and emergency service will be provided out of Station #96, The Mendota Station, located at 101 McCabe, Mendota, with an estimated response time of 15 to 20 minutes. Firewater will be supplied from the firewater distribution system as described in Section 3.4.11, Fire Protection System.

5.17.3 Mitigation Measures

Environmental consequences related to worker safety are not foreseen at this time; therefore additional measures beyond those proposed herein are not considered necessary. No significant unavoidable adverse impacts to worker safety are anticipated from the proposed project. Additional measures may be necessary should the proposed project change in a manner that impacted worker safety.

5.17.4 Applicable Laws, Ordinances, Regulations, and Standards

The following LORS are applicable or potentially applicable to the proposed project in the context of the public and occupational safety and health protection measures addressed in this section and in Section 5.16, Public Health and Safety. LORS applicable to worker safety are summarized in Table 5.17-5.

TABLE 5.17-5
LORS APPLICABLE TO WORKER SAFETY

LORS	Applicability	Conformance (Section)
Federal		
Occupational Health & Safety Act of 1970 (OSHA), 29 USC 651 *et seq.*; 29 CFR 1910 *et seq.*; and 29 CFR 1926 *et seq*.	Meet employee health and safety standards for general industry and the construction industry	5.17.4.1
Department of Labor, Safety and Health Regulations for Construction Promulgated Under Section 333 of the Contract Work Hours and Safety Standards Act, 40 USC 327 *et seq*.	Meet employee health and safety standards for construction activities. Requirements addressed by CCR Title 8, General Construction Safety Orders	5.17.4.1
National Fire Protection Association (See Table 7.4-1 for list of standards)	Meet standards necessary to establish a reasonable level of safety and property protection from the hazards created by fire and explosion	5.17.4.1
State		
California Code of Regulations, Title 8	Meet requirements for a safe and hazard-free working environment. Categories of requirements include General Industry Safety Orders, General Construction Safety Orders, Electrical Safety Orders	5.17.4.2
California Clean Air Act, California Health & Safety Code 39650 *et seq*.	Meet requirements for Best Available Control Technology to minimize exposure limits to toxic air pollutants and possible risk assessments for carcinogen pollutants	5.17.4.2
California Public Resources §25523(a); 20 CCR §1752, 1752.5, 2300.2309, and Division 2, Chapter 5, Article 1, Appendix B, Part (I), California Energy Commission (CEC)		5.17.4.2
California Health and Safety Code §25500 to 25541; 19 CCR §§2720-2734	Estimate emissions for listed air toxic pollutants and submit inventory to air district for major sources of criteria air pollutants. Follow-up from air district may require a health risk assessment	5.17.4.2
Local		
Fresno County Zoning Ordinance	Provide safety setbacks as required by the Fresno County Fire Protection Division	5.17.4.3
Fresno County Department of Community Health, Environmental Health Division	Provide implementation of the Hazardous Materials Business Plan and Risk Management Plan	5.17.4.3

5.17.4.1 Federal

5.17.4.1.1 Occupational Safety and Health Act of 1970 (OSHA), 29 USC §651 *et seq.*;29 CFR §§1910 *et seq.*; and 29 CFR §1926 *et seq*. The authority establishes occupational safety and health standards (§1910) [i.e., permissible exposure limits for toxic air contaminants (§1910.100), electrical protective equipment requirements (§1910.137), electrical workers safety standards (§1910.269), and the requirement that information concerning the hazards associated with the use of all chemicals is transmitted from employers to employees (§1910.1200)] and safety and health regulations for construction (§1926). Subpart I of §1910 and Subpart E of §1926 address personal protective equipment.

Under the Operational Status Agreement of October 5, 1989 between the Federal Occupational Safety and Health Administration (OSHA) and the California Department of Industrial Relations, Division of Occupational Safety and Health (DOSH), the state resumed full enforcement responsibility for most of the relevant federal standards and regulations, (55 Fed. Reg. 18610 [July 12, 1990]; 29 CFR §1952.172). Federal OSHA has retained concurrent enforcement jurisdiction with respect to certain federal standards including standards relating to hazardous materials at 29 CFR §1910.120 (*Id*.).

The administering agencies for the above authority are OSHA and DOSH (or Cal-OSHA).

5.17.4.1.2 Department of Labor, Safety and Health Regulations for Construction Promulgated Under §333 of the Contract Work Hours and Safety Standards Act, 40 USC 327 *et seq*. The code establishes safety and health regulations for construction. The requirements for this regulation are all addressed in Title 8 California Code of Regulations, Chapter 4, Subchapter 4, General Construction Safety Orders.

The administering agencies for the above authority are OSHA and DOSH (or Cal-OSHA).

5.17.4.1.3 Uniform Fire Code, Article 80. The article includes provisions for storage and handling of hazardous materials. Considerable overlap exists between this code and Chapter 6.95 of the Health and Safety Code. However, the fire code does contain independent provisions regarding fire protection and neutralization systems for emergency venting (§80.303, D, Compressed Gases). Other articles that may be applicable include Article 4, Permits, and Article 79, Flammable and Combustible Liquids.

The administering agency for the above authority is the FCFPD.

5.17.4.1.4 National Fire Protection Association. NFPA prescribes minimum requirements necessary to establish a reasonable level of fire safety and property protection from the hazards created by fire and explosion. The standards apply to the manufacture, testing, and maintenance of the equipment.

The administering agency for the above authority is the Fresno County Fire Protection Division.

5.17.4.1.5 Compliance. PEC will comply with all federal LORS by developing appropriate plans and policies as well as by measures described in 5.17.2 and 5.17.3.

5.17.4.2 State

5.17.4.2.1 8 CCR. These authorities prescribe general occupational safety and health regulations and standards in addition to the construction and industrial safety regulations, standards, and orders. Applicable sections of 8 CCR, Chapter 4, Subchapter 7 and 24 CCR, will be complied with. Topics of concern are provided in Table 7.4-2. Specifically, 8 CCR §1509 (Construction) and §3203 (General Industry) make numerous changes designed to redirect the emphasis of Cal-OSHA towards ensuring that employers have an effective work site IIPP to focus Cal-OSHA discretionary inspections in the highest hazard industries as determined by worker compensation and other occupational injury data, and to limit the number of follow-up inspections which Cal-OSHA must perform. The CCR, Title 8, Section 5189, requires facility owners to develop and implement effective Safety Management Plans to ensure that large quantities of hazardous materials are handled safely. While such requirements primarily provide for the protection of workers, they also indirectly improve public safety and are coordinated with the Risk Management Plan process.

5.17.4.2.2 California Health and Safety Code, Section 25500. This code requires companies that handle hazardous materials in sufficient quantities to develop a Hazardous Materials Business Plan (HMBP). The HMBP includes the basic information on the location, type, quantity, and health risks of hazardous materials handled, stored, used, or disposed of that could be accidentally released into the environment. It also includes a plan for training new personnel, and for annual training of all personnel in safety procedures to follow in the event of a release of hazardous materials. It also includes an emergency response plan and identifies the business representative able to assist emergency personnel in the event of a release.

The California Health and Safety Code, Section 25531, directs facility owners storing or handling acutely hazardous materials in reportable quantities to develop an RMP and submit it to appropriate local authorities, the EPA, and the designated local Administering Agency for review and approval. The RMP includes: an evaluation of the potential impacts associated with an accidental release; the likelihood of an accidental release occurring, the magnitude of potential human exposure; any pre-existing evaluations or studies of the material; the likelihood of the substance being handled in the manner indicated, and the accident history of the material. This new, recently developed program supersedes the California Risk

Management and Prevention Plan and is known as the California Accidental Release Program. The PEC will develop and submit an RMP prior to operation of the PEC.

5.17.4.2.3 Compliance. PEC will comply with all state LORS by developing appropriate plans and policies as well as by measures described in 5.17.2 and 5.17.3.

5.17.4.3 Local

5.17.4.3.1 Fresno County Department of Community Health, Environmental Health Division. Provides for the implementation of the Hazardous Materials Business Plan and Risk Management Plan.

5.17.4.3.2 Compliance. PEC will comply with all local LORS. The PEC will develop a Hazardous Materials Business Plan for construction and operation of the new facility, and will develop a Risk Management Plan for operation of the new facility. In addition, the PEC will continue compliance by updating the appropriate plans and policies as well as by the measures described in 5.17.2 and 5.17.3.

5.17.4.4 Agencies and Agency Contacts

Agencies with jurisdiction to issue applicable permits and/or enforce LORS related to worker safety are shown in Table 5.17-6.

TABLE 5.17-6
AGENCY CONTACTS

Agency	Contact	Title	Telephone
Fresno County Department of Community Health, Environmental Health Division	Specialist On-Call	Hazardous Materials Management Specialist	(559) 445-3271
Fresno County Fire Protection Division, Station #96	Fire Station Captain	Fire Station Captain	(559) 655-4107

5.17.4.5 Applicable Permits

The permits required for this project are listed in Table 5.17-7. A Hazardous Materials Business Plan will be developed prior to construction and will be updated prior to operation. A Risk Management Plan will be developed prior to ammonia being brought on the PEC.

5.17.5 References

American Conference of Governmental Industrial Hygienists. 1996. Threshold Limit Values (TLV) for Chemical Substances and Physical Agents and Biological Exposure Indices.

TABLE 5.17-7
APPLICABLE PERMITS

Jurisdiction	Potential Permit Requirements
Federal	None required
State	None required
Local	Hazardous Materials Business Plan and Risk Management Plan

California Code of Regulations. ND. Title 8. "General Industry Safety Orders, Construction Safety Orders, and High Voltage Electrical Safety Orders."

Code of Federal Regulations. ND. Title 29 Part 1910. "Construction Safety Orders."

ND. Title 29 Part 1926. "General Industry Safety Orders."

National Fire Protection Association. 1994. *A Compilation of NFPA Codes, Standards, Recommended Practices and Guides.* Quincy, Massachusetts.

National Institute for Occupational Safety and Health. 1992. Health Hazard Evaluation Report, U.S. Army Corps of Engineers, Ozark Power Plant, Ozark, Kansas. HETA-92-0243-2377.

1986. Health Hazard Evaluation Report, City of Ames Municipal Power Plant, Ames, Iowa. HETA-86-422-1891.

1985. Health Hazard Evaluation Report, Niagara Mohawk Power Corporation, Lycoming, New York. HETA-85-493-1786.

1983. Health Hazard Evaluation Report, Grand Gulf Nuclear Power Plant, Port Gibson, Mississippi. HETA-83-132-1508.

1978. Health Hazard Evaluation Report, U.S. Army Corps of Engineers, Ozark Power Plant, Ozark, Kansas.

National Safety Council. 1992. Accident Prevention Manual. Volume 2, Chapter 6, Fire Protection. pp. 1324-1386.

Adequacy Issue:	Adequate		Inadequate		**DATA ADEQUACY WORKSHEET**	Revision No.	0	Date	
Technical Area:	**Worker Safety**			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.	Sections 5.17.1, 5.17.2.1.1, 5.17.2.1.2, 5.17.3 and 5.17.4		
Appendix B (g) (11) (A)	A description of the safety training programs which will be required for construction and operation personnel.	Section 5.17.2.1.1 and 5.17.2.1.2		
Appendix B (g) (11) (B)	A complete description of the fuel handling system and the fire suppression system.	Section 5.17.2.1.2		
Appendix B (g) (11) (C)	Provide draft outlines of the Construction Health and Safety Program and the Operation Health and Safety Program, as follows:	Sections 5.17.2.1.1 and 5.17.2.1.2		
	Construction Health and Safety Program: * Injury and Illness Prevention Plan (8 Cal. Code Regs., § 1509);	Section 5.17.2.1.1		
	* Fire Protection and Prevention Plan (8 Cal. Code Regs., § 1920);	Section 5.17.2.1.1		
	* Personal Protective Equipment Program (8 Cal. Code Regs., §§ 1514-1522)	Section 5.17.2.1.1		
	Operation Health and Safety Program: * Injury and Illness Prevention Program (8 Cal. Code Regs., § 3203);	Section 5.17.2.1.2		
	* Fire Prevention Plan (8 Cal. Code Regs., § 3221);	Section 5.17.2.1.2		
	* Emergency Action Plan (8 Cal. Code Regs., § 3220);	Section 5.17.2.1.2		
	* Personal Protective Equipment Program (8 Cal. Code Regs., §§ 3401-3411).	Section 5.17.2.1.2		

Adequacy Issue:	Adequate		Inadequate		**DATA ADEQUACY WORKSHEET**	Revision No.	0	Date	
Technical Area:	**Worker Safety**				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) (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 5.17.4 Table 5.17-5		
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 5.17.4.4 and 5.17.4.5 Tables 5.17-6 and 5.17-7		
Appendix B (h) (2)	A discussion of the conformity of the project with the requirements listed in subsection (h)(1)(A).	Sections 5.17.2, 5.17.3 and 5.17.4		
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 5.17.4.4 Table 5.17-6		
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 5.17.4.5 Table 5.17-7		

5.18 CUMULATIVE IMPACTS

5.18.1 Introduction

The cumulative impacts assessment for the PEC is based on the CEQA (California Public Resources Code [PRC] Section 21083) and the CEQA Guidelines (CCR Section 15130) which requires that the discussion of cumulative impacts be "guided by the standards of practicality and reasonableness" (PRC Section 21083 (b)); and, that "the discussion include a list of past, present, and reasonably anticipated future projects producing related or cumulative impacts" (CCR Section 15130 (b)(1)(A)). The CEQA guidelines require that cumulative impacts be discussed when they are significant, and that the discussions of cumulative impacts reflect the severity of the impacts and their likelihood of occurrence. However, the CEQA Guidelines state that the discussion need not provide the impacts discussion in as much detail as is provided for the project's impacts.

Therefore, the purpose of this section of the Application for Certification (AFC) is to identify past, present, and reasonably foreseeable actions in the PEC project area that could affect the same resources as the PEC project, and provide the following analysis:

- Determine if the impacts of the PEC and the other actions would overlap in time or geographic extent
- Determine if the impacts of the proposed project would interact with, or intensify, the impacts of the other actions
- Identify any potentially significant cumulative impacts

The PEC will be a nominal 400-megawatt (MW) peaking facility consisting of four (4) General Electric LMS100 natural gas-fired combustion turbine generators (CTGs), emissions control equipment, one five-cell cooling tower, and process water treatment equipment and other associated equipment. The project consists of constructing the power generation facility, including a gas line extension, and expanding the existing adjacent PG&E Panoche Substation. Where potentially significant impacts have been identified, an assessment of cumulative impacts is provided in the respective resource section(s) of this AFC.

The PEC will be located on approximately 12.8 acres in the unincorporated area of western Fresno County, California. The project is owned by Panoche Energy Center, LLC. The site is southeast of the intersection of Davidson Avenue and West Panoche Road, approximately 2 miles east of US Interstate 5. The site is currently in agricultural production. Additionally, the PEC is located within a one-half mile of a power generation project owned by CalPeak Power and within 1 mile of a power generation project owned by Wellhead Electric.

Projects that will potentially contribute to cumulative impacts are those located in the same general geographic area of influence of the PEC. For this cumulative assessment, the area of influence is defined as the area within a 5-mile radius of the power plant. Projects or proposed projects of potential regional significance are also considered in the cumulative analysis.

Information was gathered on projects that either: 1) are greater than 30,000 square feet; 2) have submitted a defined project application for required approvals or permits; or 3) have been previously approved and may be implemented in the near future. The following assessment focuses on the potential overlap of construction and operation impacts among various projects meeting the criteria described above.

Information concerning existing sites for this analysis was primarily obtained from a list requested from the County of Fresno. The Computer Data Systems Department at the County of Fresno produced a list of all building permits pulled and all land use applications submitted to the County of Fresno within a 5-mile radius of the PEC site since January of 2000 to the present. This list is attached as Figure 5.18-1 and a map indicating the location of this permit activity is attached as Figure 5.18-2. This list does not designate the size of new construction. However, from the short folder description of each permit, it is relatively easy to decipher which projects are large in scale (possibly reaching the 30,000 square foot limit) and which are not.

As predicted, there are few permits for seemingly large-scale projects within a 5-mile radius of the proposed project site. This site is located on the far western side of Fresno County, and is immediately surrounded by agricultural land uses. The entire 5-mile radius area is located entirely within the County of Fresno. Based on the aerial photographs of this site, the area within a 5-mile radius of the site is also primarily agricultural land with no incorporated city or even a small-unincorporated community. The closest city is the City of Mendota, which is a small town 16 miles to the northeast of the PEC. Thus, as expected, the list of permits does not indicate that any major residential or commercial projects have been constructed, or are in the process of being constructed, within a 5-mile radius of the project site.

For the few projects that did meet the criteria listed above, potential cumulative impacts were identified if the PEC project impacts would contribute to the impacts of reasonably anticipated future projects under construction at the same time. The magnitude of such cumulative impacts depends, in part, on the extent of construction overlap in time and geographic area. For the purposes of this cumulative impact assessment, it is anticipated that the construction phase for the PEC project will begin in the first quarter of 2008. This assessment also considers potential cumulative impacts that could occur during the operational phase of the PEC project.

5.18.2 Cumulative Impacts Analysis

Table 5.18-1 presents a list of potential projects considered in this cumulative impacts assessment.

TABLE 5.18-1
LORS APPLICABLE TO CUMULATIVE IMPACTS

No.	Project Applicant	Project Description	Status/Timing	Location
1	Unknown	Plan Check Power Generation Facility	Plan Check submitted in June of 2001. Project has not yet been finalized (i.e., is not complete)	APN: 027-060-61 This is the parcel directly adjacent and to the northeast of the subject site
2	Unknown	New shell building with a convenience store	Permit finalized in October of 2003	APN: 027-190-25
3	Unknown	Proposed Starwood Power Plant to be 120 MW and operational in 2009	This proposed facility will be constructed at the same time as the PEC	South of West Panoche Road and adjacent to the existing CalPeak Power Plant

5.18.2.1 CalPeak Power Panoche No. 2

This existing power plant, which has been in operation since 2001, is directly adjacent to the proposed PEC. It is unclear what the specific project that was submitted in June of 2001 was and why County of Fresno records indicates this project's permits have not been finalized. Since this plant is currently in operation, it can be assumed that any permits submitted subsequently are for relatively minor work and probably do not meet the 30,000 square foot criteria for projects that could potentially cause cumulative impacts. Thus, this project can be dismissed from the cumulative impact analysis because no cumulative impacts would occur.

5.18.2.2 Convenience Store Building

From the project description provided by the County of Fresno, this seems to be an addition to an already existing convenience store. Detailed information on this specific project was unavailable. However, it is highly unlikely that this building permit was for a structure that was equal to or over 30,000 square feet. Thus, this project can be dismissed from the cumulative impact analysis because no cumulative impacts would occur.

5.18.2.3 Starwood Power Project

The proposed Starwood Power Project is a 120 MW peaker plant to be operational by 2009. This proposed power project will be a combustion turbine plant. Limited information is available on this proposed project but we will assume concurrent construction since the operational dates are similar to the PEC. The cumulative impacts associated with the concurrent construction schedules would be insignificant due to the short duration and lack of other pending development in the area.

The operation of the proposed Starwood Power Project will occur during operation of the PEC. The simultaneous operation of both power plants will not result in significant cumulative impacts on environmental resources in the area except for noise impacts due to the relatively remote locations of the two power facilities. Individual environmental resources and the cumulative impacts are addressed in the separate environmental disciplines contained in this section.

5.18.2.4 Conclusion

The PEC and other projects identified in this section are not expected to result in significant cumulative impacts to air quality, cultural resources, land use, water resources, or traffic and transportation during the construction period or during the operation of the new facility. Cumulative impacts associated with noise are expected to occur and is discussed in more detail in Section 5.12, Noise. There are several projects that could include short periods of concurrent construction. However, all of these projects are very small (i.e., new mobile homes, new swimming pools, canopy additions, etc.). There were no projects found that meet the criteria for projects that could potentially have cumulative impacts on the environment. Thus, as mentioned above, the PEC and other projects in the area are not expected to result in significant (or any) cumulative impacts to the environment.

5.18.3 Stipulated Conditions of Certification

No Stipulated Conditions of Certification apply to the issue area of Cumulative Impacts.

5.18.4 Mitigation Measures

No new mitigation measures are proposed for the issue area of Cumulative Impacts outside those recommended for the PEC project and discussed in Section 5.12, Noise.

5.18.5 Applicable Laws, Ordinances, Regulations, and Standards

As shown in Table 5.18-2, no laws, ordinances, regulations, and standards (LORS) apply to the issue area of Cumulative Impacts.

5.18.6 Agency and Agency Contacts

Table 5.18-3 lists agencies and agency contacts applicable to the issue of Cumulative Impacts.

TABLE 5.18-2
LORS APPLICABLE TO CUMULATIVE IMPACTS

LORS	Applicability	Conformance
Federal	No Federal LORS apply	N/A
State	No State LORS apply	N/A
Local	No Local LORS apply	N/A

TABLE 5.18-3
AGENCY CONTACTS

Agency	Contact	Title	Telephone
County of Fresno, Public Works and Planning Department	Richard Perkins	Planning and Resource Analyst	(559) 262-4806 rperkins@co.fresno.ca.us
County of Fresno, Computer Data Systems	Jim Mobley	Senior IT Analyst	(559) 262-4270 jmobley@co.fresno.ca.us

5.18.7 Applicable Permits

No permits are required for the issue of Cumulative Impacts.

5.18.8 References

No other references were used other than those listed in Table 5.18-3 as agency contacts. These personal communications occurred on June 22 and 23, 2006.